EXHIBIT B

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

BRIGHT RESPONSE, LLC F/K/A POLARIS IP, LLC v. GOOGLE INC., et al.	NO. 2:07CV-371-TJW-CE

REPORT OF DEFENDANTS' EXPERT
L. KARL BRANTING, PH.D, J.D.
CONCERNING INVALIDITY OF CLAIMS 26, 28, 30, 31, 33, AND 38
OF U.S. PATENT NO. 6,411,947

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I. INTRODUCTION

1. My name is L. Karl Branting. I have been retained by Defendants Google Inc. ("Google"), AOL LLC ("AOL"), and Yahoo! Inc. ("Yahoo") to give my expert opinion as to the validity of the patent claims asserted by Bright Response, LLC, in the above-captioned matter. Below, I set forth the reasons that I believe the patent to be invalid.

2. My analysis covers claims 26,[1] 28, 30-31, 33, and 38 of U.S. Patent No. 6,411,947 (hereinafter "the '947 patent" or "Rice '947"). It is my opinion that each of the asserted claims are invalid at least for anticipation and/or obviousness in light of the prior art.

3. I receive $350 per hour for my work. My compensation is not dependent upon the outcome of this case.

4. The matters referenced in this report are based upon my personal knowledge, and if called upon as a witness I could testify completely as to these matters.

5. The opinions set forth in this report are entirely my own and do not reflect any position by The MITRE Corporation. In expressing these opinions I am not acting on behalf of or as an employee of The MITRE Corporation but solely on my own behalf.

II. QUALIFICATIONS

6. I am Lead Artificial Intelligence Engineer in the Department of Information Discovery and Understanding, at The MITRE Corporation, headquartered in McLean, Virginia.

7. I received a Ph.D. in computer science from the University of Texas at Austin in 1991. In addition, I received a J.D. from Georgetown University Law Center in 1980 and a B.A., magna cum laude in philosophy, from the University of Colorado in 1975.

[1] While Plaintiff is no longer asserting infringement of claim 26 directly, all of the asserted claims depend from claim 26.

8. I was a professor of computer science at the University of Wyoming from December, 1990, until July, 2001, and a visiting lecturer at North Carolina State University from August 2003 until July 2004.

9. I am an expert in artificial intelligence ("AI") and case-based reasoning ("CBR") My Ph.D. dissertation set forth research showing how cases and rules can be combined to automate legal analysis. See section V.B.5.

10. I designed and supervised the development of CARMA, a case-based reasoning system supported by the USDA and used by ranchers in Western States since 1996. CARMA acts as an automated extension agent to help ranchers determine the most effective and economical response to grasshopper infestations. CARMA is currently available for 10 Western States.

11. I was the North American Co-Chair of The Third International Conference on Case-Based Reasoning, held in Seon, Germany, July 27-30, 1999.

12. My publications on CBR include a book, an edited collection, and approximately 40 refereed journal and conference papers. In addition, I have published refereed papers on the topics of social network analysis, machine learning, automated question-answering systems, name-matching, and computer systems to assist victims of domestic violence. A substantially complete listing of my publications in chronological order can be found in my curriculum vitae, which is attached as Exhibit 2.

13. My academic and research awards include the following: an NSF CAREER Award, 1995-1998, for case-based reasoning research; a 2001 Innovative Application of Artificial Intelligence award for the development of CARMA; selection as a United States Supreme Court Fellow, August 2000-July 2001; and selection as a Fulbright Senior Scholar for

research in Case-Based Reasoning at the University of Kaiserslautern, September 1998-June 1999.

14. I have reviewed extensive materials relating to this case including the asserted patent, the patent history, claim construction briefs and order, and numerous technical papers and articles discussing the scope and content of the prior art in the timeframe relevant for the asserted patent. In all cases, I have applied the claim constructions propounded by the Court in its Memorandum Opinion and Order dated June 18, 2010 or constructions agreed by the parties for terms not expressly construed by the Court. The materials relied upon are listed in Exhibit 1.

15. In this report, where I have cited a reference as prior art, either the reference predates the filing date of the Patent or I have been informed by counsel for Defendants that Defendants will be able to prove at trial that the reference is prior art as to the Patent.

16. I may present my opinions in the form of a tutorial or otherwise and reserve the right to respond to any evidence Plaintiff Bright Response, LLC ("Bright Response") may present concerning the subject matter of this report.

17. It may be necessary for me to supplement this report based on material that subsequently comes to light in this case, and I reserve the right to do so. I may be asked to present demonstrative evidence at trial, and I reserve the right to do so.

18. It may be necessary for me to revise or supplement this report, or submit a supplemental or responsive report, based on any supplemental or responsive report of Bright Response, and I reserve the right to do so.

III. LEGAL PRINCIPLES

19. As an expert assisting the Court in determining invalidity, I am obliged to follow existing law. I have therefore been asked to apply the following legal principles to my analysis, and I have done so:

a. For a claim to be anticipated, every limitation of the claimed invention must be found in a single prior art reference, either expressly or inherently, arranged as in the claim.

b. When a claim covers several alternative structures or compositions of elements, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is disclosed or practiced in a single prior art reference.

c. For a claim element to be inherently present in a prior art reference, the element must be "necessarily present" in the disclosed apparatus, system or method, not merely probably or possibly present.

d. A claim is invalid for obviousness if differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. To be properly applied as an obviousness or anticipation reference, the reference must predate the invention of the subject matter of the claim, unless a statutory bar applies.

e. In determining whether a claimed invention is obvious, one should consider the scope and content of the prior art, the level of ordinary skill in the relevant art, the differences between the claimed invention and the prior art, and whether the claimed invention would have been obvious to one of ordinary skill in the art in light of those differences.

f. If one of ordinary skill in the art can implement a predictable variation prompted by market forces or design incentives, such a variation is obvious. If a technique has been used to improve one device, and one of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual

application is beyond ordinary skill. Stated differently, the proper question is whether one of ordinary skill, facing the wide range of needs created by developments in the field of endeavor, would have seen a benefit to combining the teachings of the prior art.

g. Where there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it is obvious to pursue the known options within the grasp of one of ordinary skill.

h. Contemporaneous development of similar variations of a device or method by other parties is indicative of obviousness.

i. In establishing obviousness, one must avoid the " temptation to read into the prior art the teachings of the invention in issue" and "guard against slipping into the use of hindsight." The prior art itself, and not the applicant's alleged achievement, must establish the obviousness of the combination.

j. I understand that certain objective factors, sometimes known as "secondary considerations" may also be taken into account in determining whether a claimed invention would have been obvious. Such secondary considerations as "commercial success, long felt but unsolved needs, [and] failures of others" may be evidence of non-obviousness. If such factors are present, they must be considered in determining obviousness.

k. The person of ordinary skill is a hypothetical person who is presumed to be aware of all of the pertinent art. The person of ordinary skill is not an automaton, and may be able to fit together the teachings of multiple prior art references employing ordinary creativity and the common sense that familiar items may have obvious uses beyond their primary purposes. It is not necessary to demonstrate precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ. A patent which merely claims predictable uses of old

elements according to their established functions to achieve predicable results may be found invalid as obvious.

l. Art that is analogous to the subject matter of the patent may properly be used as an obviousness reference. I understand that a reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.

m. An invention is obvious if one of ordinary skill in the art, faced with the wide range of needs created by developments in the field, would have found it obvious to employ the solution tried by the applicant to meet such needs.

IV. OVERVIEW OF THE '947 PATENT

20. The patent-in-suit is U.S. Patent No. 6,411,947 entitled "Automatic Message Interpretation and Routing System." The patent was filed on April 2, 1998 and issued on June 25, 2002. The patent claims priority to provisional application No. 60/042,656, filed on April 4, 1997; and to provisional application No. 60/042,494, filed on April 3, 1997.

21. I understand that Bright Response specifically asserts that Defendants infringe claims 28, 30, 31, 33, and 38 of the '947 patent. All asserted claims depend from independent claim 26.

22. The '947 patent describes a method for using a rule-base and case-base knowledge engine to automatically respond to non-interactive electronic messages such as e-mail. The Abstract reads:

> A method for automatically interpreting an electronic message, including the steps of (a) receiving the electronic message from a source; (b) interpreting the electronic message using a rule base and case base knowledge engine; and (c) classifying the electronic message as at least one of (i) being able to be responded to automatically; and (ii) requiring assistance from a human operator. The method for automatically interpreting an electronic message may also include the step of

retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source.

A. The '947 Patent Generally

23. The '947 patent describes a system designed for automatically processing emails. According to the specification, as businesses go "online" they need to process and respond to an increasing number of emails. Rather than hiring additional employees and/or requiring those employees to work longer hours, the specification details a system for automatically responding to some emails so as to lower the amount of email traffic that employees need to review. ('947 patent, 1:26-59.)

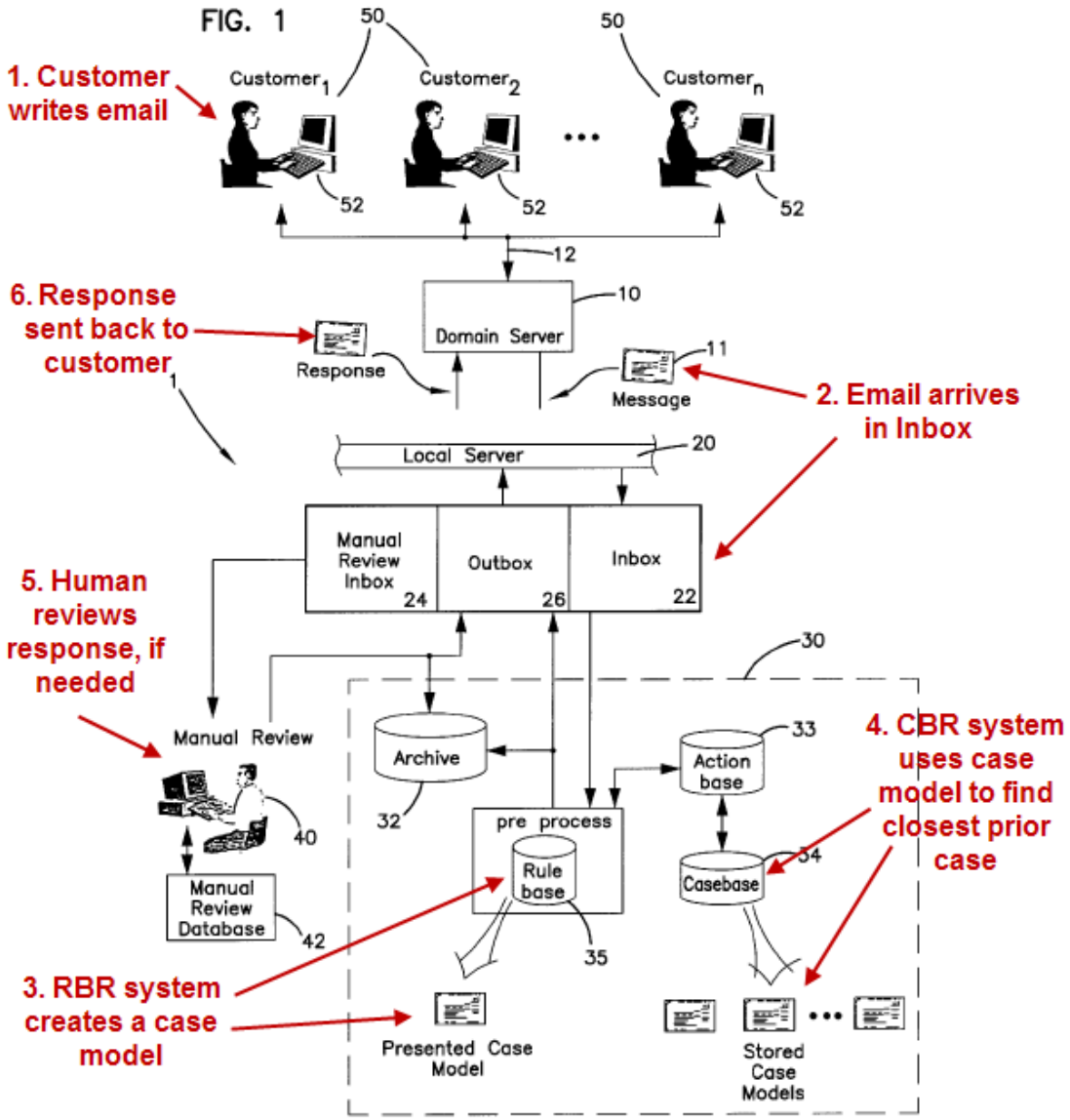
24. The specification acknowledges that there were existing solutions for automatically processing email. One such approach, identified as "rule based reasoning," applied a series of "IF-THEN" rules (conditions) to determine how to process incoming messages. For instance, if the user knows he will not be in the office that day, he may specify an "out-of-office" email to automatically respond to incoming messages. The user may further specify different responses based on the identity of the sender. ('947 patent, 1:60 – 2:7.)

25. The specification also discusses prior art case-base reasoning systems. In particular, the specification discusses U.S. Patent No. 5,581,664 to Allen, which describes a help-desk system that employs case-based reasoning.[2] Allen receives a problem (e.g., "my computer shows a Bluescreen of Death") and compares it to a stored set of previous problems. Once Allen finds the stored problem that is most similar to the current problem, Allen applies or adapts the previous solution to the current problem. In other words, Allen reasons by analogy: in the Bluescreen example, Allen would look for any previous instances involving a Bluescreen of

[2] As noted in section V.B.1 below, Allen also discloses rule based reasoning, though the applicants omitted this fact in their description.

Death, and use the past solution (presumably, "reboot") as a basis for solving the current problem. ('947 patent, 2:41-62.)

26. The alleged invention is a method of processing incoming email messages, as depicted in Figure 1. ('947 patent, 5:54 – 9:35.)



(Annotations added)

27. The rule-based reasoning system disclosed in the '947 patent performs two functions. First, it creates a "presented case model" out of the incoming email message. ('947 patent, 6:53-61.) Second, it may be able to classify the message into either "automatic" (capable

of being responded to automatically) and "referred" or "detected" (not capable of being responded to automatically). (*Id.*, 6:62 – 7:6.) If the email message is classified, then the system skips the case-based reasoning step. (*Id.*, 7:31-33.) Sample question rules are included in Table 1. For instance, if the message is blank, then the message can be automatically responded to, likely with a standard request that the user to include a message. Similarly, if the message requests a change-of-address, the there needs to be human review of the message, likely to ensure that the new address is entered into the customer database:

TABLE 1

(Question Rules)

Question Rule Detects	Action Type: Classification
customer's address	attribute/action: detected
blank body	action: automatic
service cancellation	action: referral
change address	action: referral
no call back	attribute/action: detected
facsimile number	action: detected
phone number	action: detected
request for service	attribute
reference to error	attribute
investments	attribute
foreign country	attribute/action: detected
lengthy message	attribute
specific product	attribute
multiple questions	attribute
specific employee	attribute/action: detected
lost product	action: referral
sensitive info	action: refer, auto, detected

(Highlighting added)

28. If the rule-based reasoning system is unable to classify the message, then the presented case model created earlier is used within the case-based reasoning system:

TABLE 2

Example: Stored Case Model

TITLE:	Lengthy Inquiry From Imnop.com
SUBJECT:	New Account
DESCRIPTION:	Dear Sirs, I recently saw your advertisement in the newspaper. I am interested in learning whether or not your system would work for me. Please E-mail me back and let me know the details of your system. Thanks,
ACTIONS:	1. type: referral 2. sub-class: sales 3. priority: 3
ATTRIBUTES:	1. address: yes 2. lengthy: yes

29. The patent compares the text (message) and attributes (e.g., whether there is an address) of the presented case model with the text and attributes of each case model stored in the case base. When the text and attributes of the stored case match the text and attributes of the presented case, the match score increases by a predetermined amount. When the text and attributes don't match, the match score decreases by a predetermined amount, which may be zero. ('947 patent, 8:37-57.) The stored case with the highest match score is used as the template for handling the current message: the system may apply or adapt the actions undertaken for the old case model to the new case model. ('947 patent, 7:48 – 9:17.)

30. If the message is classified as "automatic," then the system retrieves one or more predetermined responses from a repository for delivery to the sender. ('947 patent, 9:24-35.) If not, then the system routes the message to a human operator for review. (*Id.*, 9:43-53.) The human reviewer then reviews the response to be sent back to the customer. (*Id.*, 10:39-47.)

B. The '947 Patent Claims

31. The asserted claims are reproduced below:

26. A method for automatically processing a non-interactive electronic message using a computer, comprising the steps of: [3]

(a) receiving the electronic message from a source;

(b) interpreting the electronic message using a rule base and case base knowledge engine; and

(c) retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source.

28. The method of claim **26**, further comprising the steps of:

(b1) classifying the electronic message as at least one of (i) being able to be responded to automatically; and (ii) requiring assistance from a human operator; and

(c) retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source when the classification step indicates that the electronic message can be responded to automatically.

30. The method of claim **28**, wherein the step of interpreting the electronic message further includes the steps of:

(b1) producing a case model of the electronic message including (i) a set of attributes for identifying specific features of the electronic message; and (ii) message text;

(b2) detecting at least one of text, combinations of text, and patterns of text of the electronic message using character matching;

(b3) flagging the attributes of the case model which are detected in the electronic message;

(b4) comparing the flagged attributes of the case model with stored attributes of stored case models of the case base;

(b5) comparing the text of the case model with stored text of the stored case models of the case base; and

(b6) assigning a score to each stored case model which is compared with the case model, the score increasing when at least one of the attributes and

[3] Claim 26 is not itself asserted, but as all asserted claims depend from that claim, its elements must be included in the invalidity analysis.

the text match the stored case model and the score not increasing when at least one of the attributes and the text do not match the stored case model.

31. The method of claim **30**, wherein:

when at least one of the attributes and the text match the stored case model, the score is increased by a predetermined match weight; and

when at least one of the attributes and the text does not match the stored case model, the score is decreased by a predetermined mismatch weight.

33. The method of claim **31**, wherein each score is normalized by dividing the score by a maximum possible score for the stored case model, where the maximum possible score is determined when all of the attributes and text of the case model and the stored case model match.

38. The method of claim **26**, wherein the predetermined response is altered in accordance the interpretation of the electronic message before delivery to the source.

C. Characteristics of the Methods and System Claimed by the '947 Patent

I will discuss the steps or elements of the claims below:

1. A method for automatically processing a non-interactive electronic message using a computer (Claim 26[preamble]).

32. The Court has construed "non-interactive electronic message" to mean "an electronic message in which the sender does not provide any additional information after the message has been received." (Order at 9.) I understand the Court rejected Plaintiff's argument that additional user input or supplementation may be allowed. (*Id.* at 8-9.)

2. Receiving the electronic message from a source (Claim 26[a]).

33. This step requires "receiving the electronic message from a source," with the "electronic message" being the same "non-interactive electronic message" described in the preamble.

3. Interpreting the electronic message using a rule base and case base knowledge engine (Claim 26[b]).

34. This step requires "interpreting the electronic message using a rule base and case base knowledge engine" after receiving the electronic message. The "electronic message" is the same "non-interactive electronic message" described in the preamble. The parties agreed that a "rule base… knowledge engine" is "a knowledge engine that tests whether one or more conditions are met and, if so, applies specified actions." (Order at 6-7.) The Court construed "case base knowledge engine" as "a knowledge engine that processes electronic messages by comparing them to a stored set of exemplar cases." (Order at 11.)

4. Retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source (Claim 26[c]).

35. This step requires "retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source." The Court construed "predetermined responses" to mean "responses prepared prior to the receipt of the electronic message. The responses may be modified and/or altered based on the interpretation of the electronic message." (Order at 12.) The Court construed "repository" to mean "a place where data is stored." (Order at 13.)

5. Ordering

36. The parties agreed that steps 26[a], 26[b], and 26[c] occur in order. (Order, p. 7.)

6. Dependent Claims

37. Where applicable, I will also point out where the prior art contains one or more of the following dependent claim steps:

(a) Classifying the electronic message as automatic or requiring human assistance (Claim 28)

38. Claim 28 requires that "classifying the electronic message as at least one of (i) being able to be responded to automatically; and (ii) requiring assistance from a human operator;

and retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source when the classification step indicates that the electronic message can be responded to automatically." The parties agreed that "classifying the electronic message" / "the classification step" means "determining whether the electronic message falls into one or more categories." (Order at 6.) The Court construed "requiring assistance from a human operator" to mean "requiring that a manual reviewer review the electronic message or information derived from the electronic message, or review, revise or compose the response to be delivered to the source." (Order at 13.) The Court specified that "claim 28 requires the following steps: claim 26's step (a), claim 26's step (b), claim 28's step (b1), and claim 28's step (c)." (Order at 17.)

(b) Computing match scores (Claims 30)

39. Claim 30 has a number of steps relating to the computation of match scores for the cases within the case base. The parties agreed that "a case model of the electronic message" / "the case model" means "text and attributes derived from the electronic message." (Order at 7.) The Court specified that "claim 30 requires the following steps: claim 26's step (a), claim 26's step (b), claim 30's steps (b1)-(b6), claim 28's step (b1), and claim 28's step (c)." (Order at 18.)

(c) Match and mismatch scores (Claim 31)

40. Claim 31 requires that the score be increased by a "predetermined match weight" whenever at least one of the attributes and text match the stored case model, and that the score be decreased by a "predetermined mismatch weight" whenever they don't match. The Court construed "predetermined match weight" to mean "a predetermined factor that arithmetically increases a stored case model's match score when a feature from the stored case model matches text and attributes from the presented case model." (Order at 16.) The Court construed "predetermined mismatch weight" to mean "a predetermined factor which arithmetically

decreases a stored case model's match score when a feature from the stored case model does not match text and attributes from the presented case model." (*Id.*) I note that the predetermined mismatch weight may be zero, as claim 32 (which depends from claim 31) specifically requires that this be so.

(d) Normalizing match scores (Claim 33)

41. Claim 33 requires that "each score is normalized by dividing the score by a maximum possible score for the stored case model, where the maximum possible score is determined when all of the attributes and text of the case model and the stored case model match." The parties agreed that the first part of the phrase means "wherein each match score is divided by the maximum possible score for the stored case model." (Order at 7.)

(e) Altering the predetermined response (Claim 38)

42. Claim 38 requires that "the predetermined response is altered in accordance the interpretation of the electronic message before delivery to the source."

V. THE SCOPE AND CONTENT OF THE PRIOR ART

A. The Prior Art Generally

43. Case-based reasoning (CBR) is a problem-solving paradigm in which stored cases—which may be solutions to previous problems, prototypes, or exemplars—are used to solve new problems (consistent with the terminology of the '947 patent, a new problem will be referred to as the "presented case," "new problem," or "new case"). Case-based reasoning is the computer equivalent of the universal human strategy of solving new problems by reusing solutions to old problems. *See, e.g.,* A. Aamodt, E. Plaza (1994), *Case-Based Reasoning: Foundational Issues, Methodological Variations, and System Approaches Artificial Intelligence Communications*, IOS Press, Vol. 7: 1, pp. 39-59. For example, the best way to design a new house is often to start with a good existing house design and modify it to fit the specific needs of the new buyer, such as the shape of the lot, roof color, window types, and so forth.

44. Research in CBR dates back at least to the early 1980's, with DARPA-sponsored workshops in CBR held in the United States in 1988, 1989, and 1991. By the early 1990s, more than a hundred different CBR systems had been developed for a wide range of applications, including, among many others, diagnosis of heart disease, automated message answering, arbitration, hearing disorder diagnosis, mechanical and architectural design, military planning, legal analysis, computer-aided instruction, jet aircraft repair, autoclave load configuration for jet aircraft part construction, cost estimation, vacation planning, cash-flow forecasting, geometry, chemical synthesis, telephone routing, radiation therapy planning, support of rural health workers, route planning, and agricultural pest management. *See, e.g.*, Watson 1994, pg. 20; The Proceedings of the DARPA Workshop on Case-Based Reasoning, Pensacola Beach, FL, May 31-June 2 1989 (Morgan Kaufmann, San Mateo, CA); The Proceedings of the DARPA Workshop on Case-Based Reasoning, Washington, D.C., May 8-10, 1991 (Morgan Kaufmann, San Mateo, CA); The Proceedings of the DARPA Workshop on Case-Based Reasoning, Clearwater Beach, Fl, May 10-13 1988 (Morgan Kaufmann, San Mateo, CA); Case-Based Reasoning Research and Development, Proceedings of the First International Conference, ICCBR-95, Sesimbra, Portugal, Lecture Notes in Artificial Intelligence 1010, Spring (1995).

45. A wide variety of case representations have been used in CBR in the prior art, including key-value pairs, relational structures such as frames and semantic networks, free text, and mixtures of these elements. A key-value pair represents information about a single entity. For example, key-value pairs for a person might include "hair = brown," "eyes = green," and "height = 72-inches." Key-value pairs for an email might include "sender = Mary Smith" and "date = 07/04/2010." Values in key-value pairs may be symbolic (e.g., "high," "low"), Boolean (e.g., "yes," "no"), numeric (e.g., "472"), strings (e.g., "Dear Mr. Jones"), ordinals (e.g., "A, B, C, D, or F"), or selections from lists (e.g., "SUV, compact, pickup, minivan, or sports car").

Relational information represents how different individuals or things are connected, such as "John is the father of Mary," and "IBM is the employer of John." Free text is ordinary written language, such as the text of an email. *See, e.g.,* Bergmann, R., Kolodner, J., and Plaza, E. 2005. Representation in case-based reasoning. *Knowl. Eng. Rev.* 20, 3 (Sep. 2005), 209-213 (citing examples from the early 1990's of each type of case representation).

46. A rule-based reasoning knowledge engine can be thought of as a series of "IF-THEN" statements that trigger various courses of action; i.e. "a knowledge engine that tests whether one or more conditions are met and, if so, applies specific action."[4] (Order at 7.) For instance, "IF the phone number dialed is 9-1-1, THEN route the caller to emergency dispatch." Or "IF the phone number begins with 1, THEN treat the next three digits as the area code." *See, e.g.,* Buchanan, B. G. and Shortliffe, E. H. 1984 *Rule Based Expert Systems: the Mycin Experiments of the Stanford Heuristic Programming Project (The Addison-Wesley Series in Artificial Intelligence).* Addison-Wesley Longman Publishing Co., Inc.

47. In my experience, many CBR systems also employ rule-based reasoning. Indeed, numerous studies and papers in the prior art disclose that very combination. *See*, *e.g.*, Edwina L. Rissland & David B. Skalak, "Combining Case-Based and Rule-Based Reasoning: A Heuristic Approach" (1989); M. Fathi-Torbanhan and D. Meyer, "ICARUS: Integrating Rule-Based and Case-Based Reasoning on the Base of Unsharp Systems" (1995); Andrew R. Golding and Paul S. Rosenbloom, "Improving Rule-Based Systems through Case-Based Reasoning" (1991); Andrew R. Golding and Paul S. Rosenbloom, "Improving Accuracy by Combining Rule-Based and Case-Based Reasoning" (1996); Jerzy Surma and Koen Vanhoof, "Integrating Rules and Cases for the Classification Task" (1995); Robert T. H. Chi and Melody Y. Kiang, "An Integrated Approach of Rule-Based and Case-Based Reasoning for Decision Support" (1991); George

[4] The conditions are the "IF"s; the specified actions are the "THEN"s.

Vossos et al., "An Example in Integrating Legal Case Based Reasoning with Object-Oriented Rule-Based Systems: IKBALS II" (1991); and Soumitra Dutta and Piero P. Bonissone, "Integrating Case Based and Rule Based Reasoning: the Possibilistic Connection" (1991).

48. Typical uses of rules within a CBR system include inferring attributes not explicitly stated in the presented case, reasoning about whether the facts of a presented case (e.g., symptoms) can be explained by the facts of a stored case (e.g., a disease), combining the results of multiple case matches, and providing a supplemental or alternative problem-solving procedure after the best case has been located. *See, e.g.,* L. Karl Branting and B. Porter, "Rules and Precedents as Complementary Warrants," Proceedings of the Ninth National Conference on Artificial Intelligence 1991 (AAAI-91) pp. 3-9.

49. Case-based reasoning systems typically comprise a mechanism that retrieves one or more stored cases that are most relevant to the new problem, adapts the solutions of the retrieved cases to the new problem in light of any differences between the new and old cases, applies the adapted solution to the new problem, and optionally saves the new problem and its solution as a new case. These steps are sometimes referred to as the "Four Rs": Retrieve the best matching case(s); Reuse those cases to solve the problem; Revise the solution if needed; and Retain the new solution in a new case. *See, e.g.,* Watson 330:

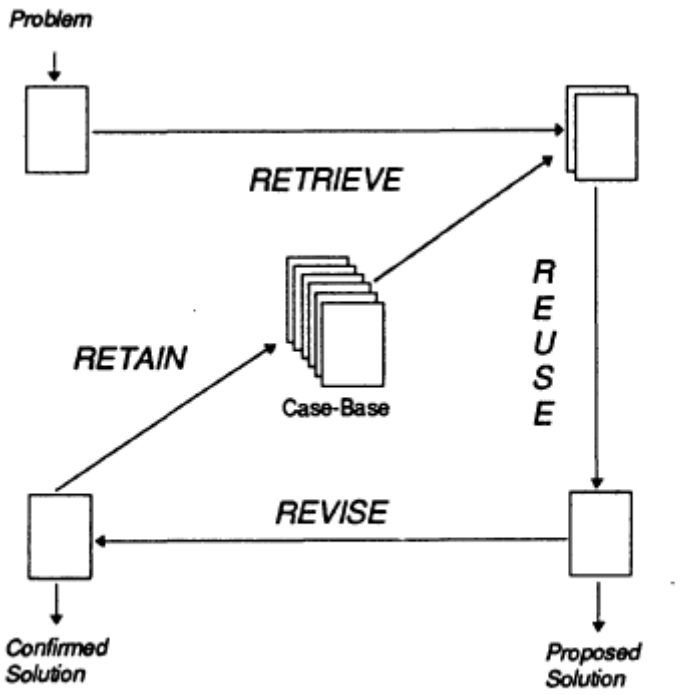


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

50. For example, a CBR system may be used to determine how much to charge a driver for auto insurance. In the "case creation" step, the system would build a case model of the new driver, including information such as the driver's age, sex, marital status, driving history, make and model of car, etc. In the "retrieval" step, the system would look through its database of already insured drivers to determine how much to charge the new driver. Typically, there will not be an exact match, so the system will select several driver profiles which are "close" to the new driver. Some attributes may be more important that others—for instance, the system may consider drivers having the same driving history to be "closer" than drivers having the same sex. In the "reuse" step, the system would determine how much each of other drivers was charged, and use that data to compute an insurance quote for the new driver. In the "revise" step, the system may adjust the solution computed in the "reuse" step if needed. Finally, in the optional "retain" step, the system may save the new driver's information and insurance rate in the system, so that it can be used during the next search. *See*, *e.g.*, Andrew R. Golding and Paul S.

Rosenbloom, "Improving accuracy by combining rule-based and case-based reasoning," *Artificial Intelligence* 87 (1996) 215-254.

51. Commercial vendors of CBR technology, such as Inference Corporation and Cognitive Systems, marketed software CBR "Tools" such CBR Express and ART**Enterprise*, which provided reusable software for creating libraries of cases for use in new CBR systems. CBR tools typically provided software for each of the stages of CBR—retrieval, reuse, revise, and retain—permitting users of the tools to provide only information specific to their particular domain. Tool users were typically not able to devise new case representations, retrieval procedures, adaptation mechanisms, or other new CBR elements that were not already provided by the tool. Thus, CBR systems created using a CBR tool were typically limited to prior art because such tools inherently precluded any technical novelty regarding the components that they provide.

B. Exemplary Prior Art References

1. Allen

52. U.S. Patent 5,581,664 "Case-Based Reasoning System" by Allen et al. ("Allen"), which was filed on May 23, 1994 and granted on December 3, 1996, describes an invention that integrates case-based reasoning with rule-based reasoning in a single "inference engine" (Allen 3:10-22). Indeed, the Abstract begins with "[a] case-based reasoning system which is smoothly integrated into a rule-based reasoning system…"

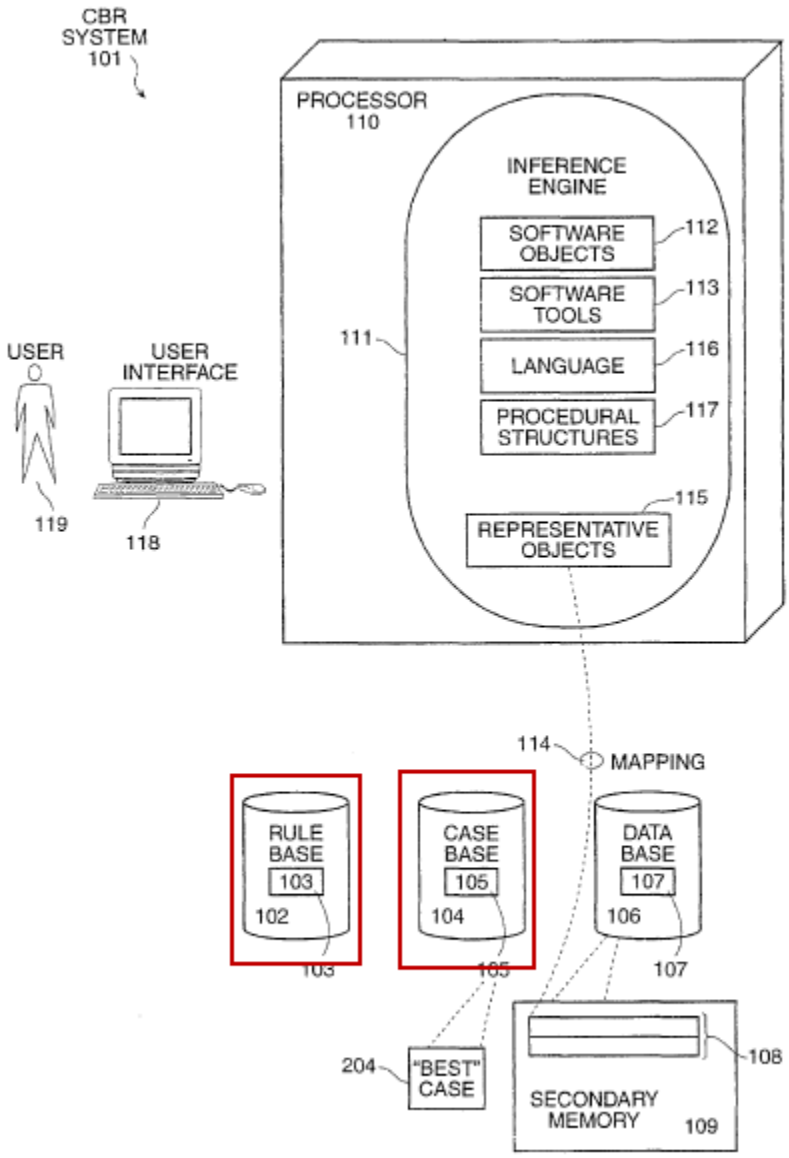


FIG. 1

(Annotations added)

53. The inference engine "retrieves a description of the facts of a particular situation (the 'problem')" and "attempts to match the problem to one or more cases in the case base" (Allen 3:66-4:1). The inference engine attempts to find the best case, note the corresponding action, and perform the action (Allen Fig. 2, 4:3-28).

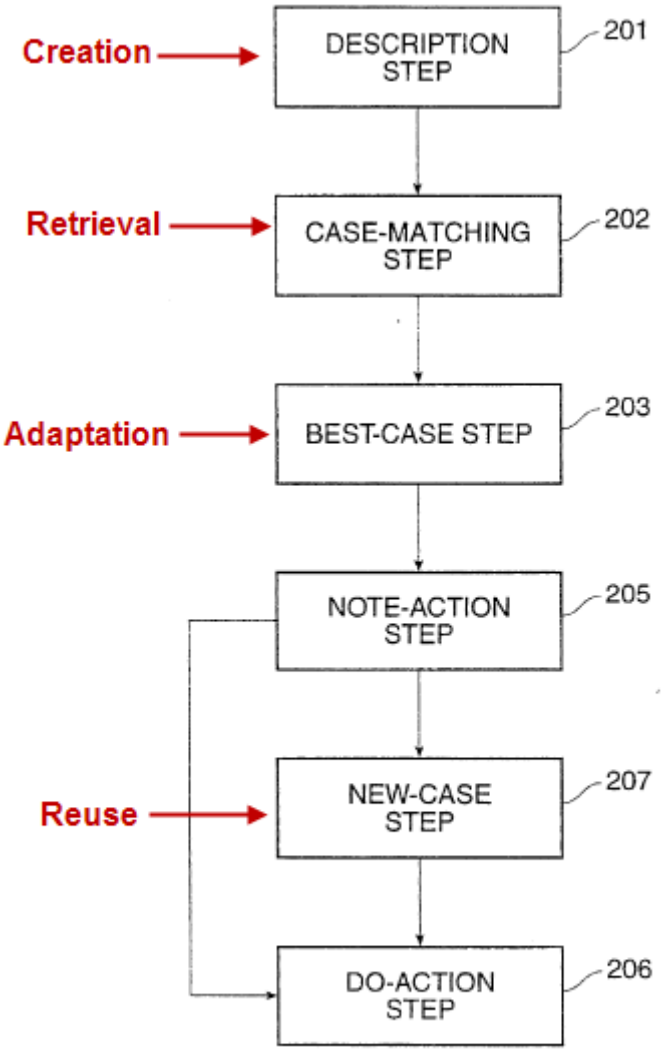


FIG. 2

(Annotations added)

54. Cases may contain a heterogeneous mixture of features, such a Boolean (i.e., yes/no questions), numeric, selections from a list, or textual features (Allen 6:46-51). Text features can be compared by exact string match, word match with stop-words (e.g., articles and conjunctions) removed, character trigram matches, or a weighted combination of all three (*Id.* 6:53-59). Allen matches an incoming case to the cases within the case base by comparing their respective features. (*Id.* 5:20-23.) Each match increases the overall match score by a predetermined amount. (*Id.* 5:23-27.) Allen then computes a match score for those cases, which is used to rank the applicability of the stored case to the incoming problem. (*Id.* 5:28-35.)

55. In the rule-based reasoning portion of Allen, rules may be matched against a set of facts or cases and "may perform procedural actions on them" (Allen 7:16). These procedural actions may include adaptation of the previous case to fit a new problem: "the processor may select the case which is the best match for the problem, but may act differently from the precise action prescribed for that case" (Allen 1:67-2:2). Allen incorporates the CBR-Express Manual, described below, by reference (Allen 10:40-43).

56. Allen discloses a general-purpose rule-base and case-base engine, which can be used to solve any type of problem. This could include diagnosing telephone connection problems, computing auto-insurance rates, or really any other problem with varying degrees of accuracy. Allen also discloses a specific embodiment of a "help desk" system used by operators while dealing with call-in complaints (Allen 8:62 – 10:39):

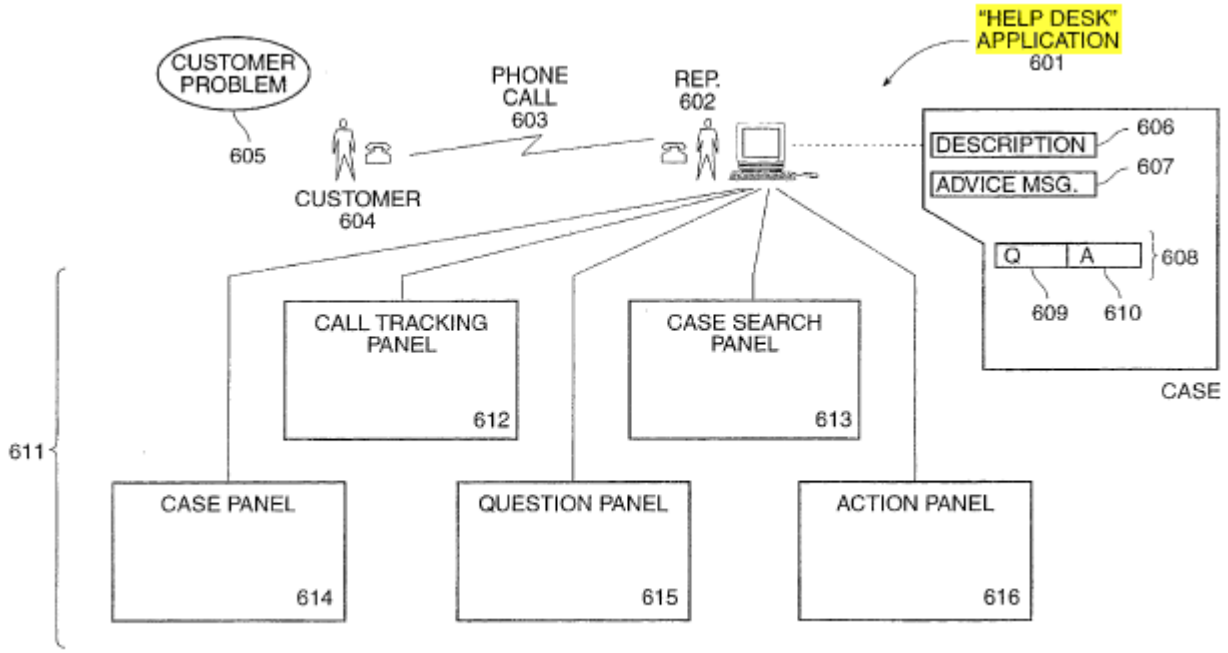


FIG. 6

(Highlighting added)

57. In the help desk application, a set of customer problems and corresponding advice are stored as cases. (Allen 9:10-11.) The customer service representative enters a fact pattern corresponding to the customer's problem, e.g. "computer does not turn on." (*Id.* 9:18-20.) Allen then searches through the case-base, trying to match the message text to each of the cases. (*Id.*

9:20-23.) If it finds a good match, the system retrieves the advice associated with that match and presents it to the user, who may then repeat the advice to the customer. (*Id.* 9:23-29.)

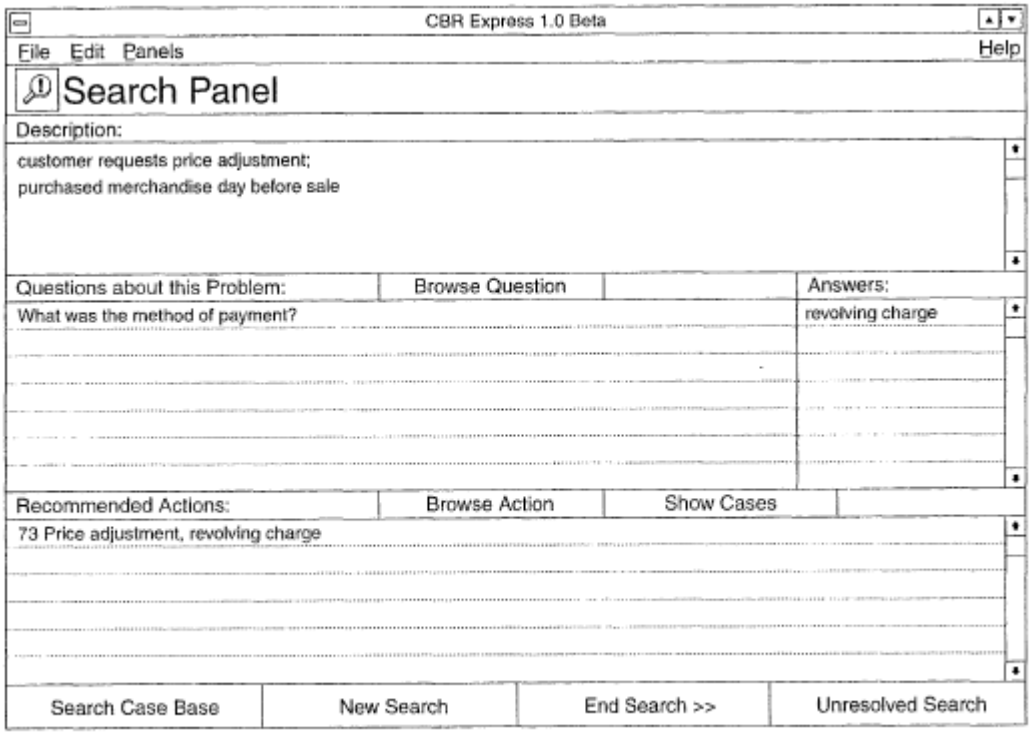


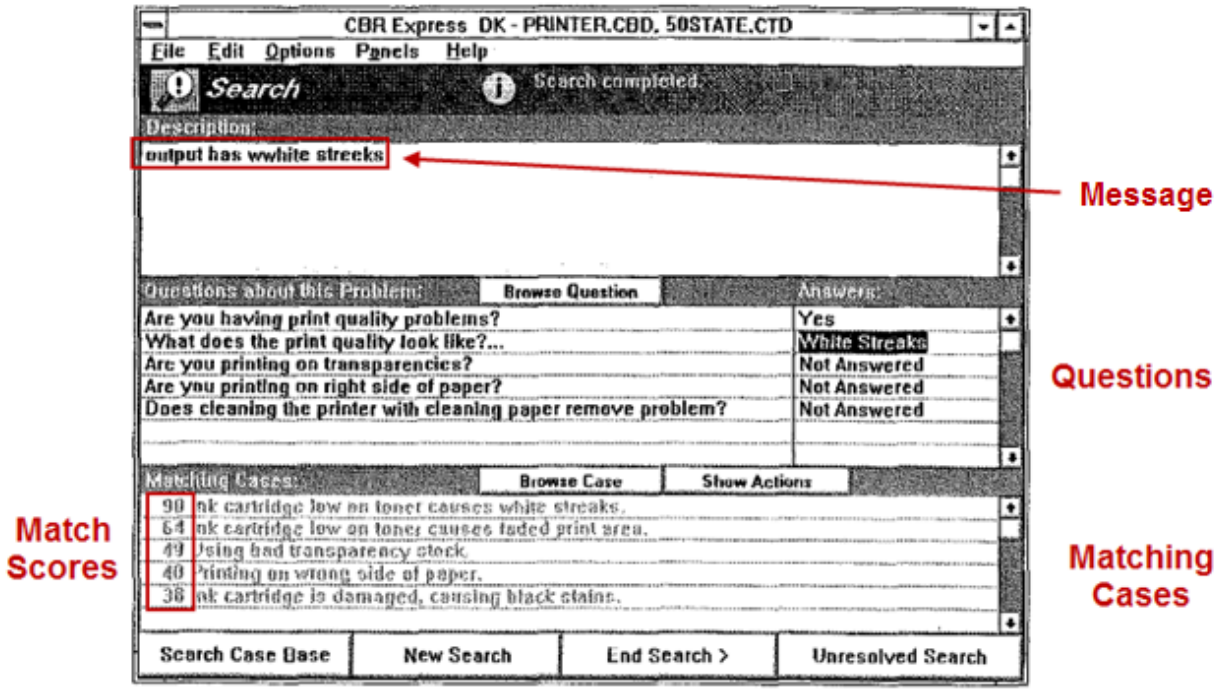
FIG. 6B

58. If the help desk application does not find a good match, then it presents a set of possible matches to the user. The system also presents a series of questions to the user, e.g. "is the power light flashing?" With each answer, the system re-rates the possible matches in order to narrow the search. If it manages to find a good match after the question phase is over, it presents the corresponding advice to the user, who can then repeat it to the customer. (Allen 9:30-41.)

59. If the help desk *still* cannot locate a good matching case, it simply asks the user to enter the new case information into the case base. Once the customer's problem is resolved, the user can also add the corresponding advice to that case base entry. In this manner, the case base grows when it encounters new problems, and future users can make use of the learned solution. (Allen 9:42-50.)

2. CBR-Express

60. The Inference Corporation CBR Express 2.0 for Windows Users Guide, Copyright 1990-1995, ("User's Guide") and The Inference Corporation CBR Express CBR Express 2.0 for Windows Reference Manual, Copyright 1990-1995, ("Reference Manual") describe a commercial help-desk product for development of case-based reasoning applications. (*See* June 28, 2010 Declaration of Bradley Allen.) This corresponds very closely to the preferred embodiment of Allen; indeed, Allen explicitly discloses that "a preferred example case-based reasoning system 101 for providing user help on call-in complaints is more fully described in 'CBR Express User's Guide', available from Inference Corporation of El Segundo, Calif." (Allen 10:40-44.) Page 51 of the User's Guide shows a sample input screen:



Search Panel

(Annotations added)

61. The user enters a message, e.g. "output has wwhite [sic] streaks." CBR-Express then attempts to match the words in the message with the cases within the case base. Prospective matching cases are listed at the bottom of the screen, along with a match score between 0 and

100. (User's Guide, p. 51.) "0" corresponds to no match at all; "100" corresponds to a perfect match. (Reference Manual, p. 15.)

62. CBR-Express may also present a series of questions to the user, though an administrator may disable this feature. (Reference Manual, p. 14.) As users answer each question, e.g. "Are you having print quality problems," CBR-Express re-computes match scores and re-ranks the cases that are presenting to the user. (User's Guide. pp. 52-53.) The questions correspond to features of the case models, and may accept Yes/No answers, an answer selected from a list of options, numeric entries, and text entries. (*Id*.)

63. As users answer questions, they may browse the matching cases presented in the window. While the case with the highest match score is likely the best solution, it is possible than a lesser ranked case may be more appropriate. Users may freely browse any of the available cases during their search. (User's Guide, p. 55.) If the user is unable to find a matching case, he may "flag" the question so that it can be addressed by a more senior technical expert. (*Id.*, p. 56.)

64. Behind the scenes, CBR-Express employs matching algorithms similar to those described in the Allen patent. CBR-Express employs a character matching algorithm to attempt to match the words within the user's message to the text description of each case in the case base. After discarding stop words (e.g., "the"), punctuation marks, suffixes, etc., CBR-Express employs trigram (three character) matching. (Reference Manual, p. 18.) Each time a trigram from the message matches a trigram from the case description, the match score for that case increases by some amount. (*Id.*) CBR-Express thus computes match scores for all the cases in the case-base, then presents the best results to the user.

65. Additionally, CBR-Express presents questions that correspond to the features of the top cases. For instance, CBR-Express may ask the user "Are you printing on transparencies," which has a Boolean or "yes/no" answer. Assuming the user answers "yes," cases that have the "printing on transparencies" feature would have their match scores incremented by a match

weight, while cases that do not print on transparencies[5] would have their match scores decremented by a mismatch weight. (Reference Manual, pp. 14-15.) The match weight and mismatch weight may differ depending on the importance of the question. For example, the "patient is pregnant" case may have a massive mismatch score if the patient is not female!

66. CBR-Express compares the features of each case in the case base to the features of the incoming case. (Reference Manual, pp. 14-15.) The resultant match weights and mismatch weights are added together to form a total match score, which CBR-Express normalizes to a range between 0 and 100. (*Id.*)

3. Nguyen

67. Nguyen[6] describes the "QuickSource" system, a help-desk application system for Compaq printers. QuickSource[7] is termed the "second-generation" of the Smart system, a help-desk application used by Compaq's technical support staff and implemented using the CBR Express engine detailed above. (Nguyen p. 50.) The idea was to take the help-desk system meant for technical support staff and make it accessible to other types of users. Rather than calling Compaq for assistance, the customer can simply use QuickSource to find a solution himself. Smart and QuickSource were developed to function with both CBR-Express as well as CasePoint, a front-end CBR system sold by Inference. (*Id*. at 51.)

[5] That is, specify that they do not print on transparencies, as opposed to not mentioning transparencies at all.

6 T. Nguyen, M. Czerwinski, and D. Lee, "Compaq QuickSource: providing the consumer with the power of AI," AI Magazine 14:3 (1993).

[7] The CBR portion of the QuickSource product is called "QuickSolve." Since I primarily focus on the CBR portion of QuickSource, I often use the two terms interchangeably. Other portions include "QuickTour, QuickConfig, and QuickTutorial. (Nguyen, p. 52.)

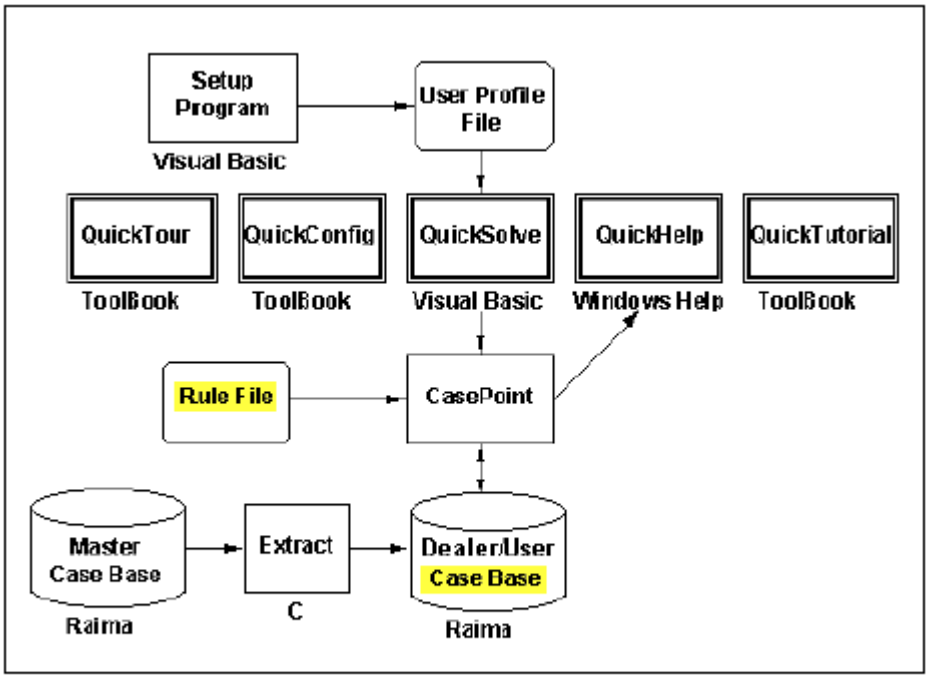
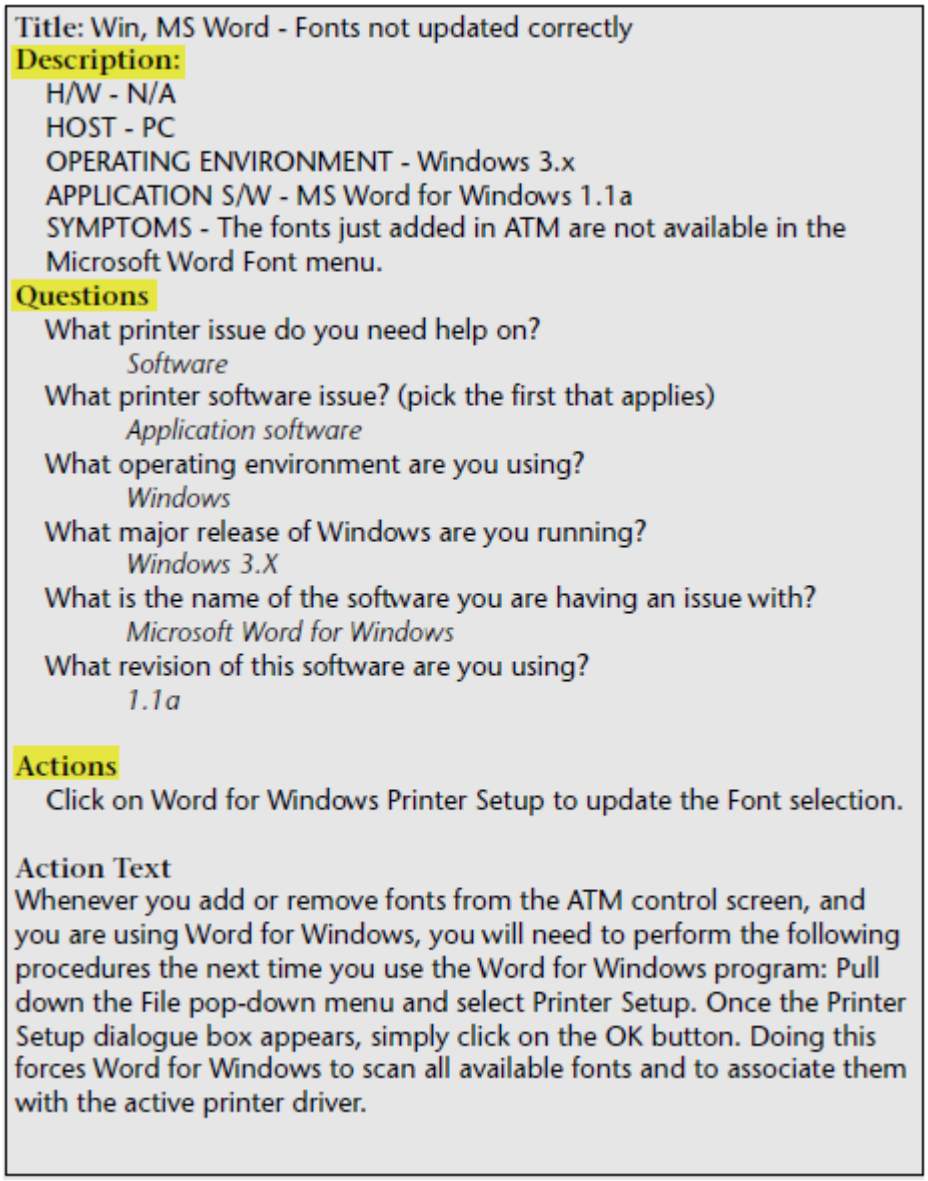


Figure 1. QUICKSOURCE System Architecture.

(Highlighting added)

68. QuickSolve stores a set of cases within its case based. Each case contains a "description" field for matching against the electronic message, a "question" field containing questions used to refine the search results, and an "action" field detailing the proposed solution to the problem encapsulated in the case. The case base itself was developed using CBR-Express. (Nguyen, p. 54.)



Title: Win, MS Word - Fonts not updated correctly
Description:
H/W - N/A
HOST - PC
OPERATING ENVIRONMENT - Windows 3.x
APPLICATION S/W - MS Word for Windows 1.1a
SYMPTOMS - The fonts just added in ATM are not available in the Microsoft Word Font menu.
Questions
What printer issue do you need help on?
Software
What printer software issue? (pick the first that applies)
Application software
What operating environment are you using?
Windows
What major release of Windows are you running?
Windows 3.X
What is the name of the software you are having an issue with?
Microsoft Word for Windows
What revision of this software are you using?
1.1a

Actions
Click on Word for Windows Printer Setup to update the Font selection.

Action Text
Whenever you add or remove fonts from the ATM control screen, and you are using Word for Windows, you will need to perform the following procedures the next time you use the Word for Windows program: Pull down the File pop-down menu and select Printer Setup. Once the Printer Setup dialogue box appears, simply click on the OK button. Doing this forces Word for Windows to scan all available fonts and to associate them with the active printer driver.

Figure 7. Example of a Software Case from the QUICKSOLVE Case Base.

(Highlighting added)

69. Users begin their searches by selecting a category, subcategory, problem detail, and problem description (non-interactive electronic message). QuickSolve then match the test in the message with the text in the description fields of the cases in the case base:

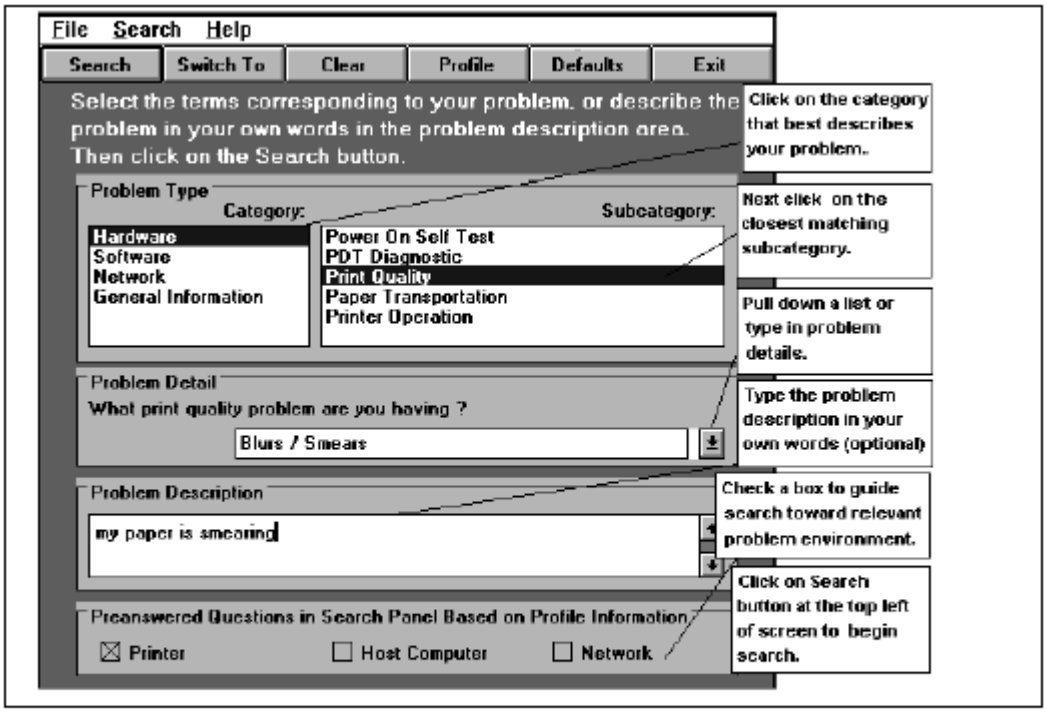


Figure 9. Screen Example from QUICKSOLVE.

70. As with CBR Express, QuickSolve presents a list of possible solutions to the user, ordered by match score. QuickSolve also provides a list of questions; each answered question may adjust the match scores to bring more relevant solutions to the top of the list. Thus, as the user fills in the attributes of the presented case via answering questions, Nguyen re-computes match scores by comparing the attributes of the presented case to each of the stored cases in the case base. Different questions have different match weights. (Nguyen 54.) Of note, QuickSolve may "pre-answer" questions based on information stored in the user's profile (e.g., printer type), as well as information entered in the initial search page. (Nguyen 56.)

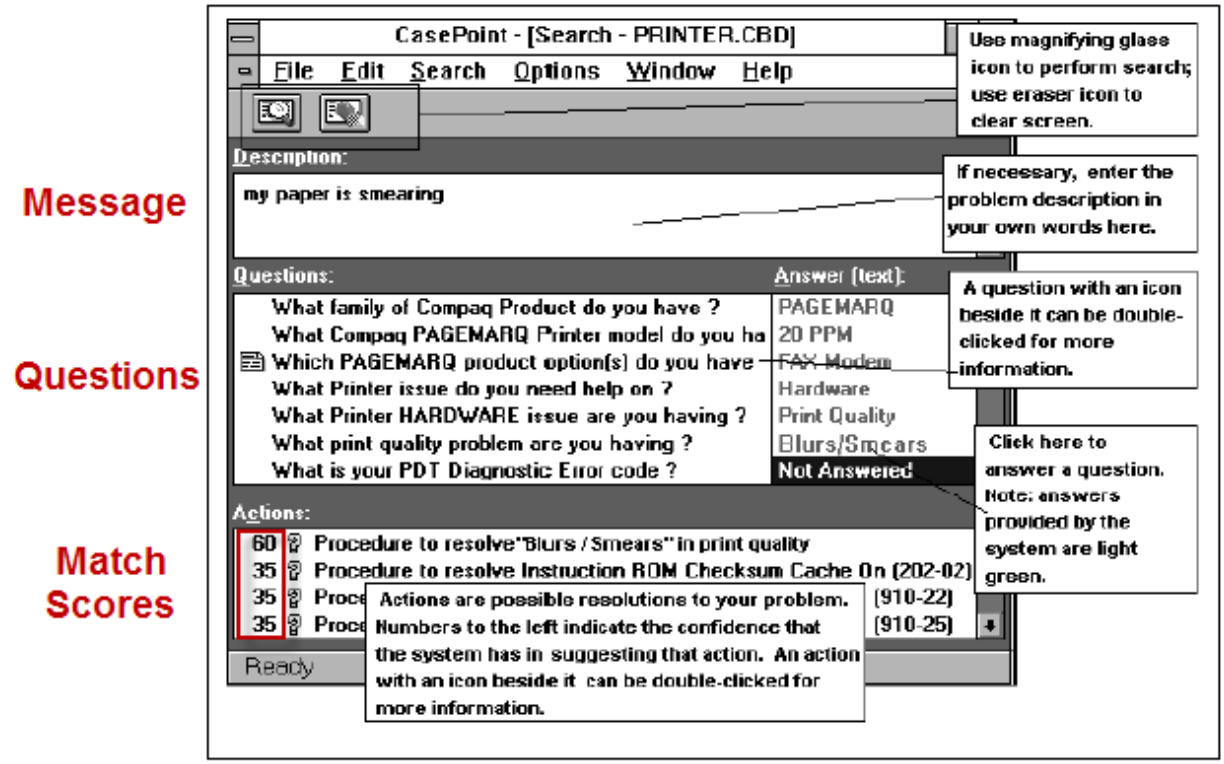


Figure 11. Example of Search Screen with Preanswered Questions.
(Annotations in red added)

71. As indicated above, some of the answers to the questions may be pre-entered by QuickSolve. This feature is implemented using rule-based-reasoning, and was added to address user frustration at having to answer multiple questions. (Nguyen 57, 58.) A sample of rules used to pre-answer questions appears below:

```
0 "blurs"
0 "print quality"
=>
1 "Blurs-Smears"
/*  If "blurs" and "print quality" strings are detected in the description
field (represented by "0"), then answer the question "What is your print
quality? (question number 1) with "Blurs/Smears".  */
34 "3.1"
=>
31 "Windows 3.X"
/*  If "3.1" is the answer for the "What version of Windows 3.X are you
using ?" question (i.e., question number 34) then answer the "What
major release of Windows are you using?" question (question number
31) with "Windows 3.X". */
```

Figure 12. Examples of Rules Used by QUICKSOLVE to Preanswer Questions.

4. EZ Reader

72. EZ Reader was a system employed by Chase Manhattan bank for automatically classifying, responding to, and/or routing incoming email. The EZ Reader system is described in a paper[8] presented at the 1996 at the Innovative Applications of Artificial Intelligence Conference (IAAI), which consists of case studies of deployed applications with measurable benefits.[9] According to the paper, EZ Reader was deployed in the first quarter of 1996 and handled up to 80% of incoming mail automatically. (Rice 1507.)

8 Amy Rice, Julie Hsu, Angotti Piccolo, Rosanna Piccolo: EZ Reader: Embedded AI for Automatic Electronic Mail Interpretation and Routing, *Proceedings of IAAI'96*, 1507-1517 (1996).

9 http://www.aaai.org/Conferences/IAAI/iaai.php

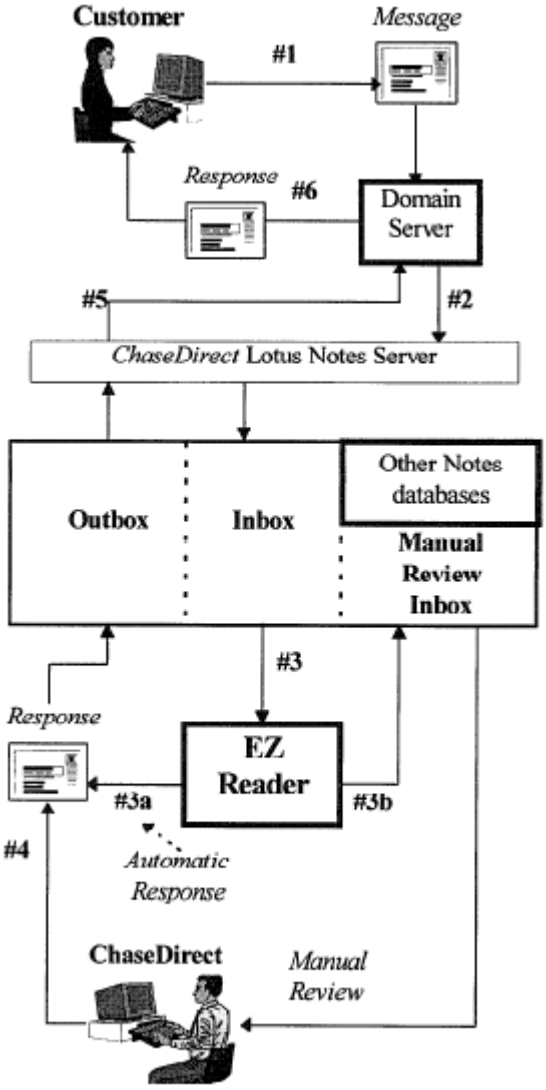


Figure 2. Email Path through ChaseDirect

73. EZ Reader periodically checks the Inbox for new messages. After a customer's message arrives in the Inbox, EZ Reader retrieves the message and interprets it using rule-based and case-based reasoning. If EZ Reader is able to interpret the message to a satisfactory degree, the message is classified as "automatic," and the system creates a response consisting of one or more prepared email ("canned responses") which is then sent back to the customer. If EZ Reader is unable to interpret the message, the message is classified as "referral" or "detected," and the system sends the message to a human reviewer, potentially with one or more suggested replies. (Rice 1509-1511.)

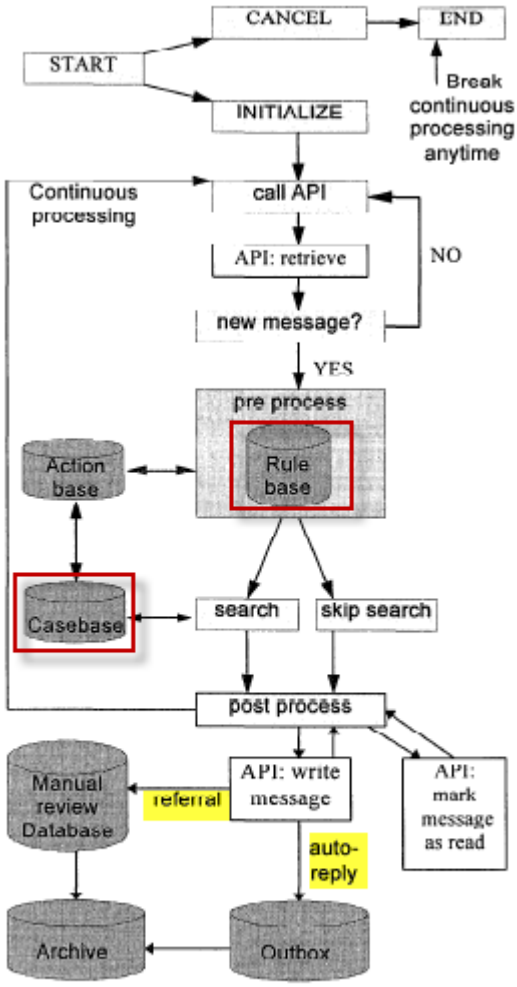


Figure 3. EZ Reader Internal Processing Flow

(Annotations and highlighting added)

74. EZ Reader employs a number of rules to attempt to detect various features within the email message. These features are then set in a presented case model later used by the case-based reasoning system. For instance, EZ Reader attempts to determine whether the email message contains a foreign phone number by looking for certain character strings within the message:

```
RULE foreign-phone
 (or
  (masked-member$ " +99 " ?message-body)
  (masked-member$ " +99-" ?message-body)
  (masked-member$ "(+99)" ?message-body)
  etc.
 )
  any other conditions...
=>
  (printout "Foreign phone number detected.")
  any other actions...
```

75. If the RBR system is unable to classify the system, EZ Reader employs case-based reasoning to try to locate the nearest prior case. The case-based reasoning system is implemented using ART**Enterprise*, a CBR system originally developed by Inference (the same company that made CBR-Express and CasePoint). EZ Reader matches the text and derived attributes of the incoming email with the text and attributes of the stored cases in the case base and assigns match scores, and uses the cases with the highest match scores. The idea is that whatever response was used to resolve the past case can be used or modified to solve the current case. (Rice 1512.)

```
CASE001:
   title = "Sign-Up Kit request; Refer."
   subject = "chase direct"
   message text = "Please send me a
                   ChaseDirect sign-up kit.
                   My address is"
   address? = "Yes"
   action = refer:sign-up-kit,
      detected:address,
      auto:sign-up-ack

CASE002:
   title = "Sign-Up Kit request/no address;
   Auto Respond."
   subject = "chase direct"
   message text = "Please send me a
                   ChaseDirect sign-up kit."
   action = chase-direct-std
```

76. EZ Reader employs trigram (three-character) matching, similar to Allen and CBR Express. Cases with matching attributes have their match scores increased; cases with mismatching attributes may have their match scores decreased, although EZ Reader defaults to a

mismatch weight of zero. (Rice 1512.) "Since stored cases can contain different numbers of features, a presented case's raw score is normalized by dividing the raw score by the maximum possible match score for the case." (*Id.*)

77. EZ Reader is further described in The EZ Reader User's Guide and Reference Manual ("EZ Reader Manual"). As depicted in the manual, EZ Reader retrieves emails from a Lotus Notes server inbox and processes each email by "either automatically respond[ing] to it by placing it a Lotus Notes 'outbox' or by forward[ing] it the ChaseDirect 'inbox' for human review and response" (EZ Reader Manual p. 10).

78. The EZ Reader manual is dated February 5, 1996. (EZ Reader Manual p. 3.) The manual further states that "This document describes EZ Reader, currently in use by the ChaseDirect unit of Chase Manhattan Bank." (*Id.* 6.)

79. Figure 1 of the EZ Reader Manual depicts an overview of the email handling process (EZ Reader Manual p. 17):

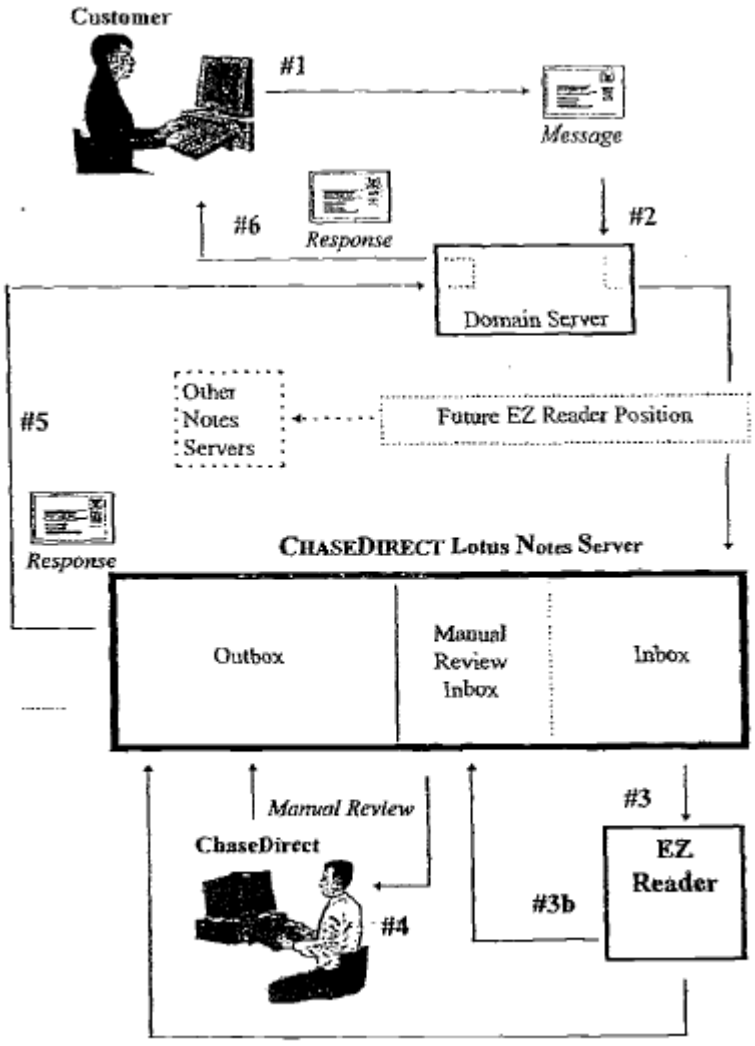


Figure 1: EZ Reader High-Level Architecture

80. The EZ Reader manual also describes each of the numbered steps in Figure 1. (EZ Reader Manual p. 18):

a. Step 1: The customer sends an email to Chase Manhattan Bank.

b. Step 2 (Retrieval): The email is delivered to the Lotus Notes inbox, where it will eventually be detected by EZ Reader.

c. Step 3 (Interpretation): EZ Reader compares the message to a library of actual customer messages, categorizes it, and based on the message's category and priority and routes the mail to one or more Lotus Notes mailboxes according to one of two action types:

i. Step 3a (Automatic): EZ Reader automatically generates a respond to the mail message, then routes its response directly to the outbox.

ii. Step 3b (Referral): EZ Reader cannot respond to the message, so it routes the message to another inbox for human review. EZ Reader also assigns a priority to the message and suggests a response, based on message type.

d. Step 4 (Response): A human reviewer composes responses to the "referral" messages, and those responses are also routed to the outbox.

e. Step 5: The Lotus Notes server transmits the emails in the outbox

f. Step 6: The customer receives a response to the email.

81. EZ Reader performs Step 3 in the process flow described above: interpreting the message and either responding to it or forwarding it to a human reviewer. This step is implemented using rules and cases:

> The knowledgebase portion of EZ Reader, written in the ART*Enterprise® language, combines case-based analysis and rule-based reasoning to interpret incoming email messages. Rules are used to drive the flow of processing, but also are utilized in a pre-processing phase, to identify and flag certain characteristics of a message. A case-based retrieval is then performed, searching for the best matching case of the current email against the casebase. If any characteristics were tagged in pre-processing phase, they will contribute to the overall casebase score. (EZ Reader Manual p. 19.)

Thus, the case-base matching algorithm compares the characteristics (or features) of the presented case with the characteristics of the stored cases in the case base.

82. The rulebase contains 2 types of rules: phase-processing rules, and question rules. Phase rules, which "are related to the process flow of the system" (EZ Reader Manual p. 32), are set forth in Table 2. For example, one rule triggers the search of the casebase for the best match to the current case (EZ Reader Manual p. 33).

Table 2: Phase-processing rules

Rule Name	Phase(s)/event(s) that triggers rule
ez-reader:main:start	none – always fires upon start
ez-reader:main:init-event	(gtk:event activate ergw:pb:start $?) – fires when Start button is clicked in Greeting Window
ez-reader:main:cancel-event	(gtk:even activate ergw:pb:cancel $?) – fires when Cancel button is clicked in Greeting Window
ez-reader:mail:retrieve:continuous:api	(phase ready-for-next-email), (continuous-process), (api)
ez-reader:mail:retrieve:continuous	(phase ready-for-next-email), (continuous-process), (no-api)
ez-reader:mail:retrieve:manual	(phase ready-for-next-email), (manual-process)
ez-reader:mail:process:pre	(phase ready-to-preprocess-email)
ez-reader:mail:process:skip-search	(phase ready-to-process-email) and (phase skip-search)
ez-reader:mail:process:search	(phase ready-to-process-email) and (not (phase skip-search))
ez-reader:mail:process:post:continuous	(phase ready-to-postprocess-email), (continuous-process)
ez-reader:mail:process:post:manual	(phase ready-to-postprocess-email), (manual-process)
ez-reader:main:end	(phase end-of-processing)

83. Questions rules are used for tagging characteristics of, or answering questions about, the current email. Question rules themselves fall into 3 categories (EZ Reader Manual pp. 33-36):

a. *action-setting rules*, e.g., "Does the message request cancellation? If so, the type is 'referral.'"

b. *attribute-setting rules*, e.g. "Does the message mention a foreign country? If so, set the foreign-country attribute to 'true.'"

c. *action-and-attribute-setting rules*, e.g. "Does the message mention a specific Chase person? If so, flag the person and set type to 'referral.'"

Table 3: Question rules

Rule name	Question: Does the email/customer:	Type/action
q:address?	reference customer's address?	attribute- and action-setting: detected
q:blank?	contain an empty/blank body?	action-setting: automatic
q:cancel?	request cancellation of services?	action-setting: referral
q:change-of-address?	request a change of customer's address?	action-setting: referral
q:do-not-call-customer?	request specifically not to be called?	attribute- and action-setting: detected

q:fax?	contain a fax number?	action-setting: detected
q:fix-service?	request service or describe an error?	attribute-setting
q:investment?	contain investment references?	attribute-setting
q:foreign?	reference a foreign country?	attribute- and action-setting: detected
q:lengthy?	contain a long message?	attribute-setting
q:macintosh?	reference Macintosh/Apple products?	attribute-setting
q:merger?	reference the Chase/Chemical merger?	attribute-setting
q:multiple?	contain multiple questions?	attribute-setting
q:pay-on-line?	contain references to using Pay-On-Line?	attribute-setting
q:person-referenced?	reference a specific (Chase) person?	attribute- and action-setting: detected
q:phone?	contain a phone number?	action-setting: detected
q:replacement?	reference to a lost or stolen ATM/credit card	action-setting: referral
q:sensitive?	contain information defined as sensitive?	action-setting: referral, auto, and detected

84. Each case in EZ Reader's casebase consists of an actual message with customer-specific information, such as names and addresses, removed (EZ Reader Manual p. 37). A casebase containing at least 200 cases is recommended (EZ Reader Manual p. 39). CBR is used to classify each new message into three general action types (EZ Reader Manual p. 41):

a. Automatic – No manual review necessary.

b. Referral – Needs manual review. Referred emails are further classified into 2 categories with one of 4 priorities.

c. Detected – Information found which matches a pre-specified keyword, phrase, or numbering scheme.

85. The process flow cycle within EZ Reader starts when the "ready-to-preprocess" phase is initiated by receipt of a new message. During this phase, questions rules may fire to set attributes of the current case (EZ Reader Manual p. 34). Phase-processing rules control the progression to the "process-email" phase, in which the casebase is searched for the most similar case, and "postprocess-email" phase in which the appropriate action is taken (EZ Reader Manual p. 32). This rule-controlled process flow is a standard ART***Enterprise* forward-chaining rule-based reasoning (EZ Reader Manual p. 32, footnote). Similarly, while the case-based reasoning process itself is not explicitly described, it appears to be a standard application of the ART***Enterprise* case-based reasoning system.

86. The description of EZ Reader's rule-based reasoning and case-reasoning mechanisms (as distinct from the rules and cases themselves) consists of references to ART*_Enterprise_ documentation, e.g. "It is strongly recommended that one read and understand the ART*_Enterprise_® documentation (especially for an understanding of rules and case-based reasoning) before attempting to make modifications to the EZ Reader code." (EZ Reader Manual p. 28.) The manual itself primarily provides information on the creation and maintenance of rules and cases for the specific ChaseBank application following the conventions of ART*_Enterprise_. Thus, EZ Reader appears to be a typical application of ART*_Enterprise_ to the kind of business application—automated handling of routine customer messages—for which ART*_Enterprise_ was designed.

5. GREBE

87. My doctoral dissertation, entitled "Integrating Rules and Precedents for Classification and Explanation: Automating Legal Analysis," was submitted in May 1991. It describes GREBE (Generator of Exemplar-Based Explanations), a system for legal analysis under Texas worker's compensation law. (Grebe 5.) GREBE contained a rule base consisting of 57 legal and common-sense rules and a case base containing 35 cases, each of which was a fact pattern drawn from a prior legal case decided under Texas law (Grebe 24-25). GREBE used these rules and cases to determine whether an employee was entitled to worker's compensation under a given set of facts. The best arguments for and against compensation were returned in the form of a legal memo (GREBE 61-64). My dissertation was and is available through a standard dissertation service (http://disexpress.umi.com/dxweb), and dissertations are also all available at the UT graduate library.

88. Suppose, for example, that GREBE is presented with the following new case and is asked whether Jarek is entitled to worker's compensation:

> Jarek was employed as a railroad porter and normally worked from 8:00 A.M. to 5:00 P.M. Because of an unusual work-load, Jarek's employer asked him to work late. Jarek requested and was given permission to walk several blocks

> home to tell his wife that he would be working late. He slipped and was seriously injured while walking home. (Grebe 44.)

89. One of the rules in GREBE's rule base was a Texas statute under which an employer is liable to his employee for worker's compensation if the injury is "sustained in the course" of the employee's employment, i.e. if the injury occurred while the employee was "engaged in or about the furtherance of his employer's affairs or business" and the injury "was of a kind and character that had to do with and originated in" the employment. (Grebe 34.) GREBE would use this rule to reason that the employee, Jarak, could recover worker's compensation only if 1) the accident occurred when the employee was engaged in an activity that was furthering his employer's business and 2) that his injury was consistent with his employment. (GREBE 65-66). GREBE would then try to find rules or cases to help it decide these two questions given the facts of the new problem. (Grebe 66).

90. In the case above GREBE, would find another Texas rule that if the injury occurred during traveling, worker's compensation is available only if the employee was "directed in his employment" to travel. There are no rules that say when an employee is "directed in his employment" to travel, but there are example cases. (Grebe 66).

91. One of the cases in GREBE's library, *Vaughn v. Highland Underwriters Ins. Co.*, 445 S.W. 2d 234 (1969), has facts that are an example of being "directed in employment." *Vaughn* has the following fact pattern:

> Vaughn worked as a truck driver hauling three loads of sulfur per night from a mine to a factory. Each round trip from the factory to the sulphur mine and back again took approximately 4 hours. Vaughn normally stopped to eat each night at a roadside restaurant during his second return trip to the factory. On the night of the accident, a technical problem at the factory delayed unloading the first load of sulfur. Vaughn's boss told him that to get back on schedule, he would not be able to stop to eat on his second trip, but should instead eat during the delay in unloading the truck. Vaughn therefore set out on his motorcycle toward a nearby restaurant, but was injured in an accident that occurred on the way to the restaurant. (Grebe 31)

92. To show that Jarek's traveling was "directed in his employment" in the same was as Vaughn's travel, GREBE would match the facts and associated relationships in Jarek with the

facts and associated relationships of the cases in the Vaughn case. GREBE assigns equal, predetermined match weights to all facts of a stored case, and uses fractional match scores for partial matches. (Grebe 62.) GREBE then sums the match weights for each matching fact and divides by the maximum possible match weight. (*Id.*) Assuming that there is a good match between Jarek and *Vaughn*, GREBE would then try to reason whether the outcome in *Vaughn* can predict the outcome in Jarek. See, e.g., Fig. 3.9 (Grebe 50):

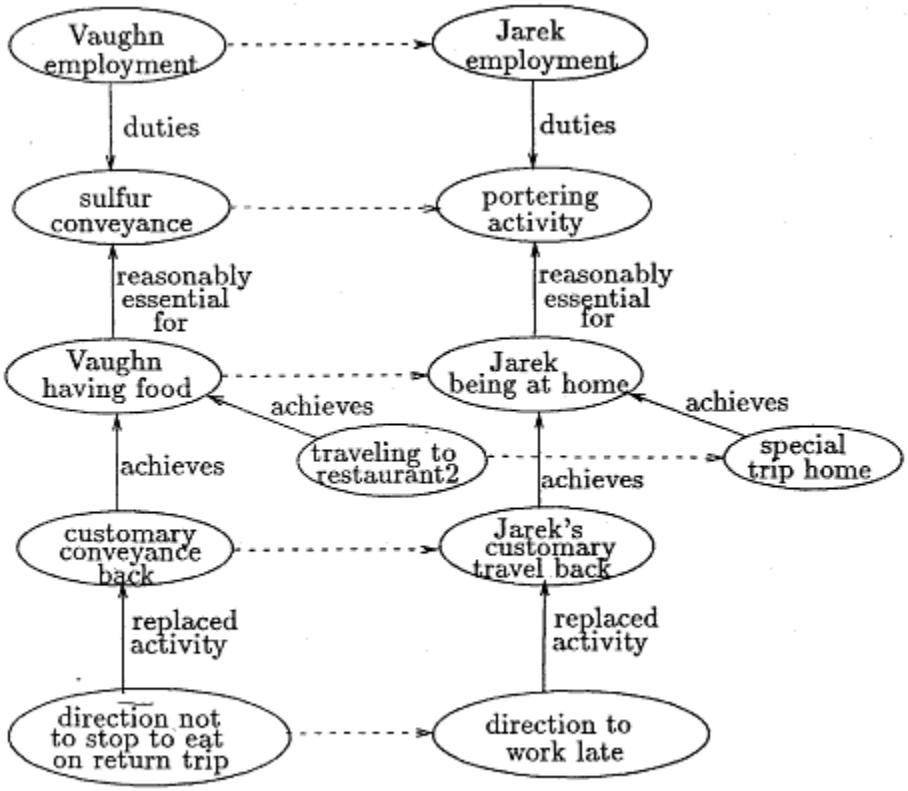


Figure 3.9: The best mapping from the criterial facts of *Vaughn* for "necessitation" to the facts of *Jarek's Case*. Horizontal dashed arrows represent object pairings.

93. GREBE also used rules to help improve the match between pairs of factual patterns, e.g., by reasoning that walking home and driving home are similar because walking and driving are both kinds of traveling (Grebe 70).

94. In answering queries, GREBE typically combined several case-based reasoning steps, each involving a match between the new case and a factual pattern in the case base, as well as multiple Texas legal rules. (Grebe 61-88). GREBE presented the results in the form of a legal memo. (Grebe 61.) A sample memo in which different aspects of *Jarek's Case* are matched with three different prior cases, including *Vaughn*, can be found at Grebe 69-74.

6. Goodman

95. Goodman[10] describes the case-based "Prism" system for automated routing of telex[11] communications amongst banks. (Goodman 25.) The Prism system employed rule-base and case-based reasoning to classify and route telexes automatically, thereby increasing response time an cutting down on human involvement. Of note, Prism was implemented at Chase Manhattan Bank—the same organization that implemented the EZ Reader application that forms the basis of the alleged invention. (Goodman 25.) It further appears that some or all of the named inventors of the '947 patent were aware of Goodman. *See*, *e.g.*, Rice 1509: "Other text interpretation applications have successfully used a hybrid approach (Sahin & Sawyer 1989) (Goodman 1991)" (emphasis added). The principle difference lies in the form of the electronic message: in 1990, banks still received many of their electronic messages by telex, whereas by 1996, more electronic messages were received via email.

96. Prism began as a rule-based system for interpreting and routing telexes. The system consisted of approximately 700 rules which semantically parsed the message text and routed the message accordingly. (Goodman 27-28.) While the pure RBR system was fast an accurate, it was both difficult and costly to expand the rule base to deal with new problems. (*Id.* 28.) Accordingly, it was determined that the second version of Prism should employ case-base reasoning. (*Id.*) A representation of the original, costly-to-maintain rule-based version of Prism appears below:

10 M. Goodman, Prism: a case-based telex classifier, *Proceedings of IAAI-90*, p. 25-37 (1990).

11 Telex systems are routed versions of telegrams, and essentially functioned like email systems do today. With the rise of and commercial acceptance of the Internet in the mid-to-late 90s, telex has been largely replaced by email.

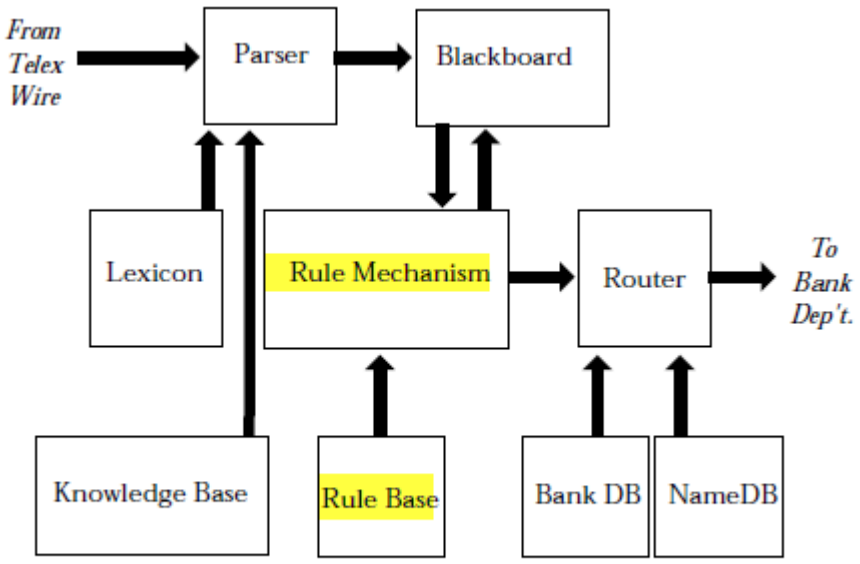


Figure 1. Rule-Based Prism.

(Highlighting added)

97. In Case-Based Prism, the system uses a lexical pattern matcher to extract features from the text of the telex, e.g. "Sender," "Pay," etc. These attributes form a presented case which is then fed into the CBR module. The presented case and the stored case models contain a number of features of different types. (Goodman 29.) The module then selects the best matches from the case library. Cases are selected using a credit (weight) assignment algorithm that evaluates cases based on a comparison of their features. (Goodman 30.)

98. These retrieved cases are in turn passed into a case adapter, which uses a set of adaptation metrics to compare the problem description with the retrieved cases and "customer-specific rules for extracting additional information from the telex and deciding on the final routing code" (Goodman 31) to adapt solutions to account for any remaining differences from the problem description. The result of this adaptation is a new solution for the incoming problem, which classifies the telex into one of 109 content-based classifications. The classification is then passed on to a rule-based router, which extracts additional information from the telex and determines the final routing code. (Goodman 31.) A depiction of the structure of the final CBR Prism is included below:

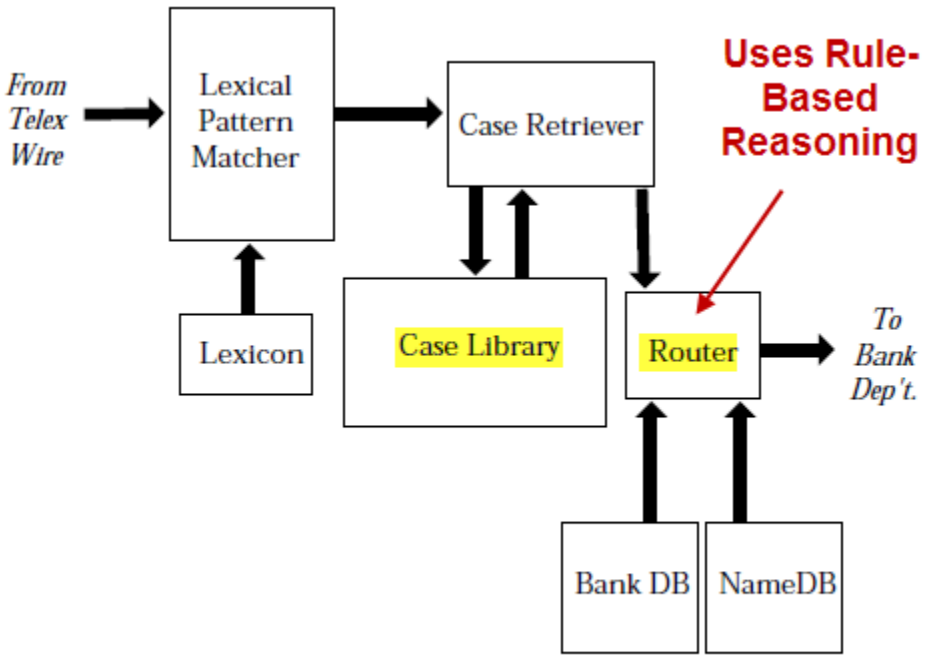


Figure 11. Case-Based Prism

(Annotation and highlighting added)

99. Goodman receives messages via telex, which functions similarly to email. (Goodman 25-26.) Senders generally do not provide any additional information after the message has been received; thus, the message is non-interactive. Goodman uses a lexical pattern matcher to extract text and attributes from the incoming telex, then creates a presented case based on that telex.

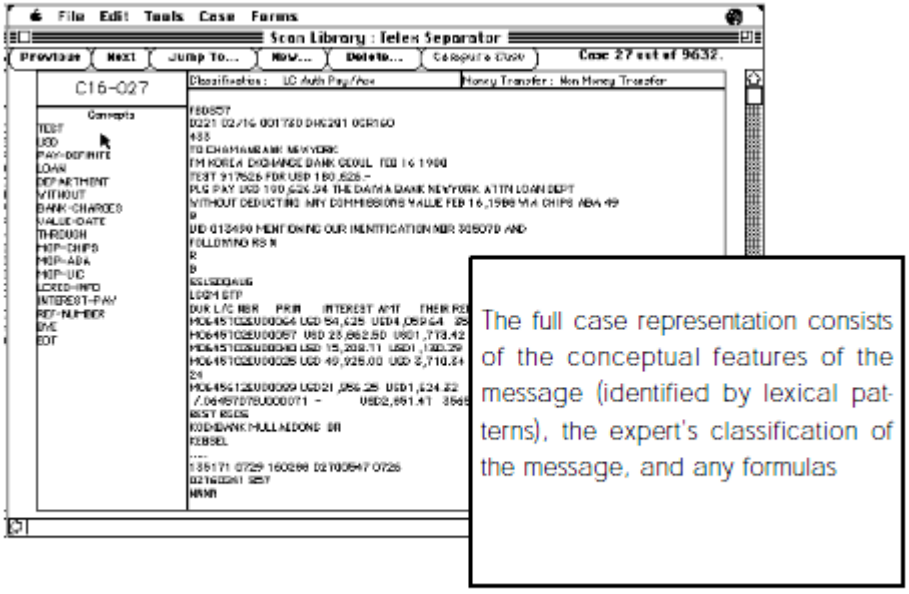


Figure 8. Full Representation of Case.

Goodman then compares the presented case with the stored cases of the case base in order to locate similar cases from the case library:

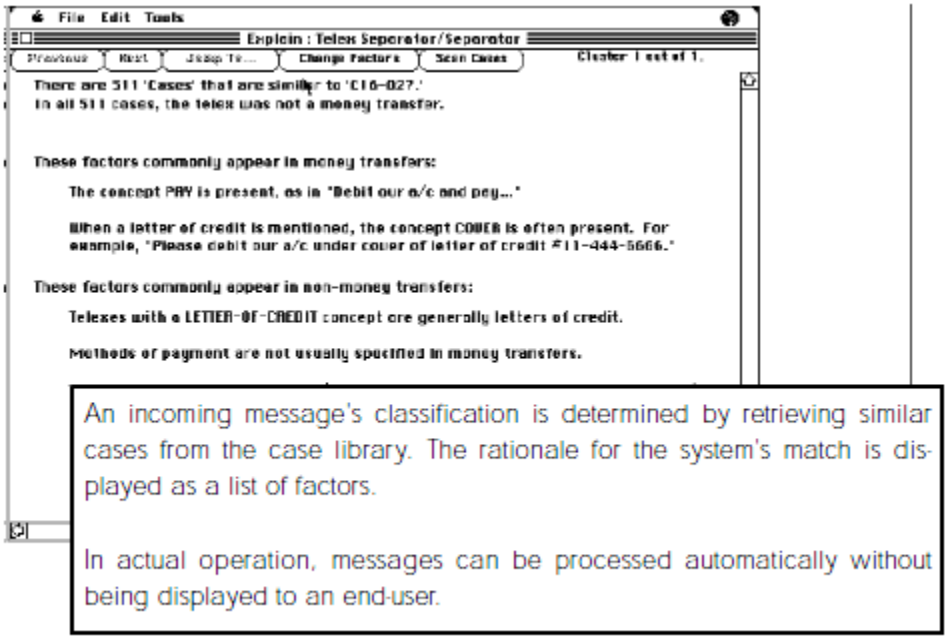


Figure 10. Retrieving Cases.

The retrieved case is used to determine the classification of the incoming message. Goodman then employs a rule-based router, "which contains which contains customer-specific rules for extracting additional information from the telex and deciding on the final routing code."

(Goodman 31.) After Goodman determines the nearest cases, it extracts a classification for that electronic message based on those near cases:

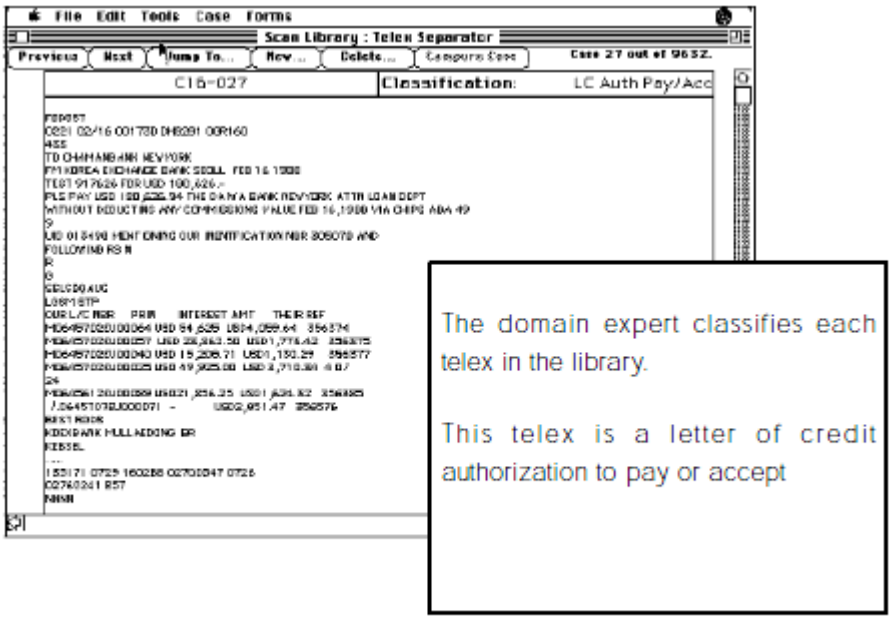


Figure 5. Classification of Messages.

The classification is used to determine how to handle the incoming telex, e.g. as "a letter of credit authorization to pay or accept."

100. Retrieved cases are passed into a case adapter (Goodman 29, Fig. 2), which uses a set of adaptation metrics to compare the problem description with the retrieved cases and "customer-specific rules for extracting additional information from the telex and deciding on the final routing code" to adapt solutions to account for any remaining differences from the problem description (Goodman 31). Accordingly, the predetermined response—the routing code—may be altered before being used.

7. Watson

101. Watson[12] presents a review of CBR practice as of 1994. It includes a history of case-based reasoning, beginning with Roger Schank at Yale University and including

12 I. Watson and F. Marir, Case-based reasoning: a review, The Knowledge Engineering Review, 9:4, p. 1-34 (1994).

contributions from Janet Kolodner, Bruce Porter, Edwina Rissland, Derek Sleeman, Mike Keane, Michael Richter, Kalus Althoff, Agnar Aamodt, and myself. (Watson 328-330.)

102. Watson sets forth the well-known 4-step CBR cycle consisting of retrieving the most similar case(s), reusing the case(s) to attempt to solve the problem, revising the proposed solution if necessary, and retaining the new solution as part of a new case. (Watson 330.)

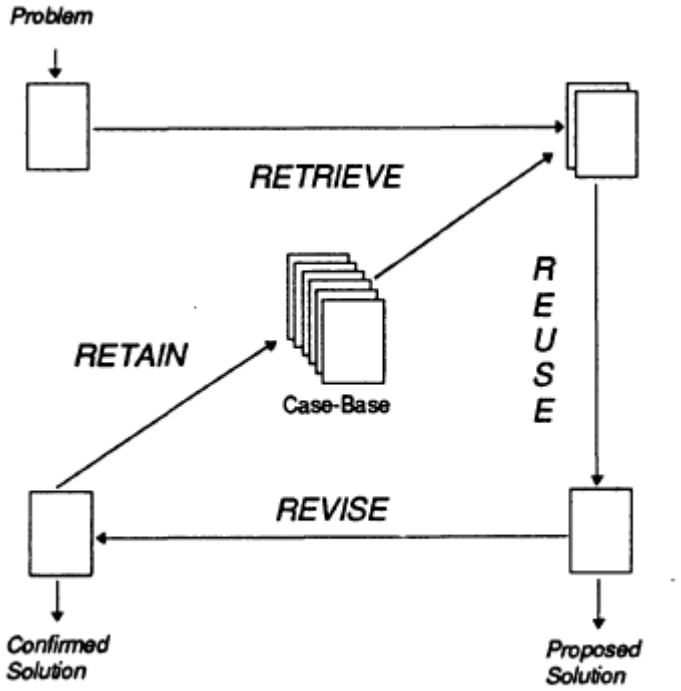


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

103. As Watson discloses, "[t]his cycle currently rarely occurs without human intervention. For example, many CBR tools act primarily as case retrieval and reuse systems. Case revision (i.e. adaptation) often being undertaken by managers of the case base. [sic] However, it should not be viewed as a weakness of CBR that it encourages human collaboration in decision support." (Watson 330.)

104. Prior to retrieval, the problem must first be converted into a *case*, so that it can be compared with the other cases in the case base. As Watson acknowledges, there was no clear consensus on the types of information that should be stored in a case. (Watson 331.) However, cases generally contain the *problem*, the *solution*, and/or the *outcome* of that solution. (See, e.g., references discussed above.)

105. The cases comprising the case base must also be selected and entered into the system. One selection strategy is termed the "category-exemplar model"—essentially, that the cases are selected so as to be a good representation of the types of cases that the CBR system may encounter. The cases contain a number of "features" of the cases, which are usually stored as name-value pairs. For instance, if we were building a case base to determine auto insurance rates, features of the case might include names like "sex," "age," "marital status," etc. Each case (customer) would fill in values for each name, e.g. "sex = male," "age = 24," etc. Furthermore, some features would be more important or have greater "weight" than others; for instance, the auto-insurer would likely care more about whether you'd been in any accidents than how many children you have. (Watson 332-333.) These weights become important in the retrieval stage.

106. During retrieval, the CBR system looks for cases that are similar to the instance case. As exact matches are unlikely, CBR systems need to be able to determine how "close" two cases are, with cases that are closest being selected for the adaptation stage (described below). Well-known methods for case retrieval include the "nearest neighbor" algorithm, induction, knowledge guided induction, and template retrieval. (Watson 333.)

$$\frac{\sum_{i=1}^{n} w_i \times sim\left(f_i^I, f_i^R\right)}{\sum_{i=1}^{n} w_i}$$

Figure 2 Nearest neighbour algorithm

107. The nearest neighbor algorithm computes a match score for a stored case by comparing its case features (key-value pairs) with the case features of the presented problem. The result of each comparison is multiplied by the weight or importance of the feature to create a score. After comparing across all features and thus deriving a number of scores, these scores are added together to get the final match score. The nearest neighbor algorithm also normalizes the final match score by dividing by the maximum possible score (i.e., the score when the similarity

function returns "1" for each feature comparison). Thus, all scores are scaled between 0 and 100%, making it easier to compare match scores.

108. As an example, suppose my hypothetical car insurance prediction program was trying to compute a rate for an unmarried 37-year-old male who drives a Toyota Camry, received one speeding ticket in the past year, and lives in Columbus, Ohio. It's unlikely that the program would have already have someone with those exact characteristics, so it needs to compute match scores for the cases it does have. Suppose one of those cases is a married 34-year-old male driving a Chevy Malibu living in New York City with one speeding ticket. The nearest neighbor algorithm would compare each feature of the two cases. Since the new applicant is unmarried while the existing customer is not, those features are not similar (similarity = 0), and the match score is not affected. However, both drivers are male (similarity = 1), so the match score would increase by the "same gender" amount. The drivers are almost the same age, 34 vs. 37, so the similarity may be 91%, and thus the match score would be increase by 91% of the "same age" amount. And so on. After all the numbers are added together for all of the matching features, the nearest neighbor algorithm divides by the maximum possible match score (i.e., the score when all the similarities are "1") to obtain the final match percentage.

109. After the closest matches are found, a CBR system may attempt to *adapt* or *revise* the solutions associated with the matched cases to meet the current problem. This adaptation typically occurs through the application of rules. (Watson 334.)

110. In addition to giving an overview of case-base reasoning, Watson also describes popular CBR software tools at the time. CBR-Express is described as "perhaps the most successful CBR product to date." (Watson 335.) Watson also describes CasePoint, "a runtime version of CBR-Express," meaning that users cannot add new cases to the regular CBR engine. (*Id.* 336-337; *see also* CBR-Express User's Manual 6.) Watson further describes Art**Enterprise*, which contains a number of AI paradigms, and relies on the same engine used in CBR-Express. (*Id.* 337.) All three products were developed by Inference Corporation.[13] Other

[13] Note also that Inference is the assignee of the Allen patent.

commercial products profiled include Eclipse, ReMind, CASUEL, and Recall. Watson also lists a number of deployed academic and deployed applications. (Watson 341-347.) Several deployed CBR systems also include rule-based reasoning, e.g. CBR-Express, ART*_Enterprise_, Eclipse, CASUEL, Recall. (Watson 335-340.)

VI. THE ASSERTED CLAIMS OF THE '947 PATENT ARE INVALID AS ANTICIPATED

111. Exhibit 3 of this expert report contains element-by-element claim charts of each of the asserted claims in this case with references to the prior art, and is fully incorporated in its entirety to and is part of this report. Further narrative discussion of these references is below.

A. Allen anticipates claims 26, 28, 30, 31, and 38.

112. Allen anticipates every asserted claim of the '947 patent except for claim 33. This is hardly surprising: as the '947 patent discloses, "the rule base 35 (and case base 34) are realized using the ART*Enterprise® tool." ('947 patent, 5:56-57.) Since ART*Enterprise uses the same case-based reasoning engine as CBR-Express, and since Allen describes the CBR-Express system as one of its preferred embodiments, one would expect a great deal of overlap between the two patents. (Watson 337.) I further spoke with Chuck Williams, one of the principal developers of ART*Enterprise and CBR-Express, the CTO of Inference, and the founder and CEO of Brightware. He confirmed that CBR-Express and ART*Enterprise used the same case-based reasoning engine, which was originally developed for the ART and ART-IM Inference products.[14]

113. The '947 patent refers to Allen as "a help-desk application utilizing case based reasoning" ('947 patent, 2:41-63); of note, it fails to disclose that Allen also contains rule-based reasoning. The '947 patent identifies only two differences with respect to Allen. The first

[14] Telephone conversation on July 2, 2010.

purported difference is that in Allen, but not the '947 patent, "a user must interact with the system to narrow down the results of the case base search to obtain the 'best' case match" and therefore "would not provide satisfactory results if … no user interaction was provided" ('947 patent, 2:53-58). This is factually incorrect: Allen explicitly discloses automatically answering problems in which the sender does not provide any additional information after the message has been received:

> In the description step 201, the application 601 may retrieve a text string description 606 of the customer problem 605. In the case-matching step 202, the application 601 may attempt to match the customer problem 605 to one or more cases 105 in the case base 104 using just the description 606 of the customer problem 605. If the match quality 315 of the case 105 which are matched is high, the application 601 may perform the best-case step 203 and following steps. The action 309 which the application 601 performs is to provide an advice message 607 to the customer service representative 602, who may then provide advice to the customer 604. (Allen 9:19-29.)

114. The second purported difference is that "the system is not capable of automatically responding to the sender of an electronic message" because "a representative or the user must interactively interpret the set of cases retrieved from the case based to obtain a response to the 'problem'" ('947 patent, 2:58-63). This is not a legitimate distinction: the "sender" of the electronic message in Allen is the customer service representative, not the customer, and Allen responds to the customer service representative as indicated above. Thus, the '947 patent's attempt to distinguish Allen due to who "created" the substance of the message in my opinion is without merit. For example, it is possible that the individual submitting emails to the system discloses by the '947 patent is a secretary or administrative assistant, and also not the "creator" of the substance of the message.

1. Allen anticipates Claim 26.

115. **Non-interactive message**: The preamble requires that the method process a "non-interactive electronic message." As detailed in paragraph 113 above, Allen discloses

automatically responding to the electronic message with a solution in the event that it locates a case with a high enough match score. It is only when none of the matches are strong enough that Allen poses additional questions to the user, i.e. requests additional information after the message has been received. Thus, Allen discloses processing a non-interactive electronic message.

116. **Receiving an electronic message**: A user enters facts into the "Search Panel," e.g. "customer requests price adjustment; purchased merchandise day before sale.":

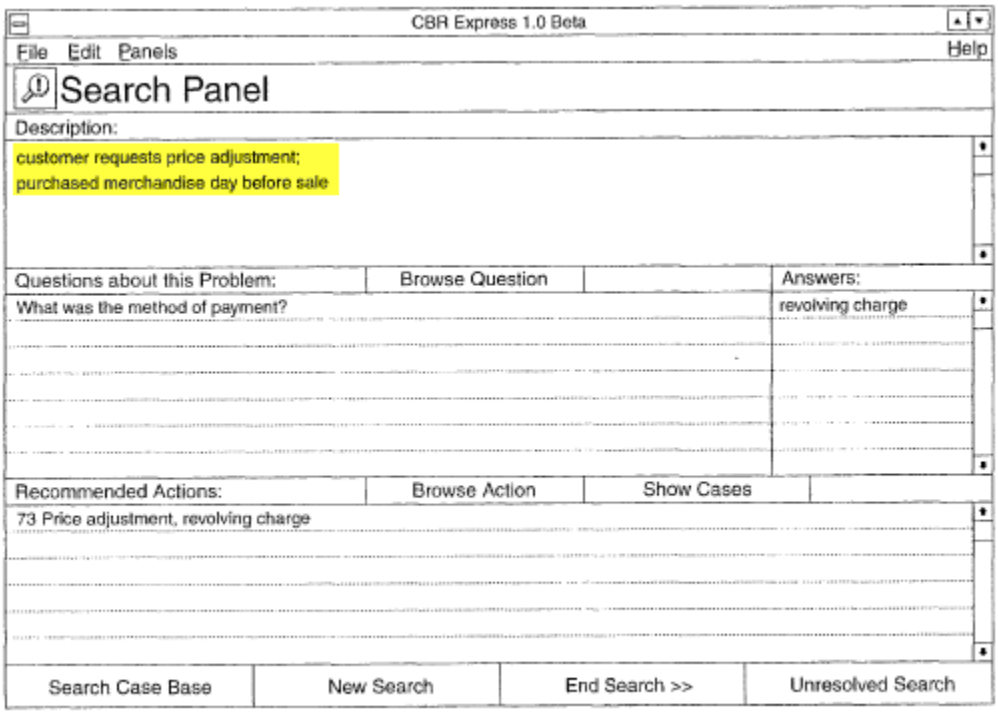


FIG. 6B

(Highlighting added)

Allen then "retrieves a text string description [] of the customer problem." (Allen 9:19-21). Accordingly, Allen receives an electronic message from a source, i.e. the customer service representative.

117. **Interpreting the message**: The second step of claim 26, "interpreting the electronic message using a rule base and case base knowledge engine" is performed by Allen when it "attempts to match the problem to one or more cases in the case base" (Allen 3:66-4:1;

see also 9:20-23). This process involves rules as well as cases: "As the inference engine 111 is implemented within the rule-based reasoning system 501, it may also apply rules … to the case template 312 before match, and to the matched cases 105 after matching" (Allen 8:13-18). Furthermore, Figure 1 of Allen explicitly discloses both a Rule Base and Case Base:

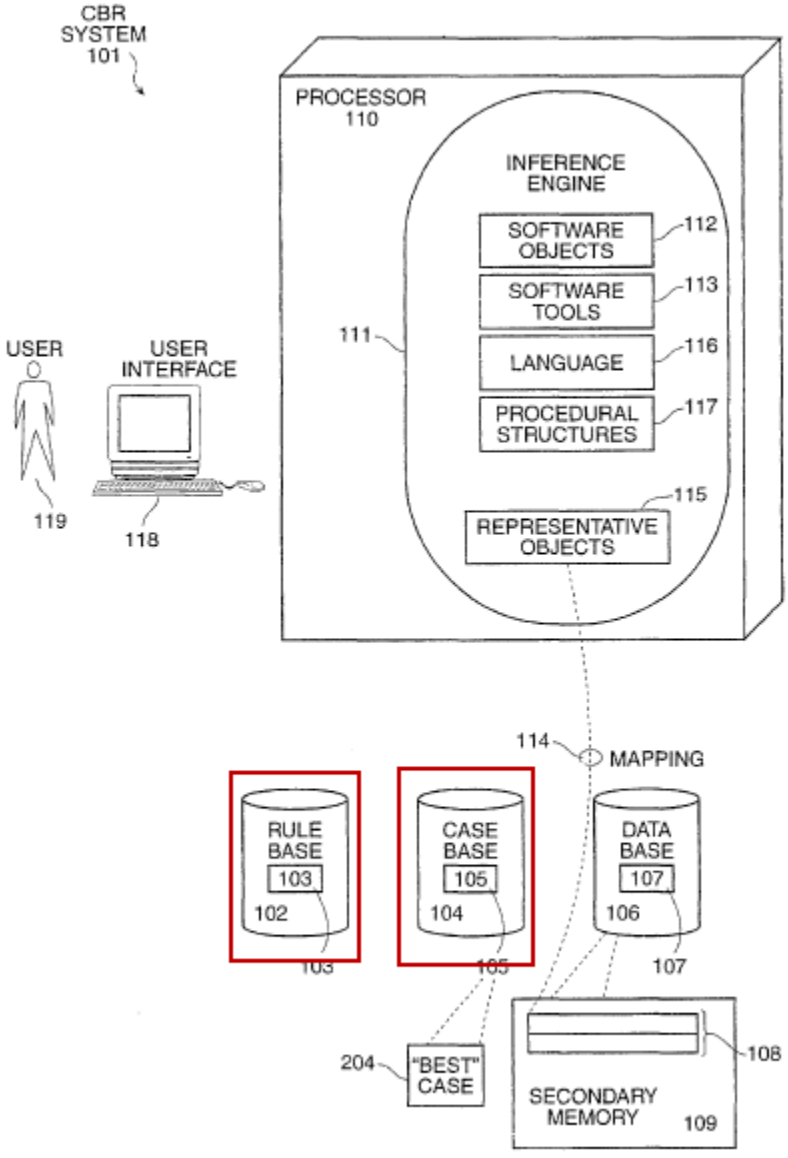


FIG. 1

(Annotations added)

118. **Retrieving predetermined responses**: The third step requires "retrieving one or more predetermined responses corresponding to the interpretation of the electronic message from a repository for automatic delivery to the source." Allen performs this step by locating a "best

case" during the interpretation step, the retrieving the action associated with the best case: "In a best-case step 203, the inference engine 111 attempts to evaluate the cases 105 which were found in the case-matching step 202, and determine a "best" case 204 to match the problem…. In a note-action step 205, the inference engine 111 determines the action prescribed by the "best" case 204, and attempts to determine if that action is a correct action to perform." (Allen 4:3-28; *see also* Fig. 2.) "The action 309 which the application 601 performs is to provide an advice message 607 to the customer service representative 602." (*Id*. 9:26-29.)

119. Thus, Allen meets each and every limitation of Claim 26.

2. <u>Allen anticipates Claim 28.</u>

120. In addition to the elements of claim 26, claim 28 further requires classifying the message as automatic and/or requiring human assistance, and then retrieving responses if the message has been classified as automatic. As shown above, Allen discloses the elements of claim 26.

121. Allen further discloses classifying the message as automatic or requiring human assistance. After receiving a problem or message from the user, Allen computes match scores for the cases in the case base. (Allen 9:21-23.) If the match quality of a case is high, then Allen classifies the message as "automatic" and provides an automatic response to the user, as shown for element 26(c) above. (*Id*. 9:23-29.) If the match qualities of the cases are all low, Allen classifies the case as requiring assistance from a human operator, and poses a series of questions to the user. (*Id*., 9:30-41.) Furthermore, Allen may classify the case as requiring further assistance from the human operator if no "best" case can be found, either because the questions failed to designate a "best" case or because there were no applicable questions. (*Id*., 9:42-50.) If that occurs, Allen creates a new case based on the presented case and requests that the customer service representative fill in the appropriate answer. (*Id*.) The new case information may be

entered by designated experts rather than the customer service representative. (*Id.* 10:17-23; 10:32-39.)

122. Accordingly, Allen meets the limitations of claim 28.

3. Allen anticipates Claim 30.

123. As detailed in Section IV.C.6(b), claim 30 has a number of steps that relate to the manner in which the case-base retrieval function operates. Allen includes all of these steps.

124. Step (b1), "producing a case model of the electronic message including (i) a set of attributes for identifying specific features of the electronic message; and (ii) message text" is performed in Allen by constructing "a case template 312 … for the problem 311 with attribute-value pairs 303 which correspond to notable parameters of the problem 311" (Allen 5:4-6). These attribute-value pairs can include "text string values" (Allen 6:23), which correspond to the '947 patent's "message text."

125. Step (b2), "detecting at least one of text, combinations of text, and patterns of text of the electronic message using character matching" is also disclosed. Allen refers to detecting text or "string matching" in which "the entire text string value 302 is matched exactly" (Allen 6:27-28). Allen further refers to "combinations of text" or "word matching" in which "the text string value 302 is broken up into separate words" which are matched individually (Allen 6:29-41). Finally, Allen performs "character matching" by extracting and matching character trigrams (Allen 6:32-52).

126. Step (b3), flagging the attributes in the presented case model that are detected in the message, is also present in Allen. Allen discloses creating a case template with attribute-value pairs which correspond to the notable parameters of the problem. (Allen 5:3-6.) These attribute-value pairs are derived from information entered by the user. (*Id.* 8:7-9.)

127. Step (b4) requires comparing the attributes of the presented case with the attributes of the stored case models. Allen discloses this matching process. (Allen 8:9-12.) Allen further disclose comparing numeric features (*Id*. 6:1-14), text features (*Id*. 6:22-59), and multiple-choice features (*Id.* 6:60 – 7:4).

128. Step (b5) requires comparing the text of the presented case with the text of the stored case models. In Allen, text is simply another feature, which may be compared in the same manner as described for step (b4). In particular, Allen discloses that "[s]tring matching, word matching and character matching are assigned weights, and the evaluation 316 of the text string match may be determined by a weighted sum of the evaluations 316 for each type of match." (Allen 6:53-59).

129. Step (b6) requires assigning a score based on the comparison of attributes. Allen states that "the inference engine 111 may determine match quality 315 for each case 105 in the match table by a weighted sum of an evaluation 316 of those attribute-value pairs 303 which are matched." (Allen 5:20-23). Allen further discloses that "the weights assigned to each attribute-value pair 303 may be predetermined and may be altered by the user 119." (*Id.* at 5:24-26.) Allen only assigns match scores to cases that appear in the optional match table. (*Id.* at 5:16-17.) Accordingly, Allen would assign match scores to all cases in the event that match table were not used, or if the match table were large and the match threshold small.

130. Accordingly, Allen meets the limitations of claim 30.

4. Allen anticipates Claim 31.

131. Claim 31 requires that match scores be increased by matching attributes, and decreased by mismatching attributes, according to predetermined match and mismatch weights. Allen permits weights to be assigned to string, word, and character matches (Allen 6:53-59), and the overall match is determined by "a weighted sum of an evaluation 316 of those attribute-value

pairs 303 which are matched" (Allen 5: 22-23). One skilled in the art would understand that the term "weighted sum" indicates that each additional matched attribute contributes a positive quality to the total score equal to the appropriate weight of that attribute. A more detailed description of case matching is provided by the CBR-Express User's Guide ("User's Guide"), which is incorporated by reference in Allen (10:40-45). The User's Guide states that a mismatch-weight "influences the score of cases where the question does not match. It is intended as a penalty." (User's Guide, pp 81-82.) The User's Guide similarly describes match-weights as well. (*Id.* p. 81.) Accordingly, Allen anticipates the elements of claim 31.

132. Allen further discloses that the match score is decreased by a mismatch weight in the event of no match. Since the score is determined by "a weighted sum of an evaluation 316 of those attribute-value pairs 303 which are matched," then no match would have no effect on the score. This corresponds to a mismatch weight of zero. I further note that claim 31 must be broad enough to cover mismatch weights of zero, because dependent claim 32 explicitly requires that this be so: "The method of claim 31, wherein the match weight has an absolute value greater than zero and the mismatch weight is zero."

5. Allen anticipates Claim 38.

133. **Claim 38.** Claim 38 states that it is a method of claim 26 in which " the determined response is altered in accordance [with] the interpretation of the electronic message before delivery to the source." Allen explicitly states that a case's solution may be adapted for a specific case: "the processor may select the case which is the best match for the problem, but may act differently from the precise action prescribed for that case" (Allen 1:67-2:2). And Allen discloses that the "action" may describe the content of an electronic message: "The action 309 which the application 601 performs is to provide an advice message 607 to the customer service representative 602." (*Id.* 9:26-29.) Accordingly, Allen anticipates the elements of claim 38.

B. The CBR Express Manuals Anticipate and Render Obvious claims 26, 28, 30, 31, and 33.

134. The CBR Express Users Guide ("User's Guide") and CBR Express Reference Manual ("Reference Manual") anticipate and render obvious claims 26, 28, 30, 31, and 33.[15] CBR Express is a preferred example of the case-based reasoning system described in Allen (Allen 10:40-44.) CBR Express was also used to build the case base engine in Nguyen (Nguyen p. 54), and the same engine was also used in the '947 patent ('947 patent, 5:56-58; Watson 337; July 2, 2010 Conversation with Chuck Williams).

135. One of skill in the art would understand that the CBR Express User's Guide incorporates by reference the teachings of Chapter 2 of the CBR Express Reference Manual. Both the User's Guide and the Reference Manual, which bear the same date, were provided to customers who purchased version 2.0 of the CBR Express software. (Declaration of Bradley Allen.) In addition, The CBR Express User's Guide states that "[t]he software packages required for user modification of *CBR Express* and its databases are described in the *CBR Express Reference Manual*." (User's Guide at 7.) One of skill in the art would understand this statement to incorporate at least Chapter 2 of the Reference Manual, which describes the software packages required for user modification of the case-base matching functions of CBR Express.

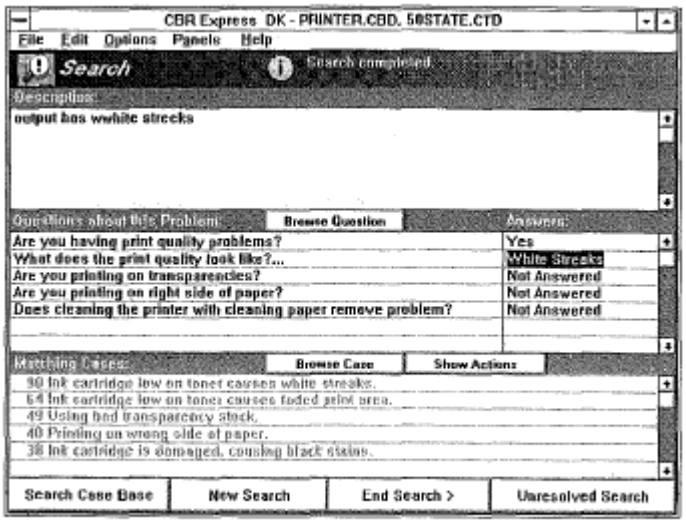
136. As stated above, it is my opinion that one of skill in the art would understand at least Chapter 2 of the Reference Manual to have been incorporated into the User's Guide. To the extent that Bright Response may contend that there was no such incorporation by reference, it would have been obvious to one of ordinary skill to combine the teachings of manuals, which were shipped together, bear the same date, and describe the same version of the same product.

[15] Throughout this section, I collectively refer to the CBR Express User's Guide and the CBR Express Reference Manual as the "CBR Express Manuals."

My analysis of the obviousness of the '947 patent's claims is stated in more detail in section VII below.

1. The CBR Express Manuals anticipate and render obvious claim 26.

137. **Non-interactive electronic message**: The preamble requires that the method process a "non-interactive electronic message." The CBR Express Manuals disclose processing electronic messages entered into a help desk system. See, e.g., User's Guide p. 51:



Search Panel

138. Normally, a user may answer questions to refine the results presented, although a user is not obligated to do so and may simply view or select from the initially matching cases. Furthermore, the CBR Express Manuals disclose configuring the system so that there are no questions, and thus no additional information for the user to enter. (*See*, *e.g.*, Reference Manual p. 14: "Of the 100 points that may be allocated to a case's score, the default percentage for descriptions is set at 20%, meaning a maximum of 20 points may come from the description. Users frequently raise that figure substantially. You are permitted to raise it to 100% if you want to ignore questions completely.") In addition, the CBR-Express Manuals disclose CasePoint, the light-weight deployment vehicle for CBR-Express case bases, which can answer some or all of the questions through the application of rule-based reasoning. (User's Guide 6.)

139. In any event, I understand that Bright Response has accused Defendants' search queries of meeting this claim element, despite that users need to click on links to see the web pages for which they were searching. (*See, e.g.,* Plaintiff's Objections And Responses To Google's Second Set Of Interrogatories, Attachment 1, p. 1.) Under this interpretation of the "non-interactive electronic message" claim language, the search results listings disclosed in the CBR Express Manuals would meet the limitation.

140. **Receiving an electronic message**: As described by the CBR Express Manuals, CBR Express obtains a new problem through text typed into the description field (see above). Accordingly, CBR Express meets this element of the claim language.

141. **Interpreting the electronic message**: Unsurprisingly, a product entitled "CBR Express" uses CBR, or "case-based reasoning." See, e.g., User's Guide at 49: "CBR Express typically returns the five closest cases and lists them in order on the Search Panel. Each case is displayed with its match score, a number between 0 and 100 that shows how nearly that case matched the search description." The CBR Express Manuals also disclose using "rules to copy information from the search description into the answers of particular questions," and to "make deductions about answers based on logical implications between one question and another." (User's Guide at 64.) In addition, CasePoint, the light-weight deployment vehicle for CBR-Express case bases, can answer some or all of the questions through the applications of rule-based reasoning. (User's Guide 6, 64.)[16] Accordingly, the CBR Express Manuals describe interpreting the electronic message using a rule base and case base knowledge engine.

142. **Retrieving predetermined responses:** Each of the matched cases located by CBR Express contains an associated solution. As described by the CBR Express Manuals, CBR

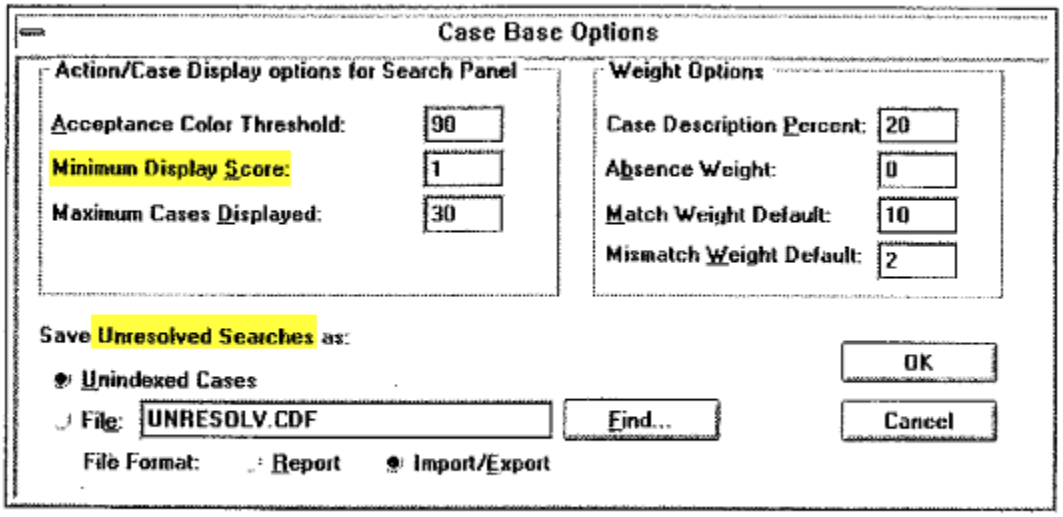
[16] CasePoint had all of the search functionality of CBR-Express; it simply prevented users from creating cases for the case base. Accordingly, CasePoint is a companion product to CBR-Express, as without CBR-Express, there would be no cases for CasePoint to search! (Conversation with Chuck Williams, July 2, 2010.)

Express may either display the cases or the solutions to the user in the results panel after a search: "Some CBR Express applications naturally display the list of cases as the output of the search. Other applications emphasize recommended actions. The Search Panel accommodates both perspectives by letting you toggle between a display of cases and a display of actions associated with those cases." (User's Guide at 50.) Thus, the CBR Express Manuals describe retrieving predetermined responses corresponding to the interpretation of the case—specifically, the actions associated with the nearest matching cases.

143. Accordingly, the CBR Express Manuals describe the elements of claim 26.

2. <u>The CBR Express Manuals anticipate and render obvious claim 28.</u>

144. Claim 28 requires classifying the message as automatic and/or requiring human assistance, and then retrieving predetermined responses if the message has been classified as automatic. The CBR Express Manuals describe calculating match scores for the cases within CBR Express's case base. It then presents the five top cases to the user, along with a series of questions. Users refine the case selection by answering questions, which may be pre-answered. (User's Guide 51-52.)



Set Case Base Options Dialog Box

(Highlighting added)

145. Users may set a number of parameters relating to the case base search. One is the "minimum display score," which is the threshold match score for appearing in the search results list. (User's Guide 111.) If the minimum display score is sufficiently high, the case base is sufficiently small, and/or the presented problem is sufficiently novel, then there may be no cases presented to the user for a particular message. Indeed, "[i]n the early stages of case base development this is normal and to be expected." (*Id.* 56.)

146. Accordingly, the CBR Express Manuals show how CBR Express classifies electronic messages as capable of being responded to automatically if the matching cases have a sufficiently high match score, and as requiring human assistance if there aren't any cases the match well. CBR-Express further includes an "Unresolved Search" functionality, which flags the search for the case-base operator. (User's Guide, 56.)

3. The CBR Express Manuals anticipate and render obvious claim 30.

147. As detailed in Section IV.C.6(b), claim 30 has a number of steps that relate to the manner in which the case-base retrieval function operates. The CBR Express Manuals describe all of these steps.

148. Step (b1) requires building a case model that includes attributes and message text. The CBR Express Manuals disclose building a case model from the electronic message: "In general, the task is to take a single search case, consisting of data from the Search Panel, and develop a numerical similarity score versus an unknown and potentially large number of stored cases." (Reference Manual 13.) The case consists of a set of features which include the description string or message text. (*Id.*) Other features or attributes can be additional strings, yes/no questions, list questions, and numerical questions. (*Id.*, 16-19.) Accordingly, the CBR Express Manuals describe this step.

149. Step (b2) requires detecting text, combinations of text, or patterns of text in the message text. The CBR Express Manuals describe how CBR Express detected all three. Specifically, CBR can use a) string matching, wherein the entire string must match; b) character matching, wherein trigrams or three-character substrings must match; and c) word matching, wherein words from the original text must match. (Reference Manual, 16, 18-19.) The CBR Express Manuals further disclose that character matching is the default matching algorithm used for search descriptions or queries. (*Id.*, 18.) Accordingly, the CBR Express Manuals describe this step.

150. Step (b3) requires flagging attributes of the case model detected in the message text. As disclosed above, the case contains a number of features or attributes. These attributes correspond to answers to questions associated with the case. (User's Guide, 53-54.) Answers to the questions may also be extracted from the description or message text. (*Id.*, 64.) Accordingly, the CBR Express Manuals describe flagging attributes of the case model (submits answers) detected in the message text.

151. Step (b4) requires comparing attributes of the presented case with attributes of the stored cases. The CBR Express Manuals describe several means of comparing attributes, including numerical comparisons, exact matching, character matching, and word matching. (Reference Manuel 16-19.) Thus, the CBR Express Manuals discloses this element.

152. Step (b5) requires comparing the message text or case descriptions. The CBR Express Reference Manual states that "[t]he scoring of each case takes place in two separate parts. The case descriptions are scored separately from the case questions. This lets us assign the description a fixed percentage of the total score, regardless of the number of questions in play in each case" (Reference Manual p. 14). Accordingly, the CBR Express Manuals describe this limitation.

153. Step (b6) requires assigning match scores to each case in the case base, where the match score increases if the attributes and text match and does not increase if they don't match. The Reference Manual discloses that "if a search feature exactly matches a stored feature (both questions answered "Yes") the raw score of the stored case is incremented by the match weight of the question.... The raw score is totaled up for each case, and is then normalized into the range of points left over after scoring the description." (Reference Manual 14.) Furthermore, the portion of the score assigned to the description is calculated by removing uninformative words and breaking the text into trigrams. "The raw score for each case is then incremented by a fraction of the description weight for each trigram that the search description and the case description have in common" (*Id*. 18). Word matching is the same except that "the text is divided up into words rather than trigrams. The raw score for each case is then incremented by a fraction of the description weight for each word that the search answer and the case answer have in common" (*Id*.) In both character and word matching, the score is normalized by the greatest possible match in that it consists of the "fraction" of the total trigrams or words that are shared. Accordingly, this element is also described by the CBR Express Manuals.

4. <u>The CBR Express Manuals anticipate and render obvious claim 31.</u>

154. Claim 31 requires that the overall match between a presented case and a stored be determined in such a way that each additional case attribute or text match causes the match score to go up and that mismatches cause the score to decrease. The CBR Express Manuals disclose this element: "if a search feature exactly matches a stored feature (both questions answered "Yes") the raw score of the stored case is incremented by the match weight of the question. ... It is also possible to define a mismatch weight for a feature. In this case, failure to match a feature of the search case results in decrementing the stored case's raw score." (Reference Manual 14).

5. The CBR Express Manuals anticipate and render obvious claim 33.

155. Claim 33 requires that each score be "normalized by dividing the score by a maximum possible score for the stored case model." The CBR Express Manuals describe this element: "The raw score is totaled up for each case, and is then normalized into the range of points left over after scoring the description. For instance, if the description percentage is set to 50% (or 50 points), the contribution from the questions will be some scaled proportion of the remaining 50 points. The normalization confines the final values to a range of 0 to 100 in CBR Express. A normalized score of 100 indicates a perfect match." (Reference Manual 14-15.)

C. Nguyen anticipates claims 26 and 28.

156. Nguyen[17] describes a help-desk application system for Compaq printers, QUICKSOLVE, that anticipates claims 26 and 28 of the '947 patent.

1. Nguyen anticipates Claim 26.

157. **Non-interactive message**: The preamble requires that the method process a "non-interactive electronic message." Nguyen discloses receiving a message from a user, for example Figure 9:

17 T. Nguyen, M. Czerwinski, and D. Lee, Compaq QuickSource: providing the consumer with the power of AI, AI Magazine 14:3 (1993).

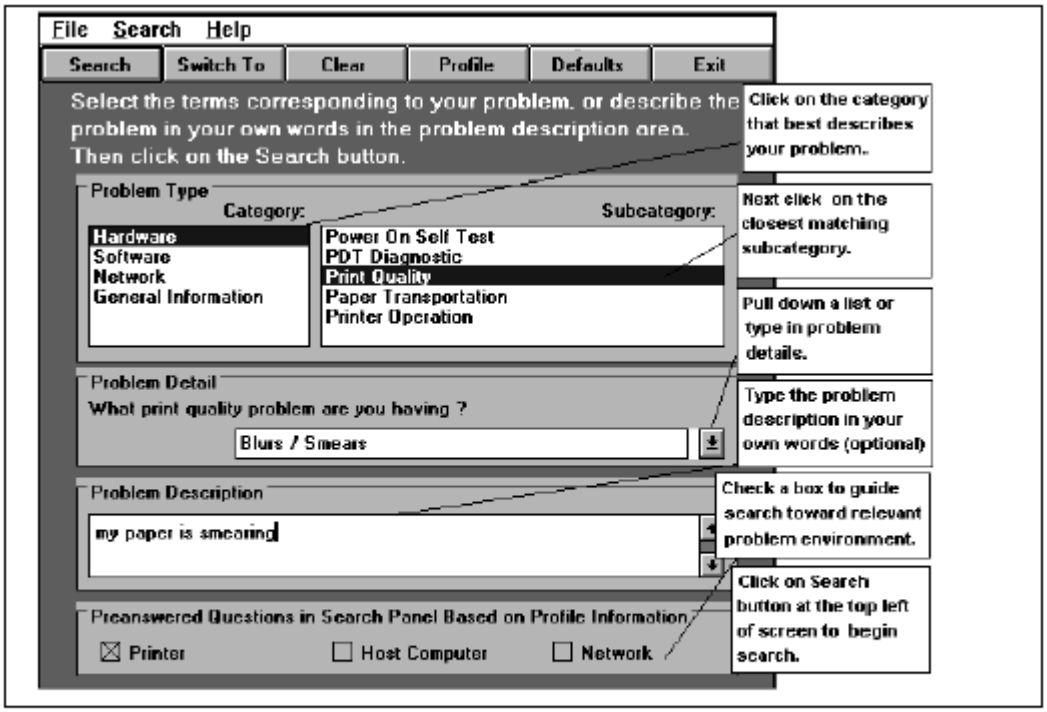


Figure 9. Screen Example from QUICKSOLVE.

158. In response to the message, Nguyen returns a list of possible results along with a list of questions. Those questions may be pre-answered by the rule-based reasoning component. (Nguyen 56.)

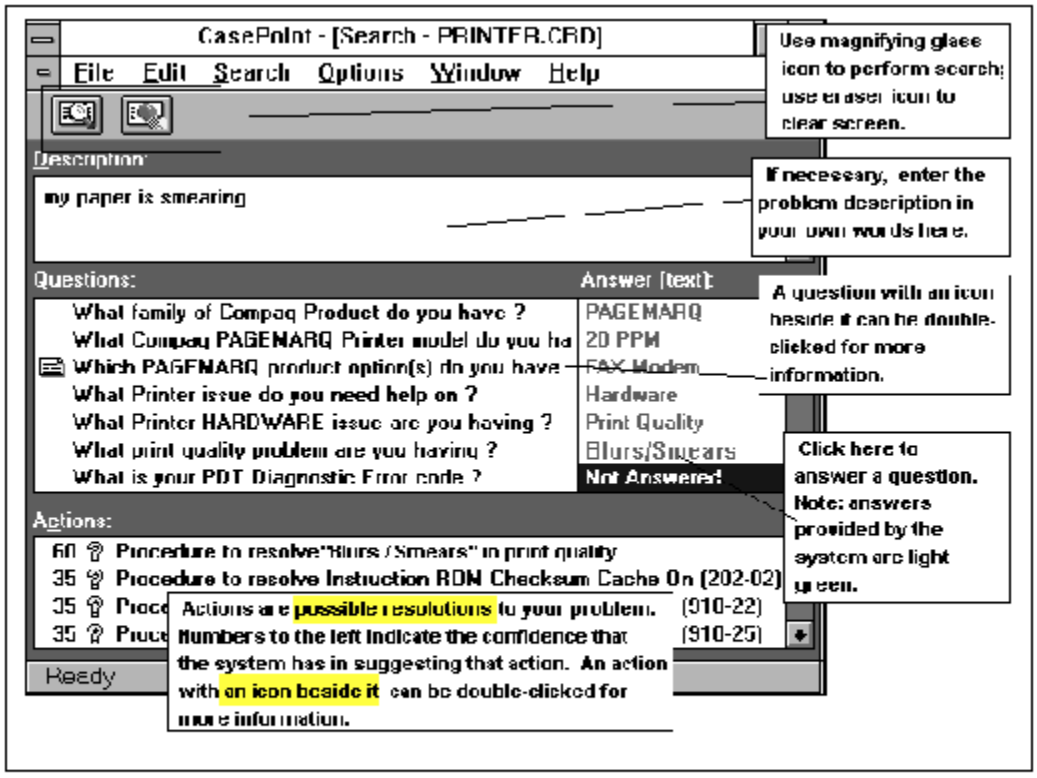


Figure 11. Example of Search Screen with Preanswered Questions.

(Highlighting added)

159. As depicted in the figure above, actions or results with icons next to them can be double-clicked for more information. This implies that some results do not have icons next to them, and thus cannot be clicked on for more information. Accordingly, Nguyen is able to display results without requiring any additional input from the user.

160. In any event, I understand that Bright Response has accused Defendants' search queries of meeting this claim element, despite that users need to click on links to see the web pages for which they were searching. (*See, e.g.*, Plaintiff's Objections And Responses To Google's Second Set Of Interrogatories, Attachment 1, p. 1.) Under this interpretation of the "non-interactive electronic message" claim language, the search results listings displayed in Nguyen would meet the limitation.

161. **Receiving an electronic message:** Nguyen discloses receiving an electronic message, e.g. "my paper is smearing" on Figure 9 above. As seen in that figure, the problem description can include message text, a category and subcategory selection, a problem detail, and a selection of problem environment (e.g., "Printer").

162. **Interpreting the message**: Nguyen discloses interpreting the message using a rule-base and case-base knowledge engine. Nguyen discloses the QuickSolve case base system, which contains a set of problems and solutions dealing with Compaq printers. (Nguyen 53-56.) There are roughly 500 cases in the case base, each of which contains a title, a description field, a question area, and a solution section. (*Id*. 54.) The case-base engine is built using CBR-Express (*Id.* 54), and is accessed using CasePoint (*Id.* 51). CasePoint is simply a version of CBR-Express that does not allow users to submit new cases, but does allow them to search existing cases. (Watson 336-337; CBR Express User's Guide 6; July 2, 2010 conversation with Chuck Williams.) Nguyen computes an overall match score between a presented case and a stored case through a weighted combination of attributes determined by the question answers. (Nguyen 54-55.) Nguyen may further use rule-base-reasoning to derive some of the attributes of the presented case by pre-answering some or all of the related questions. (*Id.* 56.)

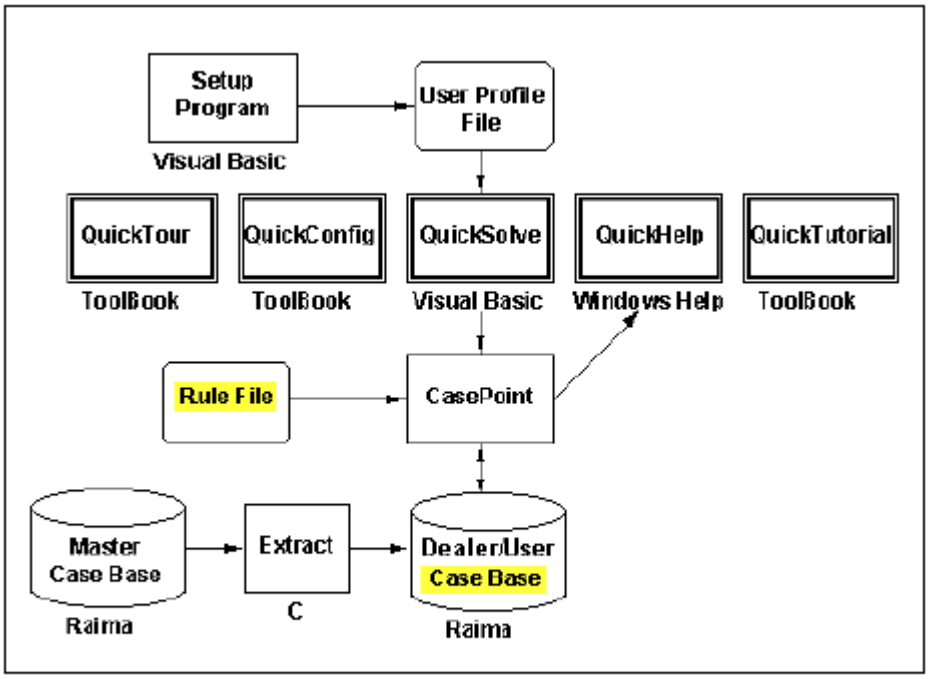


Figure 1. QUICKSOURCE System Architecture.

(Highlighting added)

163. **Retrieving predetermined responses:** After Nguyen locates the best case, it retrieves the solution associated with that case and presents it to the user. (Nguyen 56.) For example, the solution to the "my paper is smearing" fact pattern is depicted below:

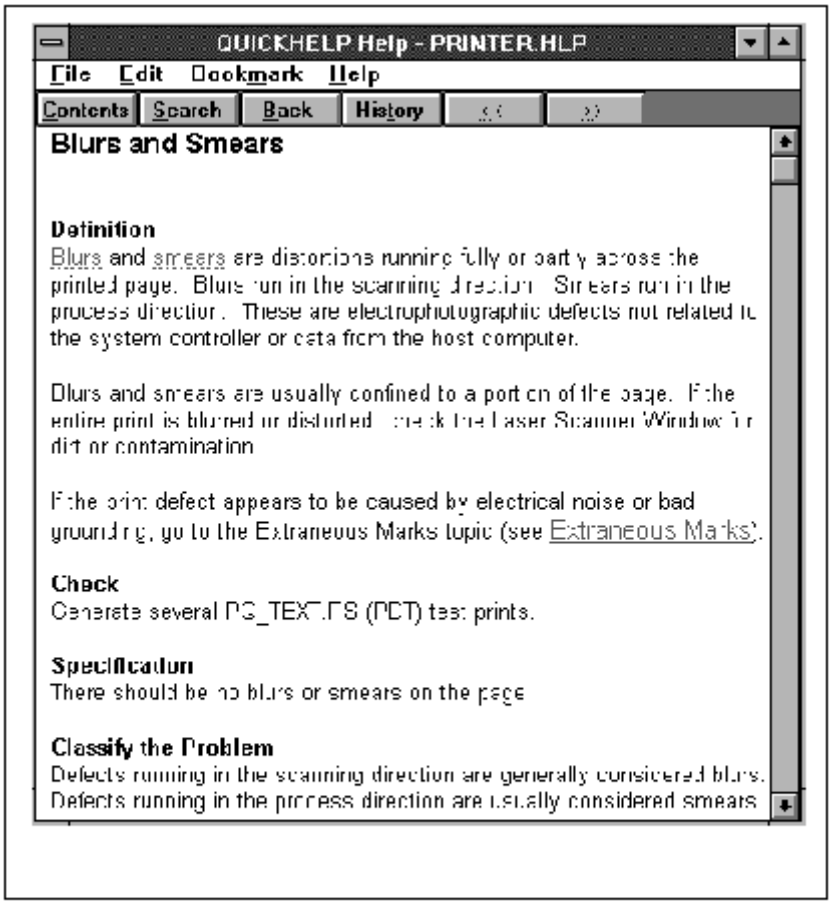


Figure 13. Example of Blurs-Smears Solution Available in QUICKHELP.

164. Accordingly, Nguyen meets all the elements of claim 26.

2. <u>Nguyen anticipates Claim 28.</u>

165. Claim 28 requires classifying the message as automatic and/or requiring human assistance, and then retrieving responses if the message has been classified as automatic. Nguyen meets this claim element. Specifically, Nguyen only shows actions having a sufficiently high match case threshold. (Nguyen 56.) If the message is classified as automatic—that is, if there are high-match cases—then Nguyen displays messages that correspond to the matching cases. If the message is not classified as automatic, then QuickSolve is unable to solve the problem, and the user will require human assistance such as contacting Compaq's customer service department. (*See*, *e.g.*, *id.* at 50: "The decision was made to package and deliver the

troubleshooting knowledge and expertise directly with the product, allowing consumers to solve most of their problems entirely on their own and to use Compaq's help desk as a back up facility.")

166. Accordingly, Nguyen meets this element.

D. EZ Reader anticipates claims 26, 28, 30, 31, 33, and 38.

167. As disclosed in section V.B.4, EZ Reader was an email response system in use at Chase Manhattan Bank. According to the EZ Reader article, it was deployed in the first quarter of 1996, and was capable of handling up to 80% of incoming mail automatically.

168. EZ Reader performs the same functions as the preferred embodiment of the '947 patent ("preferred embodiment"). The purpose of both EZ Reader and the '947 patent is to automate the handling of electronic messages by classifying the message as either routine—and therefore amenable to a stock response—or non-routine, which is then routed to a human agent for handling. (EZ Reader Manual p. 10; '947 patent 2:63-67.) The similarity of these purposes is evident from the fact that Figure 2 of Rice, captioned "Email path through ChaseDirect" is almost identical to Figure 1 of the '947 patent, "a block diagram showing the automatic message interpreting and routing system of the preferred embodiment of the present invention" ('947 patent 3:53-55).

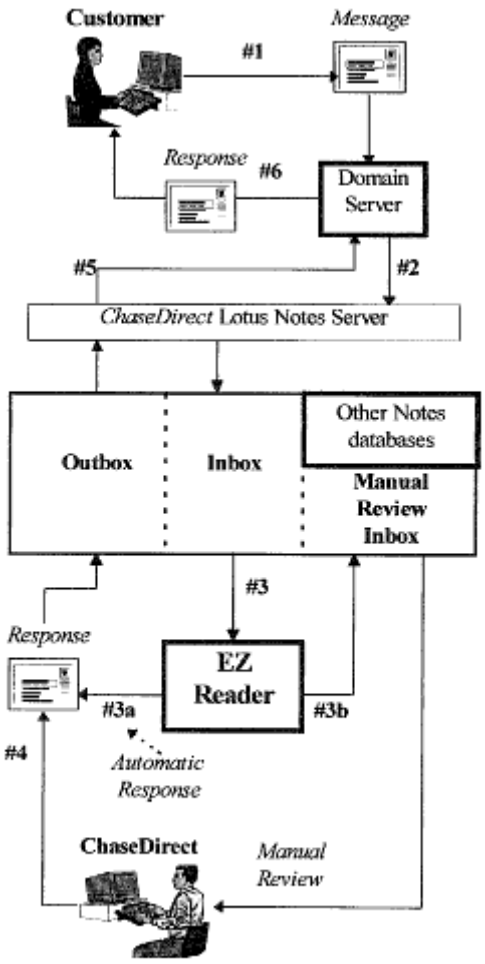
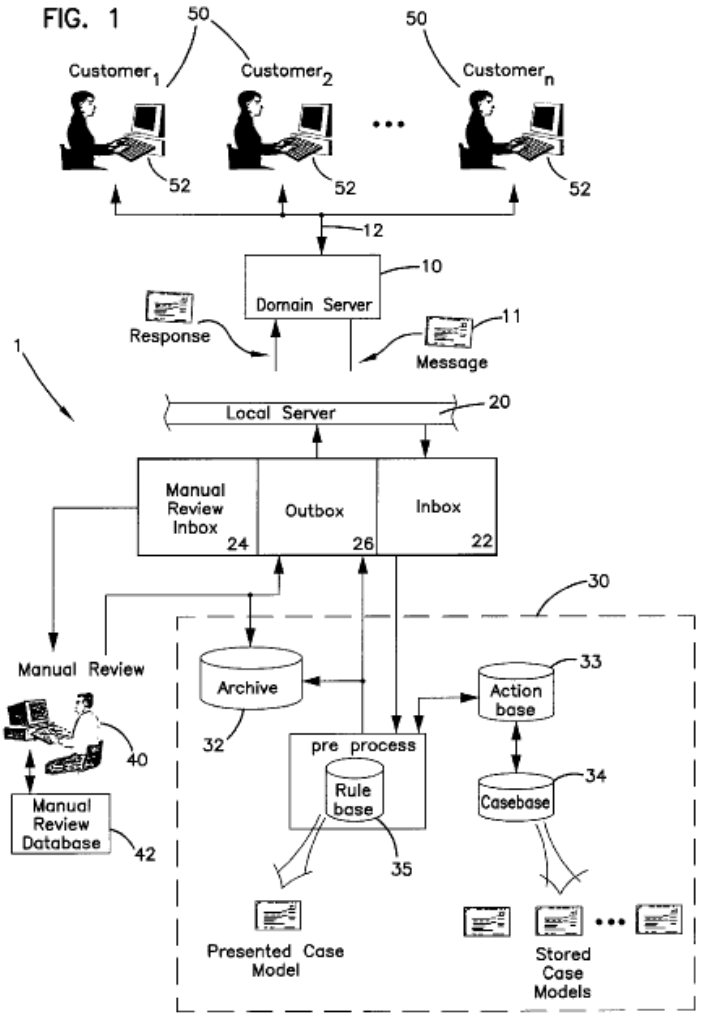
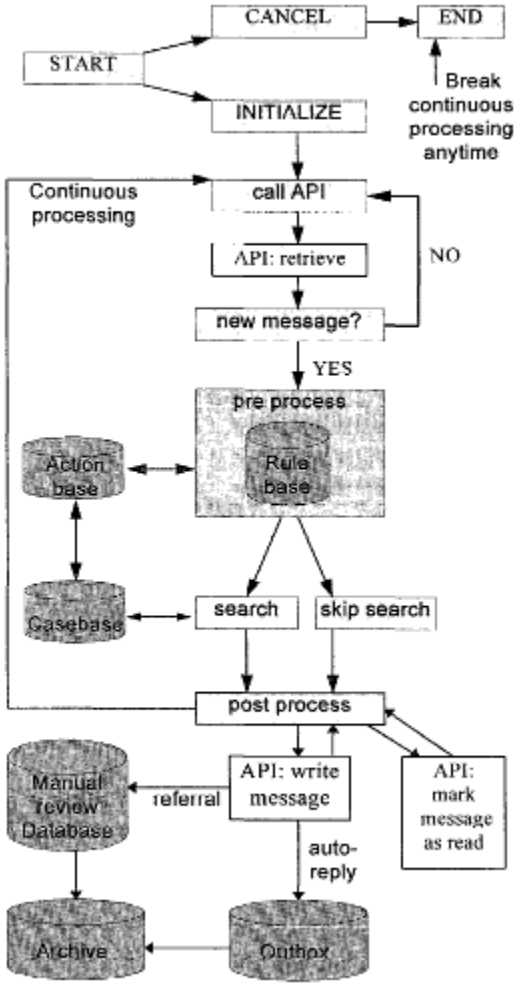


Figure 2. Email Path through ChaseDirect



The two figures differ primarily in that the rule-based and case-based classification system is summarized as a block titled “EZ Reader” in Rice et al. Figure 2, with the contents of the EZ Reader block shown in Rice et al. Figure 3, whereas in '947 patent Figure 1 the two figures are merged.



169. Both the EZ Reader and the preferred embodiment are implemented in the same CBR shell, ART*Enterprise (Rice et al. p. 1508; EZ Reader Manual p. 19; '947 patent 5:57-59). As noted previously, ART*Enterprise uses the same CBR engine as CBR Express and CasePoint. (*See* above.)

170. The paper describing the EZ Reader application was submitted as provisional application No. 60/042,494, to which the '947 patent claims priority. Furthermore, half of the EZ Reader Manual was submitted as application No. 60/042,656, to which the '947 patent also

claim priority.[18] Accordingly, one would expect that all elements of the '947 claims would be present in EZ Reader. Nonetheless, I will analyze the system below.

1. EZ Reader anticipates claim 26.

171. **Non-interactive electronic message**: The preamble requires that the method process a "non-interactive electronic message." The '947 patent further claims that "[i]t is preferred that the electronic messages 11 are E-mail messages." ('947 patent 4:10-11.) The Rice paper discloses that EZ Reader functions on Email: "EZ Reader is an intelligent electronic mail (email) that employs a unique combination of rule-based and case-based reasoning." (Rice 1507, Abstract.) The EZ Reader Manual confirms that the system that operates on email: "As a new piece of mail comes in, EZ Reader retrieves the message and compares it to a library of actual customer messages, and categorizes the message." (EZ Reader Manual p. 18.) Thus, EZ Reader discloses processing non-interactive electronic messages, specifically email.

172. **Receiving an electronic message**: EZ Reader receives electronic messages, specifically email: "The customer sends an email to Chase Manhattan Bank's Internet address…. EZ Reader periodically checks the inbox (a Lotus Notes mail database) for new mail. When a new email arrives in the inbox, EZ Reader retrieves the message." (Rice 1509.) "As a new piece of mail comes in, EZ Reader retrieves the message and compares it to a library of actual customer messages, and categorizes the message." (EZ Reader Manual p. 18.)

173. **Interpreting the electronic message**: EZ Reader discloses interpreting the electronic message using rule-base and case-base reasoning. As the Abstract of the Rice article discloses, EZ Reader "employs a unique combination of rule-based parsing and case-based reasoning to automatically and with a high level of accuracy classify and respond to large volumes of incoming email." Rice 1509: "EZ Reader retrieves the message and 'interprets' it by performing rule-based parsing and case-based retrieval." EZ Reader uses "question" rules to set

[18] The application omits the sections of the EZ Reader User's Guide that include the February 1996 datestamp (EZ Reader User's Guide 2) and that state that EZ Reader is currently in use at Chase (*Id.* 6).

attributes and actions on the message. (EZ Reader Manual p. 19, 29, 36.) In the event the RBR system does not set an action for the message, EZ Reader uses a CBR system to locate a matching case. (*Id.* p. 54.)

174. **Retrieving predetermined responses:** EZ Reader retrieves predetermined responses based on the interpretation of the message. *See* Rice 1509: "The outcome of its interpretation is one of two possibilities: a) EZ Reader can respond to the email automatically. An automatic response, which is routed directly to the ChaseDirect outbox, consists of the original email and one or more attachments, or prepared replies, that are retrieved from a Lotus Notes repository of standard responses."

Process Flow

Figure 2. illustrates the flow of an email through the EZ Reader system as described below:

1. The customer sends an email to Chase Manhattan Bank's Internet address.
2. Chase's corporate email router passes the message from the domain server to ChaseDirect's Lotus Notes server.
3. EZ Reader periodically checks the inbox (a Lotus Notes mail database) for new mail. When a new email arrives in the inbox, EZ Reader retrieves the message and "interprets" it by performing rule-based parsing and case-based retrieval. The outcome of its interpretation is one of two possibilities:
   a) EZ Reader can respond to the email automatically. An automatic response, which is routed directly to the ChaseDirect outbox, consists of the original email and one or more attachments, or prepared replies, that are retrieved from a Lotus Notes repository of standard responses.
   b) EZ Reader cannot respond to the email automatically. It refers the email to ChaseDirect for human review and response. Before placing the email in the manual review inbox, EZ Reader assigns a category and priority to the message and suggests one or more standard replies based on message content. (Categories and priorities are described in more detail later.)

175. *See also* EZ Reader Manual p. 10. Accordingly, EZ Reader meets all the elements of claim 26.

2. EZ Reader anticipates claim 28.

176. Claim 28 requires classifying the message as automatic and/or requiring human assistance, and then retrieving responses if the message has been classified as automatic. As detailed in step 3 and sub-steps 3a and 3b, EZ Reader classifies messages as automatic or requiring human assistance. *See also* EZ Reader Manual p. 41. EZ Reader retrieves and uses prepared responses if the new case is classified as automatic. (EZ Reader Manual p. 10.) Thus, EZ Reader meets this claim element.

3. EZ Reader anticipates claim 30.

177. As detailed in Section IV.C.6(b), claim 30 has a number of steps that relate to the manner in which the case-base retrieval function operates. CBR Express includes all of these steps.

178. Step (b1) requires building a case model that includes attributes and message text. EZ Reader discloses this limitation: The case-base process is dependent upon rules to derive its presented case feature values. In EZ Reader, rules fire before the case-based reasoning process to extract features or characteristics of the email that help distinguish the content of the message…. For example, if EZ Reader infers from incoming email text that the sender does not want to be telephoned by ChaseDirect, the rule for do-not-call-customer? fires and sets that attribute in the case to "Yes." (Rice 1512-1513.) Rice also discloses a "message text" attribute which contains the content of the message text. (Rice 1513.)

179. Step (b2) requires detecting patterns of text within the message text. Rice discloses processing a new message with "attribute setting" rules to infer case attributes such as that the customer does not wish to be called (Rice et al. p. 1513) and "action" rules that can add useful information about the message or classify the message without requiring the case-based reasoning step (Rice et al. p. 1513, Rice et al. Figure 3 "skip search" block). These rules are implemented using textual pattern matching:

```
RULE foreign-phone
 (or
  (masked-member$ " +99 " ?message-body)
  (masked-member$ " +99-" ?message-body)
  (masked-member$ "(+99)" ?message-body)
  etc.
 )
  any other conditions...
=>
  (printout "Foreign phone number detected.")
  any other actions...
```

180. Step (b3) requires flagging attributes in the case model. As indicated above, EZ Reader does this during its text processing stage. For instance, matching the textual patterns for "foreign-phone" would results in the "foreign-phone" attribute being set. (Rice 1511.)

181. Step (b4) requires comparing the attributes of the presented case model with the attributes of stored case models. EZ Reader discloses this limitation. For instance, two cases in the case base may differ in that one has the "address?" field flagged. If an incoming email contains an address, the "address?" field will also be triggered in the presented case model. EZ Reader will then detect that one of the stored cases has the "address?" field—just like the presented case—and rank that stored case higher. (Rice 1513.)

182. Step (b5) requires comparing the message text of the presented case model with the message text of the stored case models. In EZ Reader, message text is simply another attribute, which is compared as in step (b4). (Rice 1512.) EZ Reader also explicitly discloses comparing message text: [s]tandard case-base scoring for the message text of an email (as for all text type features" is driven by Art**Enterprise's* default trigram character-matching algorithm." Thus, EZ Reader meets this claim element.

183. Step (b6) requires computing match scores for each case based on matching attributes. EZ Reader discloses this limitation: "if the value in a feature of the stored email matches the value in the corresponding feature of the incoming email, the feature's match weight is add [sic] to the stored email's score. If the feature's value mismatches, the feature's mismatch weight, typically a negative value, is added to the score." (Rice 1512.)

184. Accordingly, EZ Reader meets all the limitations of claim 30. Note also that these limitations are all implemented by ART*Enterprise*: "EZ Reader searches the case-base assigning relative scores to each stored case based on the number of features, the mismatch of feature values and the absence of features as compared with the presented case using customizable case-based reasoning components supplied in the ART*Enterprise* tool." (Rice 1512.)

4. EZ Reader anticipates claim 31.

185. Claim 31 is similar to step (b6) of claim 30, except that it requires predetermine match weights and mismatch weights. As disclosed in step (b6), features within the case base have corresponding and predetermined match weights and mismatch weights.

186. EZ Reader requires that the mismatch-weight be customized to zero. (Rice 1512.) However, claim 31 allows for zero mismatch weights as well, as dependent claim 32 specifically requires that the mismatch weight be zero. Accordingly, EZ Reader meets all the limitations of claim 31.

5. EZ Reader anticipates claim 33.

187. Claim 33 requires that the match score be normalized by dividing it by the maximum possible match score. The Rice paper discloses that "[s]ince stored cases can contain different numbers of features, a presented case's raw score is normalized by dividing the raw score by the maximum possible match score for this case." (Rice 1507.) Thus, EZ Reader meets the elements of this claim.

6. EZ Reader anticipates claim 38.

188. Claim 38 requires that the predetermine response be altered in accordance with the interpretation of the message prior to delivery. The Rice paper discloses that "[i]f a similar previous email is found, EZ Reader infers that the response used previously can be used (or

adapted) for the incoming email. (Rice 1512 (emphasis added).) Thus, EZ Reader discloses this limitation.

E. GREBE anticipates claims 26.

189. As disclosed in section V.B.5, GREBE is a legal reasoning system I designed as part of my doctoral dissertation. GREBE anticipates claim 26 of the '947 patent.

190. **Non-interactive electronic message**: The preamble requires that the method process a "non-interactive electronic message." GREBE operates on a non-interactive electronic message, specifically a relational structure containing the fact pattern of the incoming case. *See*, *e.g.*, GREBE 44. *See also* GREBE 118-138 (listing seven hypotheticals uses as input to Grebe.) Thus, GREBE meets this claim element.

191. **Receiving an electronic message**: As detailed above, GREBE receives messages consisting of case hypotheticals. Thus, GREBE meets this claim element.

192. **Interpreting the electronic message**: GREBE interprets the message using a rule-base and case-base knowledge engine:

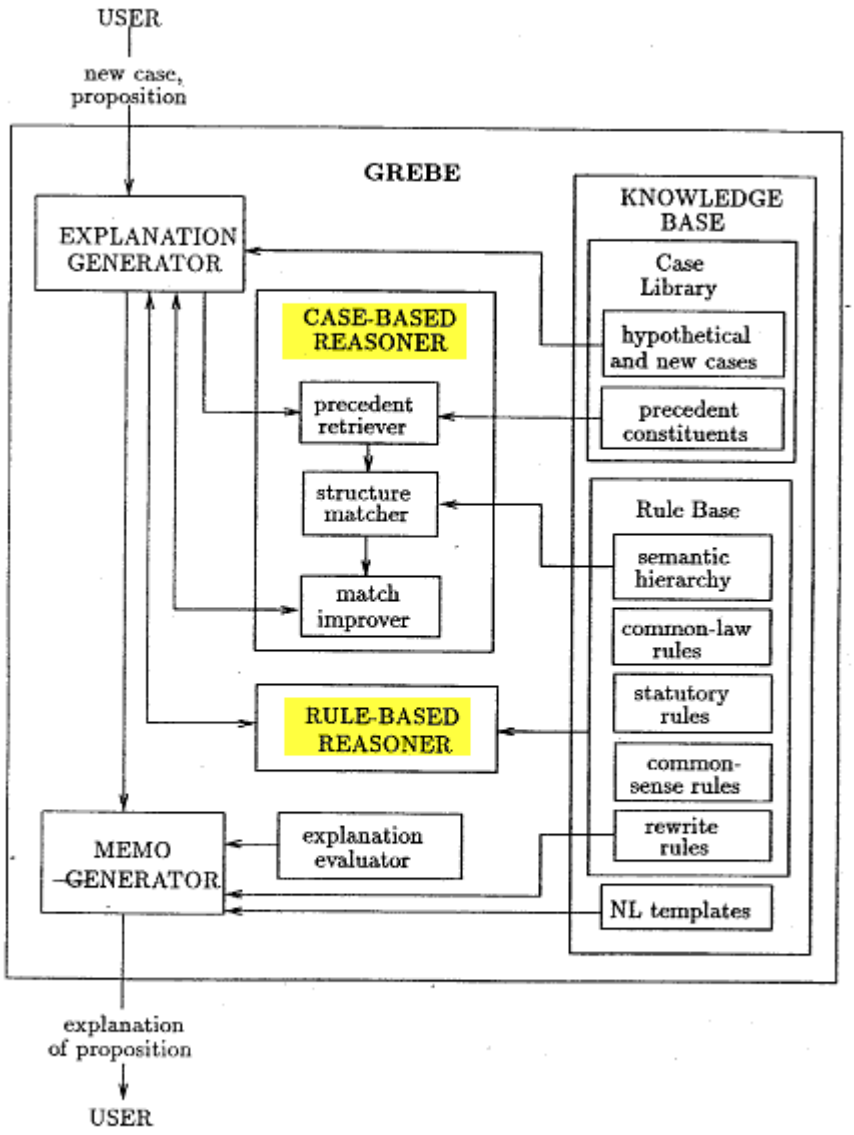


Figure 3.1: A schematic representation of the architecture of GREBE.

(Highlighting added)

More specifically, GREBE uses rule-based reasoning both to infer the relationships between the concepts present in the fact pattern and to combine multiple case comparisons into a single explanation. Thus, given a message input like the following:

> Jarek was employed as a railroad porter and normally worked from 8:00 A.M. to 5:00 P.M. Because of an unusual work-load, Jarek's employer asked him to work late. Jarek requested and was given permission to walk several blocks home to tell his wife that he would be working late. He slipped and was seriously injured while walking home. (Grebe 44.)

GREBE would apply a combination of rules and cases to show how Jarek is entitled to worker's compensation. Specifically, GREBE would use both legal rules (Texas worker's compensation statutes), common-sense rules (walking is like driving since both are traveling), and cases (Jarek is like Vaughn in that in both cases the travel was "necessitated by employment" (Grebe 65-75)) to interpret whether the new case was one in which the employee was entitled to worker's compensation.

193. **Retrieving predetermined responses:** GREBE retrieves predetermined responses based on the interpretation of the incoming fact pattern. Specifically, GREBE determines the explanations that apply to the particular fact pattern, then converts those explanations into natural-language equivalents. (Grebe 61.)

194. Accordingly, GREBE meets every element of claim 26.

VII. THE ASSERTED CLAIMS OF THE '947 PATENT ARE OBVIOUS

195. The discussion above demonstrated that the asserted claims of the '947 patent were anticipated by one or more of Allen, CBR Express, Nguyen, EZ Reader, and GREBE. To the extent that any of those references do not disclose limitations in the asserted claims, this section demonstrates that those limitations consist only of obvious application of art known to one of ordinary skill, and thus the claim is invalid for obviousness.

196. Exhibit 3 of this expert report is an element-by-element claim chart of each of the asserted claims in this case with references to the prior art, and is incorporated into the body of and is part of this report.

197. I understand that the Supreme Court in *KSR* expanded upon the framework for analyzing obviousness set forth in previous cases including *Graham v. John Deere.* It is my understanding that in *KSR*, the Supreme Court rejected the Federal Circuit's "rigid" application of the "teaching, suggestion, or motivation" test for obviousness in favor of an "expansive and flexible approach" using "common sense." I understand that in *KSR*, the Supreme Court

specifically cautioned against granting patents that are nothing more than combinations of known elements driven by non-innovative factors such as market demands. The Court also provided guidance on how combination patents should be handled. The Supreme Court noted that "[g]ranting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility." The Supreme Court also stressed the need for "caution" before validating patents that are merely combinations of elements found in the prior art. In view of this caution, the Court explained that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."

198. I further understand that the Supreme Court pointed to other factors which may show obviousness. For example, the Supreme Court observed, "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill in the art can implement a predictable variation," it is obvious. Similarly, the Court noted that "[i]f a technique had been used to improve one device, and a person of ordinary skill would recognize that it would improve similar devices in the same way, using the technique is obvious, unless its actual application is beyond his or her skill." Further, "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical knowledge." Finally, "[i]f a person of ordinary skill can implement a predictable variation of the prior art in the manner claimed, §103 likely bars its patentability."

199. I understand that in *KSR*, the Supreme Court also stated that the factors from *Graham v. John Deere* should be used in the obviousness analysis. These factors are:

(1) The scope and content of the prior art,

(2) Differences between the prior art and the claims asserted,

(3) The level of ordinary skill in the pertinent art.

(4) "Secondary considerations" of non-obviousness

A. The '947 Patent Is a Combination of Prior Art Elements.

200. Each of the elements of the '947 patent was present in the prior art. As detailed in section V.B.6, the '947 patent merely solves the same problem for emails that Chase Manhattan Bank had already solved for telexes, and in the same way: by using a rule-base and case-base knowledge engine to interpret incoming electronic messages.

201. Classifying messages is inherent in case-based reasoning. When a CBR system locates a "best-matching" case, it effectively classifies the presented class as belonging to the same category as the matched case. Indeed, a knowledge engine may deliberately pick "paradigmatic" case for the case base. (*See*, *e.g.*, Grebe 25; Nguyen 58.) For instance, a CBR system that attempts to determine auto insurance rates would try to classify or categorize drivers as high-risk, medium-risk, or low-risk.[19] It would thus be obvious, when addressing incoming email messages, to classify the message as to whether it can be responded to automatically. Indeed, requiring human assistance is fairly common in CBR systems:

> [The CBR] cycle currently rarely occurs without human intervention. For example, many CBR tools act primarily as case retrieval and reuse systems. Case revision (i.e. adaptation) often being undertaken by managers of the case base. [sic] However, it should not be viewed as a weakness of CBR that it encourages human collaboration in decision support. (Watson 330.)

202. Furthermore, the '947 patent does not disclose a new type of knowledge engine; it merely applies the existing ART**Enterprise* engine to the problem of interpreting email messages. As indicated in the prior art above, ART**Enterprise* uses the same case-based engine

[19] *See*, *e.g.*, Golding et al., "Improving accuracy by combining rule-based and case-based reasoning" (1996), pp. 218-220.

as CBR-Express, which was one of the most popular off-the-shelf engines at the time of the alleged invention. In particular, claims 30, 31, and 33 describe the case-matching process as implemented in ART*_Enterprise_, and are therefore present in any application using CBR-Express or CasePoint.[20]

203. As to modifying the retrieved message prior to sending it, revising the prior solution is one of the four basic steps to CBR reasoning, along with retrieving matching cases from the case base, reusing the solution that corresponds to the best-matched case, and retaining the new solution as a new case. (Watson 330.)

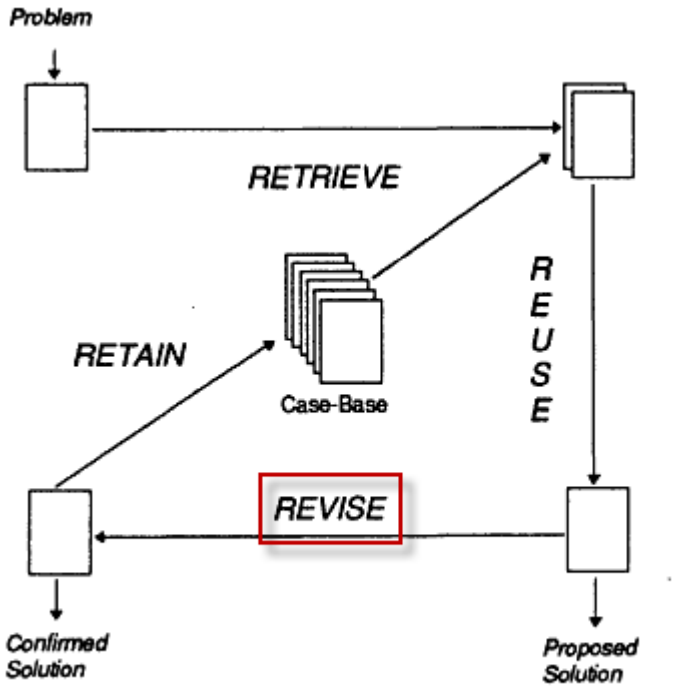


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

(Annotation added)

204. **Non-interactive messages**: In an attempt to evade the prior art Allen patent, the '947 patent draws a distinction between "interactive" messages and "non-interactive" messages. The Court has construed "non-interactive" electronic messages as "an electronic message in

[20] July 2, 2010 Conversation with Chuck Williams.

which the sender does not provide any additional information after the message has been received." The patent does not describe any meaningful distinction in handling interactive and non-interactive messages, nor does it state why the claimed invention is better suited for non-interactive electronic messages than electronic messages, or any benefits to so limiting the incoming messages.

205. However, it would be obvious to one of ordinary skill to limit a case-based reasoning system to non-interactive messages. Because CBR systems need to compare a presented case with the stored set of cases within a case base, responding to a user's message tends to be computationally expensive, particularly as the size of the case base increases. Limiting the CBR system to applications where a user is not actively waiting at his computer for a response, would therefore be obvious to one of skill—particularly in the mid 90's, when CPUs were less powerful than they are today. As indicated above, several prior art references either operated on non-interactive electronic messages exclusively or could receive and process a non-interactive electronic message. (*See* discussions of Allen, Nguyen, EZ Reader, and Goodman.)

206. Processing non-interactive electronic messages would have been particularly obvious to one of ordinary skill given the off-the-shelf CBR software applications available at the time of the alleged invention. CBR-Express, CasePoint, ART***Enterprise* (which all use the same case-base reasoning engine), Eclipse, ReMind, CASUEL, and Recall were all available products that were capable of processing non-interactive electronic messages. As detailed above, the Nguyen reference discloses using CBR-Express and CasePoint to process non-interactive electronic messages relating to Compaq printer maintenance. Furthermore, I understand from my conversation with Chuck Williams, CTO of Inference and founder and CEO of Brightware, that CBR-Express/CasePoint/ART*Enterprise were used in a variety of deployed applications at the time of the alleged invention, including products at American Express and Ford Motor

Company. Mr. Williams further stated that Inference's and Brightware's products were designed for both interactive and non-interactive users. I note that the CBR Express Reference Manual explicitly discloses removing the questions from the user interface. (Reference Manual 14.)

207. **Rule-based reasoning:** Using a rule-based reasoning system with a case-based system would also have been obvious to one of ordinary skill in the art. Several prior art references—including my own doctoral dissertation submitted in 1991—proposed systems that combined rule-based reasoning and case-based reasoning. *See*, *e.g.*, Edwina L. Rissland & David B. Skalak, "Combining Case-Based and Rule-Based Reasoning: A Heuristic Approach" (1989); M. Fathi-Torbanhan and D. Meyer, "ICARUS: Integrating Rule-Based and Case-Based Reasoning on the Base of Unsharp Systems" (1995); Andrew R. Golding and Paul S. Rosenbloom, "Improving Rule-Based Systems through Case-Based Reasoning" (1991); Andrew R. Golding and Paul S. Rosenbloom, "Improving Accuracy by Combining Rule-Based and Case-Based Reasoning" (1996); Jerzy Surma and Koen Vanhoof, "Integrating Rules and Cases for the Classification Task" (1995); Robert T. H. Chi and Melody Y. Kiang, "An Integrated Approach of Rule-Based and Case-Based Reasoning for Decision Support" (1991); George Vossos et al., "An Example in Integrating Legal Case Based Reasoning with Object-Oriented Rule-Based Systems: IKBALS II" (1991); and Soumitra Dutta and Piero P. Bonissone, "Integrating Case Based and Rule Based Reasoning: the Possibilistic Connection" (1991).

208. Furthermore, the ART***Enterprise* system used by the '947 patent also contained both rule-base and case-base knowledge engine, along with functionality for using the two systems together. Similarly, the CasePoint system used rule-based reasoning to "pre-answer" questions for the case-based reasoning. (CBR Express User's Guide 6, 64.) In any event, RBR systems were perhaps the most popular form of knowledge-base systems at the time of the

alleged invention (Watson 327), and using rules for the "adaptation" stage of case-based reasoning was common. (Watson 334.)

209. **Case based reasoning**: The process of classification using a combination of rules and cases had been a well-studied problem since the mid-1980's, and numerous approaches to the task were well-known to those with an ordinary level of skill in the art. For example, (Grebe 1990 pp. 104-108)[21] compares a variety of different techniques for performing classification with rules and cases in the art in 1990. As noted above, Allen, Nguyen, CBR Express, and Goodman all use this approach, as do the papers cited under the "rule-based reasoning" section. The approach in claim 26 would therefore have been familiar to anyone of ordinary skill.

210. **Retrieving predetermined responses**: Retrieving a response corresponding to the interpretation of the electronic message is one of the four basic steps of case-based reasoning:

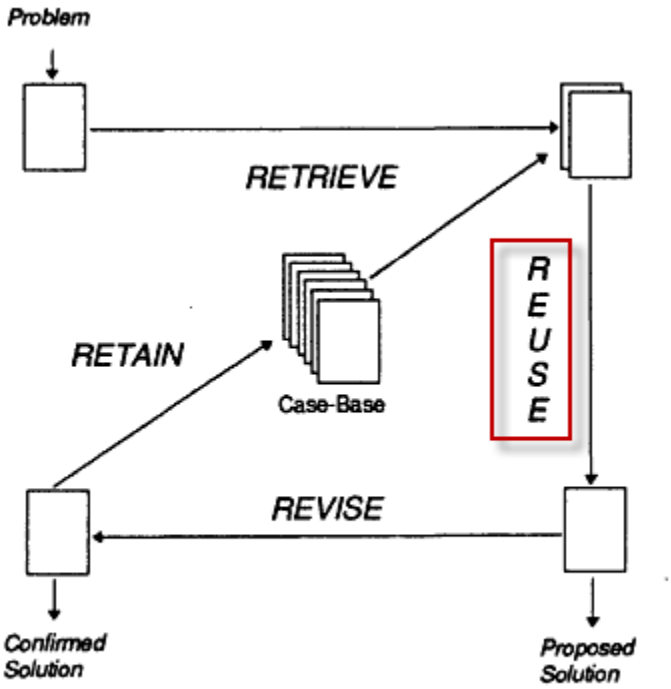


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

(Annotation added)

21 L. Karl Branting, *Integrating rules and precedents for classification and explanation: automating legal analysis*, Ph.D. Dissertation, Technical Report AI90-146, Artificial Intelligence Laboratory, The University of Texas at Austin, December 1990.

(Watson 330.) It would therefore be obvious to one of ordinary skill to do so. Indeed, it would be surprising to design a CBR system to locate the best matching case and *not* rely on the solution to that case in addressing the incoming problem. *See* discussions of Allen, CBR-Express, Nguyen, EZ Reader, GREBE, and Goodman, above.

211. **Classification as automatic or requiring human assistance**: As detailed at the beginning of this section, making classifications in general is one of the main purposes in using a CBR system. Determining whether a message can be responded to automatically or requires human assistance is an application of CBR technology that would be obvious to anyone of ordinary skill. For instance, the CBR Express User's Guide lists a variety of applications of case-based classification, including human resources, product sales, real estate, transportation, engineering, and customer service. These applications are meant to assist humans in making decisions in the various fields; accordingly, it would be obvious to request additional help from that person in the event the system is unable to find a matching case. Indeed, prior art sources explicitly disclose the need for human assistance, particularly when the case-base is small. *See, e.g.,* Watson 330:

> This cycle currently rarely occurs without human intervention. For example, many CBR tools act primarily as case retrieval and reuse systems. Case revision (i.e. adaptation) often being undertaken by managers of the case base. However, it should not be viewed as a weakness of CBR that it encourages human collaboration in decision support.

See also CBR-Express User's Manual 56.

212. **Case-based match scores**: Using case attributes to compare cases would have been obvious to one of ordinary skill in the art. Consider the car insurance hypothetical in section V.B.7, where a CBR system is trying to compute a rate for an unmarried 37-year-old male who drives a Toyota Camry, received one speeding ticket in the past year, and lives in Columbus, Ohio. It would be obvious to one of skill in the art to compare the age, marital status,

sex, make and model of car, traffic history, and residence—in short, the *attributes*—of the new driver with the attributes of the drivers in the stored cases of the case base. Put another way, one of skill in the art would not compare drivers based solely on their age, or residence, or traffic history when there is more comprehensive information in the case base. In the event one was comparing emails, it would be obvious to one of ordinary skill to compare the text of those emails in determining similarity. It would not make sense to look for a matching email message without considering the text of the email itself.

213. Since these multi-attribute cases need to be ranked to determine the "best" case, it would be obvious to one or ordinary skill to combine the attribute comparisons into a single number. Using a single number derived from multiple, disparate statistics is prevalent in a wide range of fields, e.g. ranking colleges, restaurants, baseball players, video games, vacation locations, etc. Similarly, it would be obvious to one of skill to increase the match score in the event of a matching set of attributes and not increase the match score in the event of no match. Indeed, it would make no sense to decrease the *match* score if attributes matched, or to increase the *match* score if attributes did not match.

214. Determining the best matching cases is *case retrieval*, one of the four steps of case-based reasoning:

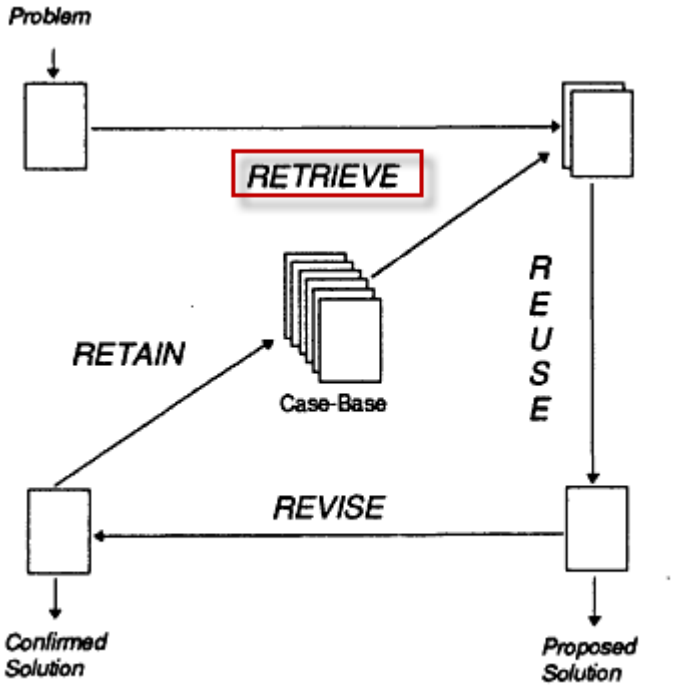


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

(Annotation added)

Furthermore, using weighted attribute comparison—the so-called "nearest neighbor" matching algorithm, was well-known in the art. (Watson 333.) Character-level n-gram matching was established in prior art in, for example, Damashek 1995.[22] Assigning separate weights to different case features was established in prior art, e.g., in Wettschereck & Aha 1995 (which focused on learning the optimal weighting scheme for a given training set).[23] For instance, Figure 2 of Watson discloses the following:

22 Marc Damashek , Gauging Similarity with n-Grams: Language-Independent Categorization of Text (10 February 1995) *Science* 267 (5199), 843.

23 Dietrich Wettschereck, David W. Aha, Weighting Features. *ICCBR'95* 347-358 (1995).

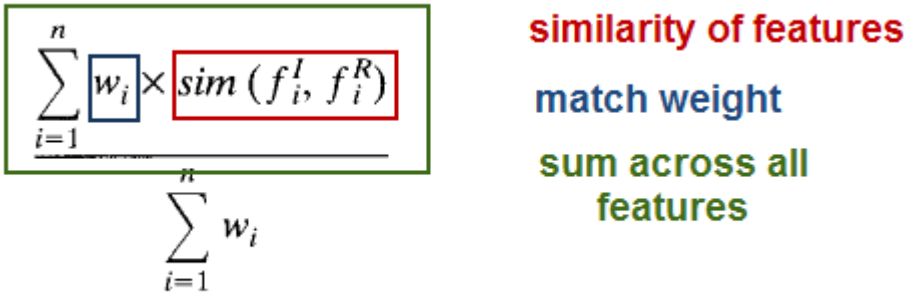


Figure 2 Nearest neighbour algorithm

(Annotations added)

In any event, weighted attribute comparison was implemented by CBR-Express/ CasePoint/ ART*Enterprise, which were among the most successful off-the-shelf software package for deploying case-base reasoning systems. (Watson 335.) It would have been obvious to one of ordinary skill to use the most successful CBR software package to implement a CBR system.

215. **Match weights / Mismatch weights**: Scoring case similarity by increasing scores based on matching attributes and decreasing scores based on non-matching attributes was used in Allen, CBR Express, and Nguyen. A very common metric for case similarity is a normalized weighted sum of matching features, used, for example, in the Cognitive Systems Remind CBR shell (Watson p. 333), included above. Since the denominator in this expression is the sum of all feature weights, representing the weighted sum of a perfect match, then any unmatched feature will reduce the metric by making the denominator proportionately larger than the numerator. Similarity metrics that penalize mismatching features have a long history, dating back to the feature-contrast similarity model of Tversky 1977.[24] In the Tversky model, similarity is a linear combination of the magnitude of three sets: (1) the set of shared features, (2) those in the first but not the second entity, and (3) those in the second but not in the first:

216. $sim(A, B) = \alpha|A \cap B| - \beta|A - B| - \gamma|B - A|$

24 Tversky A, Features of Similarity. *Psychological Review* 84, 327-352 (1977). See http://www.scholarpedia.org/article/Similarity_measures.

217. In this expression, $|A \cap B|$ represents the number of shared features, $|A - B|$ represents the number of features in A but not B, $|B - A|$ represents the number of features in B but not A, and α, β, and γ are the weights assigned to each set. The '947 patent's similarity function assigns a "match-weight" (corresponding to α) to each element of the first set and a "mismatch-weight" (corresponding to β, if A is the presented case and B the stored case) to each element of the set of features in the presented case but not in the stored case. Features in the stored-case but not in the presented case aren't explicitly weighted in the '947 patent, but contribute to the normalization factor discussed below. The feature-contrast model was used as a case similarity metric in PATDEX, which was described in Althoff 1995.[25] Thus, it would be obvious to one of ordinary skill to include match weights and mismatch weights.

218. In any event, match weights and mismatch weights were used within CBR-Express, which was described in December 1994 as the most successful off-the-shelf software package for deploying case-base reasoning systems. (Watson 335.) It would have been obvious to one of ordinary skill to use the most successful CBR software package to implement a CBR system.

219. **Normalization**: Matching score normalization was used in CBR Express (CBR Express Manual p. 15) and the Cognitive Systems Remind CBR shell (Watson 333), discussed above, but normalization is a fundamental mathematical operation familiar to anyone working with similarity metrics. Other examples of similarity metrics with an explicit normalization step (needed when the number of case attributes is variable) in the art include Althoff 1995 and Feret

25 Klaus-Dieter Althoff, Evaluating Case-based reasoning systems, in Aamodt, A., Althoff, K.-D., Magaldi, R. & Milne, R., *Case-Based Reasoning: A New Force In Advanced Systems Development.* Tutorial, London, Unicom Seminars & AI Intelligence, UK (1995).

& Glasgow 1993.[26] It would have been obvious to one of ordinary skill to use the most successful CBR software package to implement a CBR system.

220. Furthermore, it would have been obvious to one of ordinary skill to normalize match scores when cases have a dissimilar number of features: failing to do so would given too much weight to cases with many features—only some of which may match—at the expense of cases with fewer features—all of which may match.

221. Match scores of cases with different numbers of features must be normalized for the same reason that the scores of tests with different number of questions must be normalized by a school teacher. For example, for a teacher to compare the performance of a student on two tests in which the student got 8 out of 10 questions right on the first test and 12 out of 20 questions right on the second test, the teacher must divide the number of right answers by the largest possible number of right answers, i.e., 8/10 = 80% on the first test and 12/20 = 60% on the second test. Case matching scores are normalized in the same way—by dividing by the largest possible score—and for the same reason—so that different scores can be compared.

222. Cases in the case base may have a different number of attributes, i.e. ask a different number of questions relating to the incoming problem. Suppose one case matched 3 attributes of the incoming problem, while a second case matched 5 attributes. Absent normalization, the case-base engine may decide that the second case is the better match. However, suppose the first case only have 3 attributes overall (asked three questions), whereas the second case had 20 attributes (asked twenty questions). Once the total possible matches are known, it becomes obvious that the first case—which matched 100% of its questions—is more likely relevant than the second case—which only matched 25% of its questions. Normalization is simply the process of computing that percentage of "questions matched" divided by "total

26 M. Feret and J. Glasgow, Hybrid case-based reasoning for the diagnosis of complex devices, *AAAI-93 proceedings,* 168-175 (1993).

questions asked," which thus allows cases with different numbers of attributes (questions) to be compared directly.

223. **Altering the predetermined response**: As detailed at the beginning of this section, modifying the solution associated with a stored case to improve its applicability to a presented case is *case adaptation*, one of the fundamental steps of CBR. Case adaptation was performed by Allen and Goodman, as discussed above, as well as by the vast majority of other CBR systems. Watson (334-335) lists 9 different techniques for case adaptation in the art in 1994. Also, altering the response makes additional sense if responses are being shown to humans for review; absent the ability to edit the predetermined responses, the human review is of little value. Accordingly, it would be obvious to one of ordinary skill to use one of the four basic steps of CBR systems in implementing a CBR system.

B. The Combinations In the '947 Patent Claims Are Predictable And Do Not Yield Any Unpredictable Results.

224. The Supreme Court in *KSR* stated "[w]hen a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability." The Supreme Court also stated that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."

225. It is my opinion that using a rule-base and case-base knowledge engine to process emails was both predictable and produced no unpredictable results.

1. The Combinations In the '947 Patent Are Predictable

226. Combining the elements of '947 patent was predictable. The elements were available in combination and only with slight variations in the very same field of knowledge management. It is my opinion that this combination adds nothing to the nature and quality of

each of the individual elements on its own, which I understand the Supreme Court has emphasized in KSR.

227. As described above, several CBR systems were developed to deal with non-interactive electronic messages, or to make an incoming message non-interactive. *See* discussions regarding Allen, CBR-Express, Nguyen, EZ Reader, GREBE, and Goodman, above. Applying rule-base reasoning was common in the art; indeed, it is regularly used in the "adaptation" step of case-based reasoning. Retrieving a predetermined response is the "reuse" phase of CBR, and is a regular part of such systems. *See*, *e.g.*, Edwina L. Rissland & David B. Skalak, "Combining Case-Based and Rule-Based Reasoning: A Heuristic Approach" (1989); M. Fathi-Torbanhan and D. Meyer, "ICARUS: Integrating Rule-Based and Case-Based Reasoning on the Base of Unsharp Systems" (1995); Andrew R. Golding and Paul S. Rosenbloom, "Improving Rule-Based Systems through Case-Based Reasoning" (1991); Andrew R. Golding and Paul S. Rosenbloom, "Improving Accuracy by Combining Rule-Based and Case-Based Reasoning" (1996); Jerzy Surma and Koen Vanhoof, "Integrating Rules and Cases for the Classification Task" (1995); Robert T. H. Chi and Melody Y. Kiang, "An Integrated Approach of Rule-Based and Case-Based Reasoning for Decision Support" (1991); George Vossos et al., "An Example in Integrating Legal Case Based Reasoning with Object-Oriented Rule-Based Systems: IKBALS II" (1991); and Soumitra Dutta and Piero P. Bonissone, "Integrating Case Based and Rule Based Reasoning: the Possibilistic Connection" (1991).

228. Similarly, most CBR systems classify the incoming problem so as to determine the best way to deal with it, and classifying customer service emails into those which need a customer service representative would have been obvious to one of skill in the art when approaching a customer service problem. (*See* section VII.A.) The case matching, match weight, and normalization elements are all inherent to CBR-Express, the most successful CBR

system at the time of the alleged invention, and thus it would be predictable to use that off-the-shelf system to solve a problem. (*See* section VI.B.) The same CBR system at use in CBR-Express was also present in both CasePoint and ART*Enterprise, the software package that implements the alleged invention.[27] Finally, modifying the predetermined response is part of the "adaptation" stage of CBR reasoning, and thus also would have been predictable. (*See, e.g.*, Watson 330; *see also* discussions of Allen, EZ Reader, and Goodman.)

(a) Allen

229. As detailed in section VI.A, Allen anticipates every asserted claim except for claim 33. While the CBR Express User's Guide that is incorporated into Allen implies that match scores or normalized—i.e., "Each case is displayed with its match score, a number between 0 and 100 that shows how nearly that case matched the search description" (User's Guide 49)—Allen does not explicitly mention normalizing match scores.

230. However, normalizing match scores would have been obvious to one of ordinary skill in the art. The CBR Express User's Guide repeatedly refers to the CBR Express Reference Manual, which describes the same product. (*See, e.g.,* User's Guide at 7, 24, 46.) Furthermore, the Reference Guide explicitly mentions normalizing match scores:

> The raw score is totaled up for each case, and is then normalized into the range of points left over after scoring the description. For instance, if the description percentage is set to 50% (or 50 points), the contribution from the questions will be some scaled proportion of the remaining 50 points. The normalization confines the final values to a range of 0 to 100 in CBR Express.' A normalized score of 100 indicates a perfect match. (Reference Guide 14-15.)

231. Accordingly, it would be predictable for one of ordinary skill to apply normalization to the teachings of Allen. CBR Express is an embodiment of the Allen patent, and as demonstrated above, the CBR Express normalizes its match scores.

[27] July 2, 2010 call with Chuck Williams.

232. In any event, normalization is a regular part of case-based reasoning, due to the fact that cases in Allen need not have the same number of features. It would be obvious to normalize match scores in such a system. (*See* discussion in section VII.A.)

(b) CBR-Express

233. As detailed in section VI.B, the CBR Express User's Guide and Reference Manual anticipates all asserted claims except claim 38. Neither reference explicitly details adapting the retrieved case. However, as detailed in the previous section, modifying the response associated with the "best" matching case is one of the four main components of CBR systems. (*See, e.g.*, Watson 330; *see also* discussions of Allen, EZ Reader, and Goodman.) Accordingly, it would be predictable that one of ordinary skill would employ the "revise" component in light of the teachings of CBR-Express. The modification could be as simple as including the customer's name in the response presented to the user, thereby reminding the user to refer to the customer by name while answering his questions.

234. As I demonstrate in section VI.B, it is my opinion that one of skill in the art would understand at least Chapter 2 of the Reference Manual to have been incorporated into the User's Guide. To the extent that Bright Response may contend that there was no such incorporation by reference, it would have been obvious to one of ordinary skill to combine the teachings of manuals, which were shipped together, bear the same date, and describe the same version of the same product.

(c) Nguyen

235. As detailed in section VI.B, Nguyen anticipates claims 26 and 28. Nguyen does not disclose the inner workings of its case base engine, nor does Nguyen mention modifying the predetermined response.

236. However, implementing the elements of claims 30, 31, and 33 would have been obvious and predictable. In fact, those elements were *already* in the QuickSource system described by Nguyen; they just aren't disclosed in the Nguyen paper. As Nguyen indicates, the case-base reasoning component was originally implemented in CBR-Express; the front (user-facing) end of the system was later transitioned to CasePoint. (Nguyen 51.) CasePoint is simply the runtime version of CBR-Express: users may not develop or edit cases, but the searching and case-matching functionality is unchanged. (Watson 336-337; CBR-Express User's Guide 6; July 2, 2010 Conversation with Chuck Williams.) Since QuickSource already implements the elements of claims 30, 31, and 33 by virtue of using CBR-Express and CasePoint, it would have been predictable for one of ordinary skill to consider using those elements in light of the teachings of Nguyen.

237. Furthermore, Nguyen succinctly states that "[t]he description field is accompanied by a weight used to indicate its importance in determining the closeness of a match. Similarly, a weight is assigned to each question that specifies the importance of a question's answer. The overall matching score is defined by the combination of these weights during the search process." (Nguyen p. 54-55 (emphasis added)). It would be obvious to one of ordinary skill that this "combination" involves increasing the score by the weight amount for each additional attribute or text match.

238. As indicated above, modifying the response associated with the "best" matching case is one of the four main components of CBR systems. (*See, e.g.*, Watson 330; *see also* discussions of Allen, EZ Reader, and Goodman.) Accordingly, it would be predictable that one of ordinary skill would employ the "revise" component in light of the teachings in Nguyen. This may be especially important in a help-desk application meant for printer customers, who tend not to be as technically savvy. The system could easily store or derive configuration information

about the user's printer, and modify the proposed solution to refer to the user's particular hardware configuration.

(d) EZ Reader

239. As detailed in section VI.D, EZ Reader anticipates every asserted claim. Of note, EZ Reader uses ART*_Enterprise_ as its case-based knowledge engine, the same engine used in CBR-Express. (Watson 336-337; July 2, 2010 Conversation with Chuck Williams.) Accordingly, EZ Reader implements the elements of claims 30, 31, and 33 simply by virtue of its off-the-shelf software program.

2. The Combinations In the '947 Patent Do Not Yield Unpredictable Results

240. As the Supreme Court observed in *KSR*, "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results."

241. In my opinion, there is nothing unpredictable that results from combining the elements of the '947 patent. The claim elements simply apply the well-known and financially successful product CBR-Express product to the specific problem of handling emails—the same problem solved by the same company six years earlier with regard to the predecessor to email technology (telex). The Goodman paper discloses many of the same benefits claimed in the '947 patent:

> Adding the router (which selectively extracts information from the telex) increased Prism's total telex processing time to 30 seconds. Still, 30 seconds is a significant improvement over rule-based Prism's 44 seconds for each telex and a dramatic increase over each bank's previous telex processing procedure. Also, Prism (unlike human operators) is able to work effectively 24 hours a day. This ability to process telexes in a more timely and cost-effective fashion will allow MHT to reduce its current staff of telex operators from five people to between two and three people. Prism has also been able to guarantee higher consistency than previously possible. (Goodman 36.)

242. This addresses the same problems motivating the alleged invention of the '947 patent:

> The problems imposed on businesses in formulating methods to quickly respond to electronic messages will only be exacerbated as the use of on-line information channels and electronic messaging increases in the future. Some businesses have responded to increases in incoming electronic messages by having employees work longer hours or employing more people to review and respond to the messages. These methods have the drawbacks of significantly increasing the business costs associated with hiring, training and/or compensating personnel as well as requiring an increase in capital equipment and office space. ('947 patent, 1:49-59.)

243. Furthermore, ART**Enterprise* contains both a rule-base and case-base knowledge engine, and it was designed so that those functions could operate together. (July 2, 2010 Conversation with Chuck Williams.) There cannot be any unpredictable results when an individual employs the ART**Enterprise* in the manner for which it was designed. Classifying incoming problems is one of the primary purposes of using a CBR system, and there are no unpredictable results in doing so. Similarly, the case-matching and normalization elements (claims 30, 31, and 33) were an inherent part of the ART**Enterprise* system, as well as the CBR-Express and CasePoint systems. (Watson 336-337; CBR-Express User's Guide 6; July 2, 2010 Conversation with Chuck Williams.) There are no unexpected results in using the default case-match matching algorithm that ships with one of the most popular off-the-shelf CBR systems of the time. Finally, adapting or revising the solution associated with the best-matched case is one of the four main components in a CBR system, and there are no unexpected results in doing so. (*See, e.g.*, Watson 330; *see also* discussions of Allen, EZ Reader, and Goodman.)

C. One Skilled In The Art Would Have Been Motivated To Pursue The Claimed Combinations Through Market Forces And Trends

244. In *KSR*, the Supreme Court also observed, that "when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or

her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under sec. 103."

245. Here, one of ordinary skill would have been motivated to pursue the claimed combinations, as market forces had already revealed the benefits of automating response to electronic messages in 1990. As the Goodman article notes, "[t]he large number of messages that must be reviewed each day, the urgency of these messages, and the difficulty of maintaining a staff of sufficiently skilled operators all indicate the advantages of automating this task." (Goodman 25.) Goodman also noted that implementing the rule-based and case-based knowledge engine to respond to non-interactive electronic messages allowed Chase to cut the number of message handlers in half. (*Id.* 36.) Furthermore, Goodman eliminated the queue of messages that built up every evening, as the rule-base and case-base knowledge engine could operate 24 hours per day. (*Id.*) Goodman's observations—that automating a task previous performed by humans might lead to cost savings and increased efficiency—comport with common sense, and would have motivated one of ordinary skill for the same reasons articulated in Goodman. These same market forces—the need to respond to numerous messages quickly while keeping expenses low—would drive one of ordinary skill to apply the same solution to emails six years later.

246. Automatically responding to emails was also known in the art at the time of the alleged invention. For instance, Robert Hall at AT&T described automatically respond to emails posted to mailing lists. (*See* Hall, INFOMOD: A Knowledge-based Moderator for Electronic Mail Help Lists (1996); *see also* U.S. Patent No. 5,909,679). INFOMOD sought to reduce the burden on mailing lists by automatically responding to messages matching its case-base of

frequently asked questions; only in the event that an incoming email could not be automatically responded to was that email sent to the members of the mailing list.

247. Furthermore, market forces were pushing companies to automate many business functions using knowledge engines. For instance, Nguyen discusses automating technical support through a rule-base and case-base knowledge engine, and estimates $10 to $20 million dollars per year in savings as a result. (Nguyen 59.) Similarly, the CBR Express User's Guide lists a number of business fields which could be automated, including customer service, human resources, product sales, and information retrieval. (User's Guide 4-5.)

VIII. THE *GRAHAM* FACTORS DEMONSTRATE THAT THE '450 PATENT CLAIMS WHICH MERELY COMBINE KNOWN ELEMENTS ARE OBVIOUS

248. I understand that the Supreme Court in *KSR* instructed that the factors in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), for applying the statutory language of 35 U.S.C. § 103 are as follows:

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background the obviousness or nonobviousness of the subject matter is determined.

Graham also set forth a broad inquiry and invited courts, where appropriate, to look at any secondary considerations that would prove instructive:

> Such secondary considerations as commercial success, long felt but unresolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

A. The Scope and Content of the Prior Art

249. The first *Graham* factor, "the scope and content of the prior art," shows the '947 patent to be obvious. As detailed throughout this report, each element of the patent at issue existed in the prior art. See section V.

250. In particular, using rule-base and case-base knowledge engines to respond to electronic messages was well known in the art. *See* discussions regarding Allen, CBR-Express,

Nguyen, EZ Reader, GREBE, and Goodman, above; *see also* Edwina L. Rissland & David B. Skalak, "Combining Case-Based and Rule-Based Reasoning: A Heuristic Approach" (1989); M. Fathi-Torbanhan and D. Meyer, "ICARUS: Integrating Rule-Based and Case-Based Reasoning on the Base of Unsharp Systems" (1995); Andrew R. Golding and Paul S. Rosenbloom, "Improving Rule-Based Systems through Case-Based Reasoning" (1991); Andrew R. Golding and Paul S. Rosenbloom, "Improving Accuracy by Combining Rule-Based and Case-Based Reasoning" (1996); Jerzy Surma and Koen Vanhoof, "Integrating Rules and Cases for the Classification Task" (1995); Robert T. H. Chi and Melody Y. Kiang, "An Integrated Approach of Rule-Based and Case-Based Reasoning for Decision Support" (1991); George Vossos et al., "An Example in Integrating Legal Case Based Reasoning with Object-Oriented Rule-Based Systems: IKBALS II" (1991); and Soumitra Dutta and Piero P. Bonissone, "Integrating Case Based and Rule Based Reasoning: the Possibilistic Connection" (1991).

251. Most CBR systems classify the incoming problem; indeed, locating the best matching case or cases is itself classification. (*See* section VII.A.) The case matching, match weight, and normalization elements are all inherent to CBR-Express, CasePoint, and ART*Enterprise, among the most successful CBR systems at the time of the alleged invention. (*See* section VI.B.) Finally, modifying the predetermined response is part of the "adaptation" stage of CBR reasoning, and thus also would have been predictable. (*See, e.g.*, Watson 330; *see also* discussions of Allen, EZ Reader, and Goodman.)

B. Differences Between the Prior Art and the Claims at Issue

252. As to the second factor, the "differences between the prior art and the claims asserted," each element of the '947 patent existed before and each claim of the patent is anticipated as detailed above. To the extent there is any difference at all between the prior art and the claims, however, as detailed herein in section VII and elsewhere it would be obvious to one of ordinary skill to add any missing elements of the asserted claims to each of Allen, CBR-

Express, Nguyen, EZ Reader, and GREBE, to the extent those elements are not in the reference already. See Section VII.B.1 and Exhibit 3.

253. In particular, combining rule-base engines and case-based engines would be obvious to one of ordinary skill given the number of prior art references that did so. *See* section VII.A. A case-based reasoning system would have no need to make a distinction between "interactive" messages and "non-interactive" messages, and in any event several system did or could handle "non-interactive" messages. (See section V). Classifying an incoming problem, retrieving matching cases, and revising the proposed solutions are basic steps in case-base reasoning systems, e.g.:

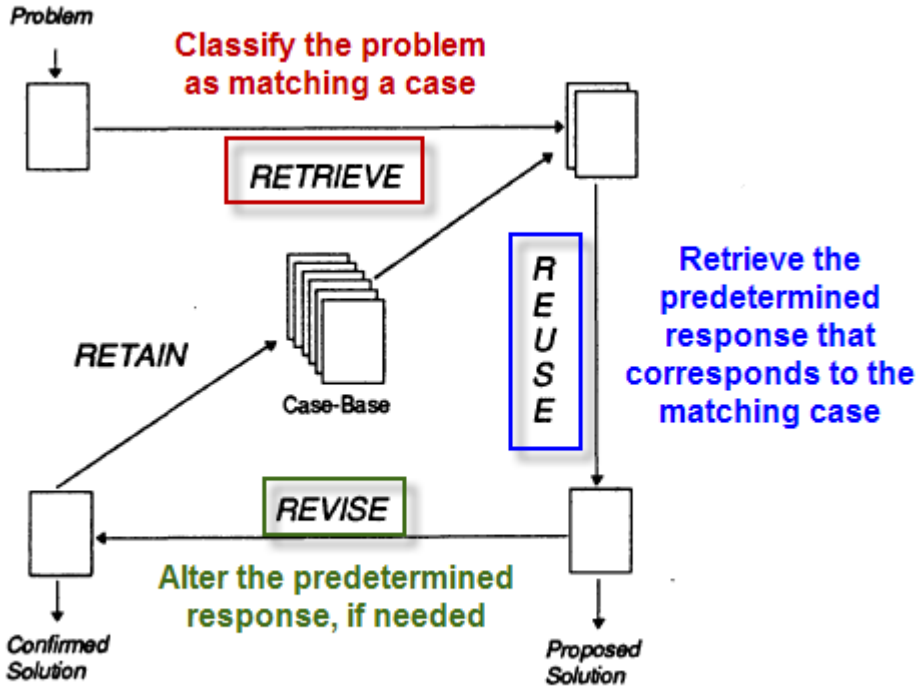


Figure 1 The CBR cycle (adapted from Aamodt & Plaza, 1994)

(Annotations added)

(Watson 330 (annotations added); *see also* section V.) Finally, the case matching, match weight, and normalization elements of claims 30, 31, and 33 are all inherent to CBR-Express, CasePoint, and ART*Enterprise, among the most successful CBR systems at the time of the alleged invention. (*See* section VI.B.) It would be obvious to one of ordinary skill to implement a case-based reasoning system using the most successful CBR systems of the day.

C. Level of Ordinary Skill in the Pertinent Art

254. The third *Graham* factor is the level of ordinary skill in the pertinent art. As the Supreme Court recognized in *KSR*, "[a] person of ordinary skill is also a person of ordinary creativity, not an automaton."

255. The '947 patent deals generally with configuring an off-the-shelf knowledge engine to respond to non-interactive electronic messages such as email. Therefore, one of skill in the art would be familiar with implementation of knowledge engines, including rule-base and case-base knowledge engines, and the manner of configuring such systems. From a reading of the specification, I judge that a bachelor's degree in computer science, or its equivalent based on experience would suffice, along with one or two years' experience in using and configuring knowledge engines.

256. An individual holding a bachelor's degree in computer science or equivalent with one or two years of knowledge engine experience would be aware of the scope and content of the prior art. The '947 patent itself admits that rule-base and case-base knowledge engines were known to those of skill in the art, and mentions that Allen reference as prior art, which is both a rule-base and case-base knowledge engine. ('947 patent, 1:60 – 2:51.) The '947 patent also suggests that the reader implement the alleged invention in ART**Enterprise*. ('947 patent, 5:56-57.) Indeed, I note that absent the awareness of the various commercial CBR products including ART**Enterprise*, one of ordinary skill would be unable to implement the alleged invention of the '947 patent, as the specification provides no source code, technical plans, or manner of creating the necessary rule-base and case-base knowledge engines; it only describes how to *configure* an existing system.

D. The Secondary Considerations Set Forth in *Graham* Do Not Alter the Conclusion of Obviousness

257. As I indicate above, I understand that the Supreme Court indicated in *KSR* that secondary considerations may be addressed when relevant. In this case, however, there are no secondary considerations that overcome the obviousness determination.

258. A telling indication of the lack of novelty of the '947 patent is that the Rice paper to which it claim priority was presented at the (IAAI) Innovative Applications of Artificial Intelligence conference. IAAI is a forum for success stories about applications of established AI (Artificial Intelligence) techniques to real-world problems. It is not a forum for presentation of technical innovations. Instead, technical innovations in are presented at the main sessions of the annual conference of the AAAI (American Association for Artificial Intelligence), which is co-located with IAAI. The fact that Rice et al. 1996 presented EZ Reader at IAAI indicates that EZ Reader (and therefore the '947 patent) is simply an application of technology known in the art having no technical novelty. A review of the research literature reveals that neither EZ Reader nor any other embodiment of the '947 patent was ever accepted to any CBR or AI conference or other forum for presenting technical innovations.

259. Furthermore, Chuck Williams, the CEO and founder of Brightware (the original assignee of the '947 patent), stated that the ART**Enterprise*, CBR-Express, and CasePoint platforms had been designed to process electronic messages using a rule-base and case-base knowledge engine, and in fact had been deployed in that manner prior to the alleged invention of the '947 patent. (*See*, *e.g.*, Nguyen.)

260. ***Commercial success***: In its response to Defendants' interrogatory No. 3 regarding secondary considerations, Bright Response alleges that "Defendants' accused products have enjoyed commercial success and industry acclaim." However, Bright Response has failed to show or even mention the *nexus* between the allegedly infringing aspects of the accused products

and the alleged invention. I reserve the right to supplement my report should Bright Response present alleged evidence of a nexus between the patent claims and the acclaim or recognition of any accused products.

261. I further reserve the right to supplement my report to the extent that Bright Response or its expert identify additional alleged sources commercial success.

262. ***Long-felt but unresolved needs***: In its response to Defendants' interrogatory No. 3 regarding secondary considerations, Bright Response asserts that "the invention covered by the asserted claims had a long felt but unresolved need, including as evidenced by the combination of patented features being absent from the prior art." As I demonstrate above, there was no such "unresolved need": the combination of each of the elements of the '947 patent were in the prior art, and indeed had already been applied to solve the same problem of processing non-interactive electronic messages for Chase Manhattan. Furthermore, the ART**Enterprise* system had already been deployed at several businesses, including Compaq. (*See* Nguyen.)

263. Bright Response further asserts that "as discussed at length in the specification of the '947 Patent, [] Allen [] failed to present a scalable solution to a company experiencing a growing volume of incoming electronic messages." I find no such discussion of scaling deficiencies in the '947 patent; the only distinctions the specification makes regarding Allen are as to "non-interactive electronic messages" ('947 patent, 2:52-58) and that Allen "is not capable of automatically responding to the sender of an electronic message." As I demonstrate in section VI.A, both of these distinctions are baseless: Allen can respond to messages without further interaction, and the "user" or "sender" in Allen is the customer service representative, to whom Allen automatically responds. Indeed, the customer in Allen is not even a "sender of an electronic message," as the customer simply talks on the phone; he does not send an electronic

message. In any event, the '947 patent uses the same knowledge engine claimed in the Allen patent, and does not make any improvements as to the operation of the case-base logic.

264. Bright Response further cites to statements from Ms. Rice suggesting a sparse state of prior art. Ms. Rice is not correct: as I describe above, there were many prior art systems that use rule-base and case-based reasoning, including one that I developed in 1991. Furthermore, I note that the EZ Reader paper itself, that Ms. Rice authored, refers to the Goodman paper described above (Rice 1509), and that Ms. Rice admitted at her deposition that the Allen patent disclosed a rule-base and case-base knowledge engine. (Rice Deposition, 237:11- 238:11.)

265. I reserve the right to supplement my report to the extent that Bright Response or its expert identify additional alleged long-felt but unresolved needs.

266. ***Acclaim, recognition, or skepticism***: In its response to Defendants' interrogatory No. 3 regarding secondary considerations, Bright Response asserts that "the patented invention received praise by others, including the AAAI and Chase, as evidenced by the AAAI's publication and award." Bright Response's is misleading. The EZ Reader article was published for the "Innovative Applications Conference on Artificial Intelligence" Conference (IAAI), which is for "deployed applications with measurable benefits whose value depends on the use of AI technology."[28] In other words, the IAAI is for papers describing the *configuration* of *existing* AI technology, not the introduction of new technology as Bright Response seems to believe. New technology is presented at the AAAI Conference on Artificial Intelligence (AAAI), which runs concurrently with the IAAI conference.[29] Furthermore, the IAAI explicitly requires "deployed applications with measurable benefits"; thus, to the extent that EZ Reader received

[28] http://www.aaai.org/Conferences/IAAI/iaai.php

[29] http://www.aaai.org/Conferences/AAAI/aaai.php

any acclaim, that is only evidence that it had both been deployed and was in use at the time the paper was submitted.

267. As to the "acclaim" bestowed by Chase, I understand that three of the named inventors—Anthony Angotti, Rosanna Piccolo, and Fred Cohen—were employees of Chase. Accordingly, Chase's acclaim or recognition of the '947 patent does not constitute acclaim or recognition *by others*.

268. I reserve the right to supplement my report to the extent that Bright Response or its expert identify additional alleged sources of acclaim, recognition, or skepticism.

269. ***Unexpected results, synergies, improved results, and new results***: Bright Response has not identified any unexpected results, synergies, improved results, or new results. I reserve the right to supplement my report should Bright Response or its expert do so.

IX. TO THE EXTENT THAT THE ASSERTED CLAIMS ARE READ TO COVER GRADIENT DESCENT ALGORITHMS AND LOGISTIC REGRESSION, THEY ARE OBVIOUS.

270. I understand that Bright Response has accused Google and Yahoo's predicted clickthrough rate algorithms, which implement gradient descent algorithms and logistic regression, of meeting the case base knowledge limitations of the '947 patent. While I do not agree that statistical modeling is a case-based reasoning system, if Plaintiff's infringement theories hold, then the '947 patent is also invalidated by those models, as both existed long before the filing date of the patent.

271. Logistic regression is a kind of statistical classification model. It has been popular with economists and science researchers since the 1970s for two broad classes of applications: statistical prediction of category membership; and measuring the rate of change in a probability of occurrence of an event give a change in a predictor (Richard Tansey, Michael

White, Rebecca G. Long, Mark Smith, A comparison of loglinear modeling and logistic regression in management research, Vol. 22, No. 2, 339-358 (1996)). Logistic regression differs from linear regression is that in logistic regression the dependent variable is binary or dichotomous rather than numerical. (Hosmer, D.W., & Lemeshow, S., Applied Logistic Regression, New York: Wiley, (1989)).

272. Gradient descent is an optimization technique that attempts to minimize an error function by iteratively modifying parameters in the manner that reduces the error function most rapidly. (Duda, R. O. and Hart, P. E. (1973). Pattern Classification and Scene Analysis, Wiley, pp. 140-141; P.Baldi, Gradient descent learning algorithm overview: a general dynamical systems perspective, IEEE Transactions on Neural Networks, 6:1 January 1995, pp. 182-195). Gradient descent has been used for neural network learning since the early 1960's. (Rosenblatt, F., Principles of Neurodynamics, New York: Spartan Books (1962)).

273. Logistic regression and gradient descent predate the '947 patent by many decades. Moreover, these techniques are fundamentally antithetical to case-based reasoning.

274. The distinguishing characteristic of case-based reasoning is that it does not attempt to create a statistical or inductive model from cases, but instead uses un-generalized cases for problem-solving. In case-based reasoning, a problem is solved by transferring and adapting the solution of a specific, individual prior case to the new problem. Case-based reasoning systems characteristically do not attempt to estimate likelihood or probability based on generalizations or summaries of prior cases, but instead seek to find the single most appropriate prior case to solve the new problem.

275. If the '947 patent is construed so broadly as to apply to logistic regression and gradient descent, then it is invalid for anticipation, since both substantially predate the '947

patent. However, case-based reasoning is not related to, but is instead distinct from, logistic regression and gradient descent.

X. TO THE EXTENT THAT THE ASSERTED CLAIMS ARE READ TO COVER SEARCH QUERIES, THEY ARE INVALID FOR LACK OF ADEQUATE WRITTEN DESCRIPTION.

276. I have been informed by counsel that to meet the written description requirement, an application must describe an invention, and do so in sufficient detail, that one skilled in the art can clearly conclude that the inventor invented the full scope of the claimed invention as of the filing date sought. I understand the question is not whether a claimed invention is an obvious variant of that which is disclosed in the specification.

277. I am of the opinion that at the time the '947 patent was filed, one of ordinary skill in the art would not understand that the specification described in sufficient detail an invention to receive, interpret, and retrieve one or more responses to an Internet search query, an Internet user's click or a web page, which I understand is what Plaintiff contends meets the non-interactive electronic message limitation in the accused products.

XI. MATERIALITY OF OMITTED REFERENCES.

278. As I demonstrate above,[30] the EZ Reader product as described in Rice et al. 1996 and in the EZ Reader User's Guide invalidates all of the asserted claims of the '947 patent because it was in public use in the United States more than one year prior to the date of the patent application.

279. The EZ Reader product is not cumulative of the references that were before the examiner. Rice et al. 1996 discloses the use of a rule base and a case base for electronic message interpretation, which is an element of the '947 patent claim 26. I have examined each of the

[30] *see supra*, section VI.D.

references before the Examiner and was unable to find the use of a rule base and case base knowledge engine for electronic message interpretation in any of them.

280. As I demonstrate above,[31] the EZ Reader User's Guide confirms that the EZ Reader product, which invalidates each asserted claim of the '947 patent, was in public use in the first quarter of 1996—more than one year prior to the date of the patent application.

281. As I demonstrate above,[32] the Allen patent invalidates all of the asserted claims of the '947 patent.

282. Allen is not cumulative of the references that were before the examiner. Allen discloses the use of a rule base and a case base for electronic message interpretation, which is an element of the '947 patent claim 26. I have examined each of the references before the Examiner and was unable to find the use of a rule base and case base knowledge engine for electronic message interpretation in any of them.

283. The specification's description of Allen is incomplete and misleading because it fails to acknowledge that Allen discloses not a mere case-based system, but rather a hybrid case-based and rule-based system. ('947 patent 2:41-51; Allen 8:13-18 and Fig. 1, Items 102 and 103.) Presented with the specification's misleading description of Allen, one of skill in the art would not have been prompted to review Allen to determine whether it is an invalidating reference. Rather, it is my opinion that one of skill in the art would have wrongly assumed that Allen does not invalidate the claims of the '947 patent.

XII. CONCLUSIONS

284. None of the Asserted Claims is valid.

285. All the Asserted Claims are anticipated.

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[31] *see supra*, section VI.D.

[32] *see supra*, sections VI.A and VII.B.1(a).

286. All the Asserted Claims are obvious.

Executed on July 6, 2010, in Columbia, MD.

L. Karl Branting, Ph.D., J.D.

Exhibit 1
Materials Considered

All documents cited in the report.

U.S. Patent No. 6,411,947
File History of U.S. Patent No. 6,411,947
Plaintiff's Opening Brief Regarding Claim Construction (Dkt. 253)
Defendants' Joint Response Brief On Claim Construction (Dkt. 275)
Plaintiff's Reply Brief Regarding Claim Construction (Dkt. 285)
Memorandum Opinion And Order (Dkt. 369)

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U.S. Patent 5,418,948
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U.S. Patent 5,243,689
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U.S. Patent 5,444,823
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