UNITED STATES DISTRICT COURT

DISTRICT OF NEVADA

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BALLY TECHNOLOGIES, INC.,

Plaintiff,

v.

BUSINESS INTELLIGENCE SYSTEMS SOLUTIONS, INC.,

Defendant.

2:10-CV-00440-PMP-GWF

ORDER

Presently before the Court are Defendant Business Intelligence Systems Solutions, Inc.'s Opening Claim Construction Brief (Doc. #38), Plaintiff's Opening Markman Brief on Claim Construction (Doc. #40), and the parties' Joint Appendix (Doc. #39), all filed on December 20, 2010. Defendant Business Intelligence System Solutions, Inc. filed a Claim Construction Reply Brief (Doc. #55) with supporting exhibits (Doc. ##56-66) on February 28, 2011. That same day, Plaintiff Bally Technologies, Inc. filed its Response Markman Brief on Claim Construction (Doc. #67). The Court held a claim construction hearing on June 21, 2011. (Mins. of Proceedings (Doc. #71).)

This is a patent infringement action brought by Bally Technologies Inc. ("Bally") against Business Intelligence Systems Solutions, Inc. ("BIS2"). Bally owns several patents, including United States Patent No. 6,871,194 (the '194), Patent No. 7,221,367 (the '367), and Patent No. 7,158,968 (the '968). The '367 and '968 patents relate to systems and methods of data analysis and data visualization for the purpose of analyzing and visualizing large quantities of data that merchants gather from their customers. For example, casinos gather substantial amounts of data from their gaming devices, such as how much a

particular machine is played, at what denomination, during what time of day or what day of the week. The patents enable casino operators and other merchants to put such massive quantities of data into visual format so they can quickly recognize patterns of use, concentrations of use or lack thereof, revenue, and other data. The data is presented in graphical representations, such as a diagram of a bank of machines around which "contour lines" emanate to visually represent the relative data being measured. Additionally, the '194 teaches the use of a computerized "neural network" which predicts future outputs, such as revenue, based on historic data.

The parties have submitted several terms in the various patents for the Court to construe. Some terms appear in more than one of the patents at issue. The parties agree those terms are to have the same meaning in all patents in suit in which the terms appear.

I. LEGAL PRINCIPLES - CLAIM CONSTRUCTION

Patent claim construction is a question of law for the Court. Markman v. Westview Instruments, Inc., 517 U.S. 370, 372 (1996). In interpreting a claim, the court looks first to the intrinsic evidence of record, which consists of the claims, the specification, and the prosecution history. Interactive Gift Exp., Inc. v. Compuserve Inc., 256 F.3d 1323, 1331 (Fed. Cir. 2001). "'Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language.'" Id. (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Among the sources of intrinsic evidence, the starting point is the claim language. Id. If the claim language is clear on its face, then consideration of other intrinsic evidence is restricted to determining if those sources show a deviation from the claim's clear language. Id.

The court should give the claim's words their "ordinary and customary meaning." Phillips v. AWH Corp., 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc) (quotation omitted). However, the court may construe a claim term differently from its ordinary meaning in at least four instances. CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359,

1366-67 (Fed. Cir. 2002). First, if the patentee "acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history." Id. at 1366. Second, "if the intrinsic evidence shows that the patentee distinguished that term from prior art on the basis of a particular embodiment, expressly disclaimed subject matter, or described a particular embodiment as important to the invention." Id. at 1366-67. Third, if the patentee's chosen term "'so deprive[s] the claim of clarity' as to require resort to the other intrinsic evidence for a definite meaning." Id. at 1367. Finally, if the patentee phrased the claim in step- or means-plus-function format, "a claim term will cover nothing more than the corresponding structure or step disclosed in the specification, as well as equivalents thereto." Id.

In construing a claim term's ordinary meaning, the court must view the claim terms through the lens of a person of "ordinary skill in the art in question" as of the patent application filing date. Phillips, 415 F.3d at 1313. "Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." Id. For example, other claims in the patent in question may assist in determining a claim term's meaning because claim terms normally are used consistently throughout the patent, so use of a term in one claim can clarify the meaning of the same term in other claims. Id. at 1314. Additionally, differences between claims within the patent also can be useful because "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." Id. at 1314-15. Furthermore, "limitations stated in dependent claims are not to be read into the independent claim from which they depend." Nazomi Commc'ns, Inc. v. Arm Holdings, PLC, 403 F.3d 1364, 1370 (Fed. Cir. 2005) (quotation omitted).

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If the claim language is not clear on its face, then consideration of other intrinsic evidence may resolve the ambiguity. Interactive Gift Exp., Inc., 256 F.3d at 1331. The specification "'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" Phillips, 415 F.3d at 1315 (quoting Vitrionics, 90 F.3d at 1582). In reviewing the specification, the court must not read into the claims the limitations of particular embodiments and examples appearing in the specification. Comark Commc'ns, Inc. v. Harris Corp., 156 F.3d 1182, 1187 (Fed. Cir. 1998). The United States Court of Appeals for the Federal Circuit has "expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment." Phillips, 415 F.3d at 1323.

Additionally, the court may consider the patent's prosecution history, which consists of "the complete record of the proceedings before the [Patent and Trademark Office ("PTO")] and includes the prior art cited during the examination of the patent." Id. at 1317. The prosecution history "provides evidence of how the PTO and the inventor understood the patent," and it may show whether the patentee "limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." Id. However, "because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." Id.

If a claim limitation is not clear after reviewing all intrinsic evidence, then the court may refer to extrinsic evidence such as expert testimony, inventor testimony, dictionaries, and learned treatises. Id.; Interactive Gift Exp., Inc., 256 F.3d at 1332. However, "[s]uch instances will rarely, if ever, occur." Interactive Gift Exp., Inc., 256 F.3d at 1332 (quoting Vitronics, 90 F.3d at 1585). Additionally, the court may consider extrinsic evidence throughout claim construction to understand the underlying technology. Id.

II. THE '194 PATENT

Bally has asserted BIS2 has infringed on claims 1-4 and 19-22 of the '194 patent. The '194 patent teaches the use of a computerized "neural network" to predict future outcomes based on past historical data. The claims at issue, with disputed terms in bold, are:

> 1. An interaction prediction system comprising:
>
> a memory in which is maintained a neural network **trained on data** retrieved from an interaction database of interaction data representing interactions between customers and gaming machines, the interaction data including at least one gaming machine identifier, and at least one monetary value for the interaction;
>
> a retrieval component arranged to **activate the neural network** and to **retrieve prediction data** representing predicted revenue from future interactions between customers and individual gaming machines; and
>
> a display arranged to display a representation of the prediction data.
>
> 2. An interaction prediction system as claimed in claim 1 wherein the interaction data includes the date and/or time of the interaction and wherein the neural network is **trained on data** including the date and/or time of the interaction.
>
> 3. An interaction prediction system as claimed in claim 1 wherein the interaction data includes the spatial position of the machine involved in the interaction and wherein the neural network is **trained on data** including the spatial position of the machine involved in the interaction.
>
> 4. An interaction prediction system as claimed in claim 3 wherein the neural network is **trained on data** including the machine identifier and/or spatial position of machines neighboring the machine involved in the interactions.
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> . . .
>
> 19. **A method of predicting interactions between customers and merchants**, the method comprising the steps of:
>
> maintaining in a memory a neural network **trained on data** retrieved from an interaction database of interaction data representing interactions between customers and gaming machines, the interaction data including at least one gaming machine identifier and at least one monetary value for the interaction;
>
> **activating the neural network**;
>
> **retrieving prediction data** representing predicted revenue from future interactions between customers and individual gaming machines from the neural network; and
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> displaying a representation of the prediction data.
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> 20. A method as claimed in claim 19 wherein the interaction data includes the date and/or time of the interaction and wherein the neural network is **trained on data** including the date and/or time of the interaction.

21. A method as claimed in claim 19 wherein the interaction data includes the spatial position of the machine involved in the interaction and wherein the neural network is **trained on data** including the spatial position of the machine involved in the interaction.

22. A method as claimed in claim 21 wherein the neural network is **trained on data** including the machine identifier and/or spatial position of machines neighboring the machine involved in the interaction.

A. "trained on data"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Adjusting the weights of the neural network using any appropriate method	The neural network performs a learning function iteratively making predictions using data from the database

Bally argues that although iterative training likely would be the usual scenario for training a neural network in practice, the claims should not be limited in this respect for two reasons. First, Bally contends claim 5 claims a neural network training method that recites repetition of the learning steps, and thus would cover iterative training methods. By virtue of claim differentiation, Bally contends claim 1 should not have the same limitation. Additionally, Bally notes that the specification provided that the weights to the various data could be adjusted by "any known algorithm suitable for the purpose." Thus, although it usually would be the case that the neural network would be trained on the data by feeding through actual data, comparing the predicted results to actual results, and adjusting the weights accordingly until more accurate predictions are made in comparison with the actual results, that does not necessarily have to be the process by which the neural network is trained. Bally contends its proposed construction comes from the specification which refers to using any known algorithm suitable for the purpose.

BIS2 contends that "trained on data" means that the neural network is trained based on data from the database which holds the data regarding customer interactions with the merchant. BIS2 argues this is consistent with the specification as well as general

understanding in the field that a neural network is trained on existing data, as that is how and from what source the neural network learns. BIS2 contends this is the very point of the neural network and the claimed invention: that the neural network takes prior interaction data, learns the patterns therein through adjusting the weights of various values until predictive outputs match actual outputs, and then using those learned patterns to predict future outputs. BIS2 contends that Bally's definition is untethered to the claim and specification language as well as the purpose of the invention, because "using any appropriate method" could be performed by a person or program at any time for any reason, unrelated to training on the data as set forth in the patent. BIS2 contends that all four extrinsic sources upon which Bally relies show that training must be iterative.

The claim language is not clear on its face as to what is meant by "trained on data." Looking to the specification, Figure 5 shows an iterative method whereby actual data is fed to the neural network, and the predicted outputs are compared to actual results. (Fig. 5; Col. 6, l. 50 - Col. 7, l. 31.) The weights given to the various signals between the nodes are then adjusted "by any known algorithm suitable for the purpose . . . ." (Col. 7, ll. 25-29.) This process "may be repeated and the weights adjusted until such time as a good fit is obtained." (Col. 7, ll. 29-32.) Although this would suggest the patent describes only an iterative learning process, the patent states that Figure 5 is a "preferred method," and thus does not necessarily limit the patent to an iterative process. (Col. 6, l. 50; see also Col. 2, l. 54 ("Fig. 5 is a flow chart of one method of training the neural network.").)

Although Figure 5 does not necessarily limit the patent claims to an iterative method, one of ordinary skill in the art would understand the training method to be iterative. Bally contends there is a form of training known as "unsupervised" training which is not iterative, but the sources Bally relies upon demonstrate that unsupervised training also requires iterative learning. (Bally's Op. Br. (Doc. #40), Ex. C at 36 ("The training progresses through many epochs, just as in supervised training."); BIS2's Reply Br., Ex. 4 (Doc. #61)

at 263 (discussing iterative training of neural network); BIS2's Reply Br., Ex. 5 (Doc. #63) at 15 (referring to both supervised and unsupervised training as iterative processes).) Thus, one of ordinary skill in the art would understand the term "trained on data" to mean an iterative training process. (BIS2 Op. Br., Cardno Decl. at ¶ 9 ("Neural network software learns from existing data to recognize patterns within the data. Rather than just confirming a hypothesis developed by a human, a neural network iteratively learns the patterns as it processes the data.").)

However, Bally contends that claim 5 shows an iterative system whereby the actual data is compared to the predicted data, and then compares the predicted data to the actual outputs. (Col. 8, l. 62 - Col. 9, l. 13.) Bally contends that because the limitation of an iterative system is set forth in claim 5, claim 1 cannot be so limited. Bally is incorrect because claim 5 is not a dependent claim of claim 1. Claims 1 and 5 are each independent claims. While such a conclusion would be appropriate for a dependent claim, the same is not necessarily true for independent claims. Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 910 (Fed. Cir. 2004) (stating "the presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim"). Independent claims 1 and 5 have different scopes. SunRace Roots Enter. Co., Ltd. v. SRAM Corp., 336 F.3d 1298, 1302 (Fed. Cir. 2003) (noting the doctrine of claim differentiation creates "a presumption that each claim in a patent has a different scope" (quotation omitted)). Claim 5 is a training system, and thus recites a "training component arranged to compare the data retrieved from the interaction database and the prediction data and to adjust the neural network based on the comparison." (Col. 9, ll. 10-13.) Claim 1, in contrast, is a prediction system. It contains within it a neural network which is "trained on data." Claim 5 claims a system by which a neural network prediction system such as that recited in claim 1 is trained.

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The Court thus concludes that BIS2's proposed construction is generally appropriate. However, the language "using data from the database" in BIS2's proposed construction would be repetitive of other language in the claims. For example, claim 1 recites "a memory in which is maintained a neural network **trained on data** retrieved from an interaction database of interaction data representing interactions between customers and gaming machines." BIS2's interpretation would result in repetitive language of "using data from the database" and "data retrieved from an interaction database" in the independent claims.

The Court therefore adopts the following construction of the claim term "trained on data": "***The neural network performs a learning function iteratively making predictions***."

B. "activate the neural network"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The neural network is made available to predict values, and then determines those predictions	The neural network trained on data is made available for predicting values

"retrieve prediction data"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The neural network retrieves the predicted values	The neural network calculates and outputs predicted revenue

The parties dispute at which step, activation or retrieval, the neural network generates the predicted values. Bally contends that it makes more sense that predicted values are generated before they are retrieved because once the neural network makes the prediction, it need not recalculate it every time the same information is requested. Rather, the neural network would retrieve the previously calculated response. Bally contends the specification discusses the calculation of the prediction with the activation of the network.

Bally further contends activation is a term of art to mean applying a node's transfer function, which is more appropriately associated with activation, not retrieval.

BIS2 contends its definition of "activate the neural network" includes the requirement that the neural network must be trained before it is activated, consistent with the claim and specification language. BIS2 also argues that this claim term does not entail making predictions. Rather, BIS2 contends that activating the neural network must happen before the neural network outputs predicted data. BIS2 contends that neural networks do not save calculations as Bally suggests; rather, the neural network would re-perform the predictions, like a calculator. BIS2 thus contends that calculating and outputting the predicted revenue falls within the retrieval claim term, rather than the activation claim term. Finally, BIS2 contends that claim construction must refer to predicted revenue, not predicted values generally, as the claim language specifically refers to predicted revenue.

Bally does not appear to dispute, and the specification and claim language support, BIS2's proposed construction that activation occurs after training is complete. Although BIS2 suggests a reference to "revenue" must be included in construing these terms, that word is included in other claim language and is not necessary to construe the claim terms at issue.

Thus, it appears the only dispute is whether the generation of the predicted results is done at the activation or the retrieval stage. The patent does not specifically refer to the generation of the predicted values. It refers to activating the neural network and retrieving predicted values, but it is not clear from the claim language whether generation of the predicted values occurs at activation or retrieval or somewhere in between.

Looking to the specification, Figure 6 is meant to depict activating the network and retrieving predictions. (Fig. 6; Col. 7, ll. 33-42.) As explained in the specification:

> Once learning is complete, the neural network may then be used to predict future interactions. FIG. 6 illustrates use of the preferred system for this purpose. The neural network is first activated as shown at 400. The network calculates and outputs predicted data representing future interactions between

customers and merchants.

> As indicated at 402, this data is retrieved from the neural network and as shown at 404, the data is displayed to the user, following which the neural network is deactivated as shown at 406.

(Col. 7, ll. 33-42.) The specification mentions calculating and outputting together. This suggests that calculations are performed at the retrieval stage. Such a construction comports with how one of ordinary skill in the art would understand what it means to retrieve results. Results are generated through a query or request to the neural network to preform the prediction. In other words, the neural network performs the predictions in response to a request to retrieve predicted outputs.

The Court therefore adopts BIS2's proposed constructions for these two claim terms.

C. "a method of predicting interactions between customers and merchants"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The steps are not required to be performed in the order recited	The claimed method requires the steps to be performed in the order recited in the claim

This dispute centers on claims 19-22, which are method claims. Bally contends that although generally the steps would be performed in the order recited, the claims should not be so limited. Bally contends there is a presumption that the steps need not be performed in a certain order, and BIS2 has not overcome that presumption, as nothing in the claims, specification, or prosecution history suggest the steps must be performed in order. BIS2 contends that the claim terms and the specification recite the steps in one order: (1) the neural network must be maintained in memory; (2) the neural network then must be activated; (3) then retrieve predictions from the neural network; and (4) finally a representation of the data is displayed.

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To determine whether the steps in a method claim must be performed in a certain order, the Court looks "to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written." Altiris, Inc. v. Symantec Corp., 318 F.3d 1363, 1369 (Fed. Cir. 2003). If not, then the Court looks "to the rest of the specification to determine whether it directly or implicitly requires such a narrow construction." Id. at 1370 (quotation and emphasis omitted). "If not, the sequence in which such steps are written is not a requirement." Id.

Claim 19 involves the steps of (1) maintaining a neural network in memory, (2) activating the neural network, (3) retrieving prediction data, and (4) displaying prediction data. Claim 19 does not expressly state that the steps must be performed in a certain order. However, as a matter of logic, the step of retrieving the prediction data must occur before the step of displaying such data. Also, logically, the neural network must be trained before it is activated to make predictions. That is the point of the invention. To make the predictions to be retrieved and displayed, the neural network must be trained and activated. Bally admits that this is the way the patent will be used, and it can think of no situation in which one would not follow the method steps in order. ***As a matter of logic, the steps recited in independent claim 19 must be done in order, and so must be done in order for the dependent claims 20-22.***

III. THE '367 PATENT

Bally asserts BIS2 infringed claims 1, 4, 5, 7, 10, and 11 of the '367 patent. The '367 patent is directed at providing data visualization techniques to present data in visual format, such as monitoring the number of customers in line at a merchant's store through a video camera and graphically superimposing the data obtained over the floor plan of the monitored area.

The claims at issue, with disputed terms in bold, are:

1. A data visualization system comprising:
an interaction database maintained in computer memory of interaction data

representing interactions between customers and merchants, the interaction data obtained from **monitoring apparatus**;

a retrieval component configured to retrieve from the interaction database data representing interactions between customers and merchants and to construct a finite set of **data values** from the retrieved data;

a display component configured to display a graphical representation of at least one merchant and **a graphical representation of each of the set of data values centered on respective data points**; and

a contour generator configured to generate and **display one or more contour lines at least partly around each data point or group of data points**, **each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed**.

. . .

4. A data visualization system as claimed in claim 1 wherein at least some of the **data values** comprise a set of **data values** obtained from **monitoring apparatus** in the form of **traffic-counting apparatus**, each set of **data values** including an integer representing **traffic flow** and a time and/or date value.

5. A data visualization system as claimed in claim 1 wherein at least some of the **data values** comprise a set of **data values** obtained from **monitoring apparatus** in the form of **pressure-sensitive apparatus**, each set of **data values** including a time and/or date value.

. . .

7. **A method of data visualization** comprising the steps of:

maintaining in computer memory an interaction database of interaction data representing interactions between customers and merchants, the interaction data obtained from **monitoring apparatus**;

retrieving from the interaction database data representing interactions between customers and merchants;

constructing a finite set of **data values** from the retrieved data;

displaying a graphical representation of at least one merchant;

displaying a graphical representation of each of the set of **data values** centered on respective **data points**; and

generating and **displaying one or more contour lines at least partly around each data point or group of data points**, **each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed.**

10. A method of data visualization as claimed in claim 7 further comprising the step of obtaining at least some of the **data values** from **monitoring apparatus** in the form of **traffic-counting apparatus**, each set of **data values** including an integer representing **traffic flow** and a time and/or date value.

11. A method of data visualization as claimed in claim 7 further comprising the step of obtaining at least some of the **data values** from **monitoring apparatus** in the form of **pressure-sensitive apparatus**, each set of **data values** including a time and/or date value.

A. "data point"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
A single data item, or set of logically related data values	A location in the graphical representation that may have a data value associated with it

"data value"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
The value of a certain variable at a certain data point	The value of a certain variable

In its opening brief, Bally did not dispute BIS2's construction of these two terms. However, in its response brief, Bally disputed the definitions to the extent BIS2 is contending that the data point must be a specific location in a graphic representation, rather than a location in geographic space. The parties did not file reply briefs, and BIS2 did not indicate at the claim construction hearing its position on whether it was attempting to limit this term to a location in geographic space, rather than a location in the graphical representation.

The '367 claim language refers to the generation and display of a graphical representation of a merchant, with data values "centered on respective data points." (Col. 9, ll. 16-19; Col. 10, 15-16.) The specification states the following:

> Each data point could be represented by x and y coordinates indicating the relative position of each data point in the representation. Each data point could also have a z value representing the height or magnitude of the data point. This z value could indicate, for example, the length of time spent at a particular data point. Each data value is therefore centered on a data point.

(Col. 6, ll. 11-17.) Later, the specification states that "[a]ppropriate x and y values are generated for each data point to space the data points over a generated representation." (Col. 9, ll. 25-28.) BIS2's expert, Dr. Berry, states that the term "data point" is a well-known term of art referring to a location within a graphical representation, such as a pair of

x and y coordinates in the Cartesian plane." (BIS2 Op. Br., Berry Decl. at ¶ 36.)

As the Court understands it, BIS2's construction refers to a data point as a location within the graphical representation, not necessarily a location in a geographic or spatial sense. That comports with the claim and specification language, which refer to the generation of a graphical display with data points located in that graphic display. The citing of x and y coordinates refers to placement of the data point within the graphic display, not in a spatial or geographic sense. Because this was the only dispute as to these terms, ***the Court will adopt BIS2's proposed constructions with the clarification that the location of the data point is a location in the graphical display, not a geographic or spatial location.***

B. "contour line"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
A boundary that delineates the border between two data values or ranges of values	A line connecting points of data having equal value

Bally argues a line is a set of individual points, and a defined boundary would satisfy this definition. Bally contends that BIS2's proposed construction that a contour line must include a discrete line would read the preferred embodiment in Figure 3 out of the '367 patent and Figure 4 out of the '968 patent, a result patent law would not support. Bally contends that the patents use the terms contoured representation and contour line interchangeably, and Bally contends that it did not give up coverage of contoured representations in patent prosecution, or at least it is ambiguous what happened during patent prosecution.

BIS2 contends that a contour line was, at the time the patent issued, a well know term of art as a line connecting points of data having equal value, and the patents do not otherwise define the term. BIS2 contends by the claim term's plain language, a contour line must be an actual, visible line. Additionally, BIS2 argues that the term "contour

representations" is distinguished in the specification and was disclaimed during patent prosecution, and thus a visible line is required. BIS2 further contends the '367 specification distinguishes between contour lines and contoured representations.

It is not clear from the claim language what is meant by a contour line. Neither the '367 nor the '968 defines the term contour line. However, one of ordinary skill in the art would understand the term to mean a line connecting points of equal value.[1] (BIS2 Op. Br., Berry Decl. at ¶¶ 18, 20-23.) The term "contour line" was well known prior to the patents' issuance, and the inventor did not otherwise define it. (Id., Exs. 6-7.) The inventor avers by declaration in this matter that he used the term contour line in the '367 and '968 patents consistent with the well-known meaning of the term as a line connecting equal points of data value. (BIS2 Op. Br., Cardno Decl. at ¶ 18.)

In discussing the definition of a contour line, the parties also dispute whether a contour line is something different from a contoured representation, and, if so, whether the inventor disclaimed contoured representations during patent prosecution. The abstract of the '367 patent states the following:

> The invention provides a data visualization system comprising a data value memory in which is maintained a finite set of data values obtained from monitoring apparatus and a display configured to display a representation of each data value centered on respective data points. The invention also provides a contour generator which in one form is configured to generate and display a contoured representation around each data point such that each data point is displayed as local maximum and in another form is configured to generate and display one or more contour lines around each data point, each contour line representing data values which are less than the data value of the data point around which the contour line is displayed.

('367 Abstract (57).) The '367's specification uses two terms, contour lines and contoured

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[1] BIS2's expert, Dr. Joseph K. Berry states that in his opinion, the patents refer to contour lines as "discrete" lines that represent data points with equal value. (Id. at ¶ 25.) Berry does not define what he means by "discrete." At his deposition, Berry opined that BIS2's proposed claim construction did not require a "discrete" line. (Bally Resp. Br. (Doc. #67), Ex. H at 33-34.) Whatever Dr. Berry meant by the word "discrete," that term does not appear in BIS2's proposed construction and this dispute therefore is not an issue before the Court.

representations. (See, e.g., Col. 2, ll. 14-15, 36-40, 45-48.) The specification states that a preferred form of the invention involves a contour generator "which in one form comprises a computer-implemented software program generates a contoured representation or series of contour lines in order to display a representation of the data on a client workstation as will be described below." (Col. 3, ll. 53-58.) The specification describes Figure 3 as a "contoured representation." (Fig. 3; Col. 5, ll. 48–50.) Figure 3 shows a graphical representation of the merchant's store over which is superimposed a "contoured representation" in gray scale representing the number of customers per hour in various parts of a merchant's store. (Fig. 3; Col. 6, ll. 48-61.)

Although the specification refers to both contoured representations and contour lines, the claim language refers only to contour lines. (Col. 9, l. 7- Col. 10, l. 48.) The original patent application had claim language which referred to both contoured representations and contour lines. (Joint Appx. (Doc. #39) ["JA"] at JA1129-31.) Claim 1 of the original application claimed a contour generator configured to generate and display a "contoured representation around each data point such that each data point is displayed as a local maximum." (JA1142.) Claim 2 claimed a contour generator configured to generate and display "one or more contour lines around each data point, each contour line representing data values which are less than the data value of the data point around which the contour line is displayed." (Id.) Figure 3 was the only figure provided that showed a contoured representation. (JA1154.) There is no figure which purports to represent "contour lines" specifically.

The United States Patent and Trademark Office ("PTO") rejected claim 1 based on prior art by Boyette and Connell. (JA1308.) Specifically, the patent examiner stated that while other prior art by Boyette "doesn't teach about a contour generator configured to generate and display a contoured representation around each data point such that each data point is displayed as a local maximum . . . Connell teaches the above limitation in (Fig. 5,

elements 36, 38, 40 and 42)." (Id.) The examiner also rejected claim 2 because it was "similar in scope to Claim 1 and is rejected under the same rationale, in addition Connell teach[es] about each contour line representing data values that are less than the data value of the data point around which the contour line is displayed (Fig. 5). The slopes that ascend towards and descend from the local maximum of the data points represent the values that are less than the data points around which the contour line is displayed." (Id.)

In response, the applicant cancelled all the original claims and added new claims. (JA1323.) The applicant deleted the "contoured representation" phrase from the claims, although it remained in the specification. The applicant stated the following:

> As recited in new independent claims 27 and 43, the present invention generates and displays one or more contour lines at least partly around each data point or group of data points, each contour line representing data values that are less than the data values of the data point around which the contour line is displayed. It will be appreciated that in some circumstances the contour lines around data points may overlap and will only completely surround a data point if the data point is represented in isolation. Nevertheless, the contour lines at least partly surround each data point or group of data points. This feature of the applicant's visualization system enables a user to quickly view data points of interest.
>
> With respect to the asserted base Boyette/Connell combination, the Examiner acknowledges that Boyette does not expressly disclose or teach a contour generator configured to generate and display a contour representation around each data point, such that each data point is displayed as a local maximum. The examiner asserts that Connell teaches this limitation in Fig. 5.
>
> However, Fig. 5 of Connell shows a graph of all valid depth readings shown visually in Fig. 3. Connell explains how these depth readings can be used to identify the number of people standing in a queue using these readings. The graph points cited by the examiner (36,38, 40 and 42) are local maxima, but not every depth reading (the other, non maximal points on the graph) represented in the graph is a local maxima. In fact, if every depth reading were represented as a local maximum, the graph would not be suited to the stated purpose in Connell for considering such a graph. The stated purpose is that the peaks (in other words, local maxima) can be used to detect the number of people in the queue. Not every data point or depth reading in Connell's Fig. 5 is represented by a local maxima. Thus, assuming, for the sake of discussion only, that the asserted Boyette/Connell combination is proper, Connell does not provide the disclosure or teaching missing from Boyette.
>
> Further, the graph in Fig. 5 is not a contour graph. Connell does not disclose or suggest any method of generating a contour graph with or without local maxima. Connell does not disclose or suggest the generation and display of one or more contour lines at least partly around each data point in

> the display, each data point representing data values that are less than the data values of the data points around which the contour line is displayed.
>
> Connell describes a system by which two images from video cameras at two displaced locations can be used to indicate the number of objects in a queue. This is done by comparing patches of the images at predetermined offsets and giving a match score at each offset based on the number of offset patches having the best match. The peaks (i.e., local maxima) in the graph of offset match scores are used to determine the number of objects in the queue. The use of local maxima is for the discovery of information about the queue, not for representation of information about the queue.
>
> By contrast, the present invention, as recited in the new claims, displays interaction data in such a way that all data points are represented by local maxima. All data points are represented by local maxima as contour lines are displayed around each data point, the data values represented by the contour lines being less than the data values of the data points around which the contour lines are displayed.

(JA1323-25.)

The '968 patent has a similar prosecution history, although different prior art was cited to reject the original claims. (JA889-94.) With respect to the '968 patent, the examiner rejected the original claims as unpatentable over Hoppe and Fujisawa. (JA879-.) The examiner stated that Hoppe "teaches a contour generator configured to generate and display a contoured representation around each data point, such that each data point is displayed as a local maximum." (JA880.) In response, the applicant argued that Hoppe's "perspective wall" is not "contoured" and "although Hoppe's query expression results are displayed through a visualization based on Venn diagrams, Hoppe does not teach or suggest that a series of contour lines are displayed with values less than the data point around which the contour lines are displayed." (JA896.)

While it might seem significant that the inventor removed the words "contoured representation" from the claim language, it is not clear and unmistakable that the inventor surrendered contoured representations. Cordis Corp. v. Medtronic Ave, Inc., 511 F.3d 1157, 1177 (Fed. Cir. 2008) ("[A]n applicant can make a binding disavowal of claim scope in the course of prosecuting the patent, through arguments made to distinguish prior art references. Such argument-based disavowals will be found, however, only if they constitute

clear and unmistakable surrenders of subject matter."). The inventor made several arguments in response to the examiner's disallowance. The inventor assumed for discussion purposes only that the Connell/Boyette combination was proper. That the inventor was willing only to assume for purposes of discussion that this prior art was applicable indicates the inventor did not expressly disavow any subject matter. The inventor went on to distinguish his invention by arguing neither Connell nor Hoppe are contoured.

Further, although it is not without precedent that a patent could be construed so as not to cover the preferred embodiment, "[s]uch an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support." Elekta Instrument S.A. v. O.U.R. Scientific Int'l, Inc., 214 F.3d 1302, 1308 (Fed. Cir. 2000) (quotation omitted). Figure 3 of the '367 and Figure 4 of the '968 show "contoured representations" which were "generated in accordance with the invention" according to the specifications. ('367, Col. 3, ll.13-14; '968, Col. 2, ll. 65-66.) As discussed above, the prosecution history is not highly persuasive evidence that the inventor disclaimed contoured representations, particularly where the specification continued to refer to contoured representations.

However, the Court rejects Bally's proposal that a contoured representation is the same thing as a contour line. The specification states that a preferred form of the invention involves a contour generator "which in one form . . . generates a contoured representation or series of contour lines in order to display a representation of the data on a client workstation as will be described below." (Col. 3, ll. 53-58.) The United States Court of Appeals for the Federal Circuit has "consistently interpreted the word 'or' to mean that the items in the sequence are alternatives to each other." Schumer v. Lab. Computer Sys., Inc., 308 F.3d 1304, 1311 (Fed. Cir. 2002). Further, a general rule of patent construction is that "different claim terms are presumed to have different meanings." Helmsderfer v. Bobrick Washroom Equip., Inc., 527 F.3d 1379, 1382 (Fed. Cir. 2008).

A contoured representation thus is something different than a contour line. A careful read of the specification demonstrates that while Bally oversimplifies the matter by claiming the two terms are identical, the two terms are interrelated. The '968 patent uses the term "contour representation" generically. For example, the '968 specification states that "it is envisaged that the contoured representation could comprise an individual display or could alternatively comprise animated sequences of representations comprising two or more 'still' representations at various time intervals." (Col. 8, ll. 15-20.) Further, the fact that the inventor describes Figures 3 and 4 of the respective patents as being generated using the invention, and refers to those items as contoured representations, suggests that the inventor used the term contoured representation to refer generally to contoured graphical representations. Thus, a contoured representation is different from contour lines in that contour lines are the building blocks of a contoured representation. In other words, the overall graphic is a contoured representation which is formed by using contour lines. (Ferraro Dep. (Doc. #56-1) at 72 (stating that "contour representations are necessarily constructed from contour lines").

The Court therefore adopts BIS2's proposal and construes the term "contour line" to mean "a line connecting points of data having equal value," with the understanding that the inventor did not disclaim contoured representations during prosecution history as explained herein.

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C. "a graphical representation of each of the set of data values centered on respective data points"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
Does not need construction beyond its ordinary meaning	All data values are displayed and centered on respective data points

"display one or more contour lines at least partly around each data point or group of data points"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
Does not need construction beyond its ordinary meaning	Each data point or group of data points has one or more contour lines at least partly around it

BIS2 contends that "each" means "all." Bally responds that argues that BIS2's construction ignores the actual claim language that refers to a set of retrieved data values, not each data value that exists in the interaction database. ***The Court concludes no construction is needed beyond the ordinary meaning of the terms.*** BIS2's proposed constructions amount to nothing more than paraphrasing the claim terms.

D. "a contour generator configured to generate and display one or more contour lines at least partly around each data point or group of data points"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
Software that generates contours	Software that generates and displays a display that contains one or more contour lines at least partly around each data point or group of data points

Bally argues this term is plain, as a contour generator generates contours and needs no further construction. BIS2 contends that the contour generator must generate and

display lines. BIS2 also contends that Bally's definition reads out the claim requirement that the software both generate and display contour lines.

The parties agree a contour generator is software. ***The Court therefore will construe the term "contour generator" to mean "software." The rest of the claim language speaks for itself and needs no further construction.***

E. "each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Does not need construction beyond its ordinary meaning	Each data point or group of data points is displayed as a maximum and each contour line represents data values that are less than the data value(s) of the data point(s) around which the contour line is displayed

Bally argues that BIS2's construction attempts to import limitation language that each data point be a local maximum where the inventor removed that very language from the claims during prosecution before the claims were allowed. Further, Bally argues that while some data points will be displayed as local maximums, the patent does not require that every data point be a local maximum. Bally contends that would in fact be impossible, as then you could not display numerous data points together, because they could not all be local maxima. Bally further argues that if BIS2's construction is adopted, the preferred embodiment as depicted in Figure 4 would be read out of the patent. Finally, Bally argues that even if the Court adopted the local maxima limitation, it would apply only to the "finite set of data values" constructed, not to all data values.

BIS2 argues that the fact that a data point or group of data points is displayed as a local maximum follows from the claim language itself, which requires the surrounding contour lines to have less value than the data value of the data point. BIS2 also argues that during prosecution, the applicant confirmed each data point is displayed as a maximum.

In the specification, the '367 mentions several embodiments as displaying contoured representations around each data point "such that each data point is displayed as a local maximum." (Col. 2, ll. 14-16, 36-39, 45-48; Col. 3, ll. 1-2.) However, the specification lists other embodiments that do not contain the "local maximum" language, and instead refer to each contour line representing data values which are less than the data value of the data point around which the contour line is displayed. (Col. 2., ll.17-26, 49-57.)

The allowed claim language does not include reference to a local maximum or local maxima. The original proposed claim language included language in some claims that "each data point is displayed as a local maximum." (JA1142-49.) The patent examiner rejected the claims as unpatentable over Boyette and Connell. (JA1307.) Specifically, the examiner asserted that Connell teaches displaying a contoured representation around each data point such that each data point is displayed as a local maximum. (JA1308.)

In response, the patentee canceled the prior asserted claims and added new claims. (JA1323.) As mentioned previously, the patentee "assum[ed], for the sake of discussion only, that the asserted Boyette/Connell combination is proper." (JA1324.) Making that assumption, the patentee argued that Connell does not display each graph depth point on Connell's figure 5 as a local maximum, and if it did so, it would not be suited to the purpose of the Connell patent. (Id.) The patentee further argued that Connell did not show a contour graph and "does not disclose or suggest any method of generating a contour graph with or without local maxima." (Id.) The patentee also states that in Connell the "use of local maxima is for the discovery of information about the queue, not for representation of information about the queue." (Id.) The patentee goes on to distinguish his invention as follows:

> By contrast, the present invention, as recited in the new claims, displays interaction data in such a way that all data points are represented by local maxima. All data points are represented by local maxima as contour lines are displayed around each data point, the data values represented by the contour lines being less than the data values of the data points around which the

contour lines are displayed.

(JA1325.) The "local maximum" language that was in the original proposed claims was removed from all the new claims. (JA1327-29.)

The '968 patent has a similar prosecution history. The original proposed claims contained the local maximum language. (JA732-39.) The examiner rejected the claims as unpatentable over Fujisawa and Hoppe. (JA879.) Specifically, the examiner asserted that Hoppe "teaches a contour generator configured to generate and display a contoured representation around each data point, such that each data point is displayed as a local maximum" through the use of Venn diagrams. (JA880.)

In response, the patentee canceled some claims, and amended others. (JA889-94.) Among the amendment was to delete the language "such that each data point is displayed as a local maximum." (Id.) In his remarks, the patentee argued that a perspective wall in Hoppe should not be interpreted as contoured. (JA895.) The patentee did not make any remarks specific to the "local maximum" concept, other than to state that the new claims involve contour lines around each data point or group of data points, each contour line representing data values less than the data values of the data point around which the contour line is displayed. (JA896.)

The Court concludes no further construction is required. The claim language specifies what it means to be a local maximum in the context of this patent: the contour lines at least partly surrounding a data point or group of data points will represent values less than the data point or group of data points around which the contour line is displayed.

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F. "monitoring apparatus"

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
An apparatus that generates data by monitoring events	Apparatus that monitors human activity that occurs in a monitored area

BIS2 contends that each claim requires monitoring of human activity in the form of interactions between customers and merchants. BIS2 argues the claims distinguish between two types of interaction data, data obtained from monitoring apparatus which requires further processing to convert into numeric data, such as video monitoring of how many customers are standing in line, versus interaction data that already consists of numeric data, such as the number of callers on hold on the telephone. BIS2 contends this distinction shows that the patent distinguishes between interaction data and monitoring apparatus, and monitoring apparatus must involve the monitoring of human activity in a monitored area.

Bally contends that while the preferred embodiment refers to human activity and monitored areas, there is no need to limit the broader claim language. Bally argues a jury readily can understanding monitoring apparatus without further explanation. With respect to the distinction between interaction data obtained from monitoring apparatus versus other sources of interaction data, Bally contends that interaction data is simply data obtained from monitoring apparatus, including from a telecommunications network. Bally contends that dependent claims 6 and 12 refer to data from a telecommunications network, thus demonstrating that the monitoring apparatus in the independent claims includes interaction data obtained from a nonphysical location, such as a telecommunications network.

The patent does not define monitoring apparatus. The specification states that the invention includes a data repository which "includes data from a variety of sources. The data repository may include, for example, data obtained from monitoring apparatus for example visual input apparatus, audio input apparatus, traffic counting apparatus, pressure

sensitive apparatus, and/or interaction data representing interactions between customers and merchants which in one form could comprise interactions between customers and merchants over a telecommunications network . . . ." (Col. 3, ll. 35-44.) The phrasing of this sentence suggests the inventor was including interaction data over a telecommunications network as one form of data from monitoring apparatus. Grammatically, interaction data from a telecommunications network is included as an example of data obtained from monitoring apparatus. If the inventor had intended to distinguish interaction data obtained from a telecommunications network as something different from, rather than a form of, monitoring apparatus, the sentence would read as follows: "The data repository may include, for example, data obtained from monitoring apparatus for example visual input apparatus, audio input apparatus, traffic counting apparatus, and/or pressure sensitive apparatus, and/or interaction data representing interactions between customers and merchants . . . ."[2] See In re Hyatt, 708 F.2d 712, 714 (Fed. Cir. 1983) ("A claim must be read in accordance with the precepts of English grammar.").

This construction is consistent with the independent and dependent claim language. Independent claim 1 claims "an interaction database . . . of interaction data representing interactions between customers and merchants, the interaction data obtained from monitoring apparatus." (Col. 9, ll. 7-11.) Use of the definite article "the" to describe interaction data obtained from monitoring apparatus refers back to the interaction data

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[2] BIS2 suggests the difference between interaction data obtained from monitoring apparatus and interaction data obtained from a telecommunications network is important because each type of monitoring apparatus other than interaction data from a telecommunications network generally must undergo further processing to produce raw data. However, that is not necessarily the case. Traffic-flow apparatus, for example, could produce raw data such as how many people walked through a turnstile on a particular day. No further processing of the data would be required. How many people tripped a pressure-sensitive apparatus during a particular time frame likewise would require no further processing to convert to raw data. If video or audio apparatus were motion or sound activated, and the person collecting the data were interested only in the number of times, or times of day, such apparatus was activated, rather than the content of an audio or visual data captured, such data also would not need further processing.

contained in the interaction database. See Baldwin Graphic Sys., Inc. v. Siebert, Inc., 512 F.3d 1338, 1342 (Fed. Cir. 2008); TouchTunes Music Corp. v. Rowe Int'l Corp., 727 F. Supp. 2d 226, 235 (S.D.N.Y. 2010) (holding use of definite article "'said programmable memory' necessarily refers back to the 'a programmable memory' recited earlier in the claim.").[3] Claim 1 further claims a retrieval component which retrieves from the interaction database a "finite set of data values from the retrieved data." (Col. 9, ll. 12-15.) Because the retrieved data value set derives from the interaction database, it consists of interaction data obtained from monitoring apparatus.

Dependent claims 2 through 5 recite the system in claim 1 "wherein at least some of the data values comprise a set of data values obtained from . . . monitoring apparatus in the form of" visual input apparatus (claim 2), audio input apparatus (claim 3), traffic-counting apparatus (claim 4), and pressure-sensitive apparatus (claim 5). Claim 6 is a dependent claim which includes the limitation that "at least some of the data values comprise a set of data values obtained from a telecommunications network . . . ." (Col. 9, l. 50 - Col. 6, l.1, Col. 6 ll. 44-48.)

Claim 6 does not follow the form of claims 2 through 5 in that it does not state that the data values are obtained from monitoring apparatus in the form of a telecommunications network. However, dependent claim 6 includes all the limitations of the independent claim from which it derives. Claim 1 states that the data values are retrieved from the interaction database and that the interaction database is comprised of interaction data obtained from

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[3] See also Creative Internet Advertising Corp. v. YahooA, Inc., No. 2010-1215, 2011 WL 1522414, *4 (Fed. Cir. Apr. 22, 2011) (slip copy) (holding "'said end user communication message" referred back to the antecedent phrase "'an end user communication message'"); Tuna Processors, Inc. v. Hawaii Int'l Seafood, Inc., No. 2008-1410, 2008-1435, 327 Fed. Appx. 204, 210, 2009 WL 1084197, *6 (Fed. Cir. Apr. 23, 2009) (unpublished) (citing Robert C. Faber, Faber on Mechanics of Patent Claim Drafting, App. D-1 (6th ed. 2008) for the proposition that "'the definitive article THE is used to refer to an ELEMENT which has been established earlier in a claim'").

monitoring apparatus. Claim 6 states that at least some of these data values, which under claim 1 is obtained from monitoring apparatus, is obtained from a telecommunications network. The same analysis holds for independent claim 7 and its dependent claim 12. Because the dependent claims derive from the independent claims which identify the source of the interaction data as monitoring apparatus, the claim language supports the construction that interaction data from a telecommunications network is interaction data obtained from monitoring apparatus.

As a result, the Court rejects BIS2's proposed construction that monitoring apparatus must involve a monitored area, to the extent monitored area means a physical location as in a merchant's store. Moreover, although BIS2 notes that Figure 3 shows a layout of a merchant's premises as the monitored area, the specification states that Figure 3 is a "preferred representation generated in accordance with the invention" and is "one example of a display generated by the system where a merchant operates a retail premises." (Col. 3 at 13-14; Col 5, ll. 39-47.) The specification states that the "graphical representation could include a spatial representation of the premises of the merchant showing for examples shelves 202 and 204 and counters 205A and 206B. It will be appreciated that the particular representation generated will be varied according to the nature of the data presented." (Col. 5, ll. 39-47.) The specification further states that "[g]enerally a pre-defined monitored area will be selected for the monitoring of human activity within that selected area." (Col. 4, ll. 8-10.) Thus, although specification throughout refers to a "monitored area," the claims do not include this language, and it would be improper to import the limitation from the specification and preferred embodiments into the claim language, particularly where the specification uses qualifying language such as "generally."

As to the proposed limitation regarding human activity, the specification often refers to the monitoring apparatus capturing human activity. For example, the specification states that "[v]ideo cameras and other visual input apparatus could be directed toward the

monitored area in order to capture data representing human activity within that area." (Col. 4, ll. 15-17.) However, at the very start of the specification, it states that this invention is "particularly but not solely designed for use in assessing and analyzing human activity such as queues of people, crowds attending an event, foot traffic through a space, individuals loitering in an area, and so forth." (Col. 1, ll. 14-15.) It would be improper to take a preferred embodiment from the specification and impose a requirement of monitoring of human activity where the specification specifically states the invention is not designed solely for analyzing human activity.

The Court therefore will adopt Bally's proposed construction. Monitoring apparatus means "apparatus that generates data by monitoring events."

G. "traffic-counting apparatus"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Apparatus that measures traffic, such as turnstiles, ticket machines, or similar metering devices	A device that monitors human activity in a monitored area by counting the number of people passing through a monitored area

"traffic flow"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Ordinary meaning - no construction required	Movement of people through a monitored area

"pressure-sensitive apparatus"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
A device capable of monitoring activity in an area by way of pressure sensors	A device capable of monitoring human activity in a monitored area by way of pressure sensors

Relying on its proposed interpretation of monitoring apparatus, BIS2 contends that

each of these types of apparatus must be a device that monitors human activity in a monitored area. Bally contends the monitoring of human activity in a monitored area likely would be the use, there is no basis to restrict the claim terms in this manner. As discussed with respect to the term monitoring apparatus, there is no basis for restricting the claim terms to human activity or a monitored area.

The Court therefore adopts Bally's proposed constructions of these terms.

H. "a method of data visualization"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The steps are not required to occur in the order recited	Method claim requires steps to occur in the order recited by the claim

Bally contends that while the steps likely will be performed in order, there is no requirement in the claim that they must be done in order, and it would be improper to so limit the claim language. Bally argues as an example that the last three steps of claim 7 can be performed in any order with no relevant consequence. BIS2 contends that the operations recited in the method must occur in order based on the claim language and the specification.

Claim 7 is a method claim with the following steps: (1) maintaining an interaction database containing interaction data; (2) retrieving data from the interaction database; (3) constructing a finite set of data values from the retrieved data; (4) displaying a graphical representation of at east one merchant; (5) displaying a graphical representation of each of the set of data values centered on respect data points; and (6) generating and displaying one or more contour lines at least partly around each data point or group of data points. (Col. 10, ll. 4-21.) As discussed above, a method claim is not presumed to require a certain sequence in the steps unless the claim language or the specification compel that conclusion. The first three recited steps must be performed in order. Interaction data cannot be retrieved from the database at step 2 if there is not first maintained an interaction database

containing interaction data in step 1. Further, a finite set of data values cannot be constructed from the retrieved data in step 3 without first retrieving the data. However, there is nothing that requires a particular order with respect to step 4, at least in regard to steps 1, 2, or 3. Step 4 is generating a graphical representation of at least one merchant. There is no logical reason why step 4 could not be done before or after any of steps 1, 2, or 3.

However, step 5 requires displaying a graphical representation of each of the set of data values centered on data points and step 6 requires generating and displaying contour lines at least partly around each data point or group of data points. Steps 5 and 6 thus must come in order after step 3 because the data must be maintained, retrieved, and constructed into a finite set of data values before such data values can be displayed in a graphic representation around which contour lines are generated and displayed. Although steps 5 and 6 must come after step 3, there still is nothing that logically requires steps 5 or 6 to come before step 4. Logically, you could display the data values centered on data points and generate and display the contour lines before you superimpose it on a graphical representation of at least one merchant.

Consequently, ***the Court concludes that steps 1, 2, 3, 5 and 6 must be performed in that order, but step 4 may be performed at any time.***

IV. THE '968 PATENT

Bally asserts BIS2 has infringed claims 1-8 and 19-22 of the '968 patent. This patent is directed at allowing users to customize graphical representations of data by including parameters in the database query regarding how to display the data obtained. Claims 1-8 and 19-22, with disputed terms bolded, are:

> 1. A data visualization system executed on a storage device, comprising:
> a finite set of discrete values maintained in computer memory;
> a retrieval component configured to receive a **database query expression** and to retrieve a set of values from computer memory using the **database query expression**;

a display component configured to display a graphical representation of each of the set of the retrieved data values centered on respective data points based at least partly on **display parameters** included in the **database query expression**; and

a contour generator configured to generate and display one or more contour lines at least partly around each data point or group of data points, each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed.

2. A data visualization system as claimed in claim 1 herein the display component is configured to optionally display a line graph representing the set of retrieved data, the line graph defined at least party by the **display parameters**.

3. A data visualization system as claimed in claim 1 wherein the display component is configured to optionally display a histogram representing the set of retrieved data defined at least partly by the **display parameters**.

4. A data visualization system as claimed in claim 1 wherein the display component is configured to optionally display a pie chart representing the set of retrieved data defined at least partly by the **display parameters**.

5. **A method of data** visualization executed on a storage device comprising the steps of:

maintaining in computer memory a finite set of data values;

receiving a **database query expression**;

retrieving a set of data values from computer memory using the **database query expression**;

displaying a graphical representation of each of the set of the retrieved data values centered on respective data points based at least partly on **display parameters included in the database query expression**; and

generating and displaying one or more contour lines at least partly around each data point or group of data points, each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed.

6. **A method of data visualization** as claimed in claim 5 further comprising the step of displaying a line graph representing the set of retrieved data, the line graph defined at least by the **display parameters**.

7. A data visualization system as claimed in claim 5 further comprising the step of displaying a histograph representing the step of retrieved data defined at least partly by the **display parameters**.

8. **A method of data visualization** as claimed in claim 5 further comprising the step of displaying a pie chart representing the set of retrieved data defined at least partly by the **display parameters**.

. . .

19. A computer program stored on tangible storage media comprising executable instructions executed on a storage device for performing a method of executing a **database query expression**, the expression having a display clause and one or more

standard clauses, the method comprising the steps of:
identifying the display clause within the query expression;
identifying the **contour sub-clause** within the display clause, the contour clause specifying a **key performance indicator**;
retrieving a set of data values from computer memory using one or more of the standard clauses within the query expression;
displaying a graphical representation of each of the set of retrieved data values centered on respective data points; and
generating and displaying one or more contour lines at points, each contour line representing values of the **key performance indicator** specified in the **contour sub-clause** less than the data value of the data point around which the contour line is displayed.

20. The device of claim 19 where the method further comprises the steps of:
identifying a background sub-clause within the display clause, the background sub-clause **specifying a spatial representation**;
displaying the spatial representation specified in the background sub-clause; and
displaying the contour lines overlaid on the spatial representation.

21. The device of claim 20 where the method further comprises the steps of:
identifying a label sub-clause within the display clause, the label sub-clause specifying test to be overlaid on the spatial representation; and
displaying the text overlaid on the spatial representation.

22. The device of claim 20 where the method further comprises the steps of:
identifying a title sub-clause within the display clause, the title sub-clause specifying a title to be overlaid on the spatial representation; and
displaying the title overlaid on the spatial representation.

A. "database query expression"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The visual document request	Text that forms an SQL query and is sent to a database

BIS2 argues that a database query expression was a well-known term as set forth in the specification as text written in computer format as SQL statements which are sent to a database. BIS2 contends Bally's proposed construction is untethered to any claim or specification language.

Bally responds that BIS2's proposed instruction improperly limits the claim term by requiring text, use of a certain computer language, and also reducing the retrieval

component to a useless "middleman." Bally contends claim 1 is broader than this construction, and nothing requires the database query expression itself to be sent to the database or that it be written in SQL specifically. Bally argues the preferred embodiment refers to SQL, but that does not make it a claim limitation. Bally also contends that the query is sent to the system, not the database, as the retrieval component receives the query and retrieves the requested data from the database. Bally argues BIS2's construction would read out the preferred embodiment in Figure 1. Bally further argues that because claim 19 defines the query expression as having a display clause and one or more standard SQL clauses, and these limitations were not included in claim 1, it is not proper to so limit claim 1 under the theory of claim differentiation.

Bally's proposed construction is untethered to the specification or claim language. Bally refers to the visual document request, but the database query expression is aimed at both non-visual and visual query commands. The Court therefore rejects Bally's proposed construction.

However, BIS2's proposed construction imposes limitations not supported by the claim language or specification. The claim language states that there is a retrieval component which receives the database query expression and retrieves a set of values from computer memory using the database query expression. (Col. 8, ll. 54-56.) This is confirmed in the specification, which states that the system "further comprises a retrieval component 80 which in one form is a computer implemented software program which is configured to receive the query from the client 20 and to retrieve the data from the data repository 40 using the database query." (Col. 3, ll. 57-61.) The query is "normally passed to a query interpreter which parses the database query expression to identify the text strings of the select, from, where, group, and order clauses . . . . The query interpreter then executes the query to retrieve data from a relational database . . . ." (Col. 5, ll. 17-23.) The Court therefore rejects BIS2's proposed language that the query is sent to a database.

The Court also rejects BIS2's proposed requirement of text in SQL format. The specification states that the query to obtain information "from a relational database . . . are usually defined by ANSI standard structured query language statements." (Col. 4, ll. 49-52.) The use of the word "usually" suggests that the invention is not limited to only SQL. Rather, the specification states the query defines "in computer recognizable terms" various parameters for the query. (Col. 4., ll. 52-56.) Thus, although the query "usually" will be in SQL, any computer recognizable query will suffice.

The Court therefore construes the term "database query expression" to mean "a computer recognizable query command."

B. "display parameters"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Information indicating how the data is to be displayed in the graphical representation	Clauses that define display characteristics of the graphical representation to be displayed

BIS2 argues that the display parameters do not refer to "information" generally, but to "clauses" as part of the text that forms the SQL query expression. Bally argues that the parties both agree that display parameters generally are what tells the computer what it should display and in what form. However, Bally disputes BIS2's additional proposed requirements that display parameters must be clauses and must define the display characteristics. Bally contends there is nothing in the patent that requires the display parameters be clauses. Bally argues that because claim 13 specifically refers to a display clause, by the principal of claim differentiation, that requirement cannot be imported into other claims. Bally also argues that BIS2 improperly attempts to narrow the scope of the patent by requiring the display parameters define to the display characteristics, where the claim language refers to the graphical representation being "partly" based on the display parameters. Bally contends BIS2's construction would vitiate the "partly" language.

Although the specification refers to "clauses" it does so in the context of SQL queries, which involve clauses. As discussed with respect to the last term, the invention is not be limited solely to SQL. Consequently, the use of the word "clause" would be unduly limiting. Although Bally claims that construing this term to mean that it defines the display characteristics would read the word "partly" out of the claim language, the word "partly" still would be in the claim language. The only term being construed here is "display parameters." Thus, the full phrase "based at least partly on display parameters included in the database query" still would contain the "partly" limitation.

The Court therefore construes the term "display parameters" to mean "a computer recognizable query command that defines display characteristics of the graphical representation to be displayed."

C. "display parameters included in the database query expression"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Needs no further construction	A non-standard SQL expression portion of the database query expression enabling a user to specify parameters of the graphical representation

This term needs no further construction. The Court already has construed the terms display parameters and database query expression. That would leave only the words "included in" to construe, and those words need no construction.

D. "a method of data visualization"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
The steps are not required to occur in the order recited	Method steps of (1) receiving, (2) retrieving, and (3) displaying must be performed in order of the claim

As with the other method claims, the parties dispute whether the steps must be

performed in order. However, with respect to this claim, Bally does not dispute that retrieving and displaying logically would be required to be performed in that order, as one could not display the retrieved data values until one has retrieved those values. Bally contends, however, that the Court should not impose this as a claim limitation, as perhaps there is a scenario where that could happen, and the Court should wait until the infringement analysis to determine whether such a scenario is within the scope of the claims.

Claim 5 recites a method of data visualization comprising five steps: (1) maintaining in computer memory a finite set of data values; (2) receiving a database query expression; (3) retrieving a set of data values from computer memory using the database query expression; (4) displaying a graphical representation of the retrieved values; and (5) generating and displaying contour lines around the data values. Logically, the steps must be performed in order. To receive a database query at step 2, a database to query must exist at step 1. To retrieve data values based on a database query expression at step 3, the database must receive that query at step 2. To display the retrieved values at step 4, those values first must be retrieved at step 3. To generate and display contour lines around the data values at step 5, the data values first must be displayed at step 4, as there would be nothing around which to draw the contour lines. ***Logically, the steps must be performed in order.*** Bally's "wait-and-see" approach is infringement driven, and the Court will not defer claim construction to see if there is some possible means by which BIS2 might infringe on these claims before deciding what the claims mean.

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E. Claims 19-22

Plaintiff Bally's Proposed Construction	Defendant BIS2's Proposed Construction
Claims 19-22 are Beauregard claims which are treated as system claims	Claims 19-22 are method claims

Bally argues these are not method claims, they are "Beauregard"[4] claims, and as such are system, not method, claims. Bally argues that in a systems claim, the software need only be capable of performing the steps, it need not actually perform them. BIS2 contends that claims 19-22 describe themselves as method claims, and thus are method claims. BIS2 contends there is no such thing as a separate category of "Beauregard" claims.

Independent claim 19 states it claims a "computer program stored on tangible storage media comprising executable instructions executed on a storage device for performing a method of executing a database query expression, the expression having display clause and one or more standard clauses, the method comprising the steps of" and then a series of steps are identified. By claim 19's plain language, it is a computer program stored on tangible storage media which performs a method, it is not itself a method.

Pursuant to the Manual of Patent Examining Procedure § 2106.1 (8th Ed. Aug. 2001), "[w]hen a computer program is claimed in a process where the computer is executing the computer program's instructions, USPTO personnel should treat the claim as a process claim." But, when "a computer program is recited in conjunction with a physical structure, such as a computer memory, USPTO personnel should treat the claim as a product claim." Id. For example, the Federal Circuit considered a patent which claimed a "computer-readable storage medium storing program code for causing a computer to perform the steps of . . ." a "storage medium" claim that did not require the performance of

[4] In re Beauregard, 53 F.3d 1583 (Fed. Cir. 1995).

any method steps. Finjan, Inc. v. Secure Computing Corp., 626 F.3d 1197, 1204 (Fed. Cir. 2010). Consequently, these claims are product or "manufacture" claims, not method claims.

However, regardless of what kind of claim these are, the claim language requires actual execution of the steps rather than the mere capability to do so. Claim 19 states that the computer program is "executed" on a storage device for performing the method. It does not say it is capable of being executed or executable. Compare Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc., 424 F.3d 1293, 1310-11 (Fed. Cir. 2005) (holding that claim term of "operatively joined" required that the interface and the bone segment be connected and in contact, and thus accused product that merely had capability for contact with the bone did not infringe), with Fantasy Sports Properties, Inc. v. Sportsline.com, Inc., 287 F.3d 1108, 1118 (Fed. Cir. 2002) (where patent language provided for a computer playing football including "means for scoring . . . bonus points," infringement could occur where software included means for scoring bonus points, "regardless of whether that means is activated or utilized in any way"); Intel Corp. v. U.S. Int'l Trade Comm'n, 946 F.2d 821, 832 (Fed. Cir. 1991) ("Because the language of claim 1 refers to 'programmable selection means' and states 'whereby when said alternate addressing mode is selected' . . . the accused device, to be infringing, need only be capable of operating in the page mode[and] actual page mode operation in the accused device is not required.").

The Court therefore construes claims 19-22 to be manufacture claims which require actual execution of the method, not merely the capability to do so.

F. "contour sub-clause"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Sub-clause in the display clause that contains information about how the contours are to be generated	Sub-clause in the display clause that identifies a variable used for generating the graphical representation

BIS2 contends that the claims and specifications indicate that the contour sub-clause

identifies a variable. Bally argues that while BIS2's construction is not particularly objectionable, it also is not as helpful as Bally's construction. Bally argues its construction more accurately conveys that the contour sub-clause is the sub-clause that informs the computer what variable is to be used for drawing the contours.

Claims 13 and 19 contain the claim language "identifying a contour sub-clause within the display clause, the contour clause specifying a key performance indicator." (Col. 10, ll. 12-14; Col. 11, ll. 5-7.) The concept is explained at Col. 7, ll. 56-63 in reference to Figure 5:

> As indicated at 406, if a data visualization display clause is present in the database query expression, the display clause is checked to see whether a contour sub-clause is present in the display clause. In some circumstances where a contour sub-clause is not present in the display clause, the invention could be arranged to assign a default contour value or clause as indicated at 410 in which the representation is contoured on revenue for example.

The parties do not have a substantive dispute over this term. ***The Court will adopt BIS2's proposed construction as the clearer statement of the claim term.***

G. "a key performance indicator"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
A value of interest to a user, such as revenue or profit	A variable that enables monitored performance to be quantified

BIS2 contends the key performance indicator is specified in the contour sub-clause, as indicated in the claim language, and must be capable of being quantified, as evidenced by the examples of a key performance indicator being revenue, gross profit, net profit, and the like. Bally argues a key performance indicator is a variable that is important to the user generating the visual document.

The term "key performance indicator" is in claims 13 and 19, and the related dependent claims. In the claims, the key performance indicator is specified in a contour

subclause within the display clause. The specification states the following about key performance indicators:

> The sub-clause contour specifies the key performance indicator or KPI presented to a user. This KPI could include turnover as is the case with the query described above. The KPI could also include revenue, gross profit, net profit and any other value of interest to a user.

(Col. 6, 26-30.)

The Court rejects Bally's construction as too vague and broad. Although the specification uses the language "any other value of interest to a user," BIS2 is correct that this would cover material that has nothing to do with the patent. For example, a consumer's name conceivably could be of value to a user, but that has little do with displaying key performance indicators on a contoured representation. The Court therefore will adopt BIS2's proposed construction, except for the reference to "monitored" performance. There is no basis to include the word "monitored." Accordingly, ***the Court construes the term "key performance indicator" to mean "a variable that enables performance to be quantified."***

H. "specifying a spatial representation"

Plaintiff Bally's Proposed Construction	**Defendant BIS2's Proposed Construction**
Specifying a spatial layout of some location, such as a merchant	Specifying a visual layout of a merchant's premises to be displayed as a background

BIS2 contends that the specification explains that a spatial representation is a visual layout of a merchant's premises. Bally argues that BIS2's proposed restriction that the spatial representation must be the layout of a merchant's premises improperly limits the claim. Bally notes the specification states the merchant premises is an example of such a spatial representation, but does not limit it only to a merchant's premises.

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The Court adopts Bally's construction and rejects BIS2's attempt to narrow the claim to only a display of a merchant's premises. The specification states that Figure 3 is merely "one example" of a spatial representation. (Col. 6, ll. 1-2.) Consequently, to limit the display to the merchant's premises improperly would read into the claim a limitation in a preferred embodiment.

The Court construes the term "specifying a spatial representation" to mean "specifying a spatial layout of some location, such as a merchant."

V. CONCLUSION

IT IS THEREFORE ORDERED that the disputed claim terms in U.S. Patent Nos. 6,871,194; 7,221,367; and 7,158,968 are construed as follows:

U.S. Patent No. 6,871,194	
Trained on data	The neural network performs a learning function iteratively making predictions
Activate the neural network	The neural network trained on data is made available for predicting values
Retrieve prediction data	The neural network calculates and outputs predicted revenue
A method of predicting interactions between customers and merchants	The steps must be performed in order
U.S. Patent No. 7,221,367	
Data point	A location in the graphical representation that may have a data value associated with it
Data value	The value of a certain variable
Contour line	A line connecting points of data having equal value
A graphical representation of each of the set of data values centered on respective data points	No further construction is required
Display one or more contour lines at least partly around each data point or group of data points	No further construction is required

Contour generator	Software
Each contour line representing data values that are less than the data value(s) of the data point(s) around which the contour line is displayed	No further construction is required
Monitoring apparatus	Apparatus that generates data by monitoring events
Traffic-counting apparatus	Apparatus that measures traffic, such as turnstiles, ticket machines, or similar metering devices
Traffic flow	No further construction required
Pressure-sensitive apparatus	A device capable of monitoring activity in an area by way of pressure sensors
A method of data visualization	Steps 1, 2, 3, 5 and 6 must be performed in that order, but step 4 may be performed at any time
U.S. Patent No. 7,158,968	
Database query expression	A computer recognizable query command
Display parameters	A computer recognizable query command that defines display characteristics of the graphical representation to be displayed
Display parameters included in the database query expression	No further construction required
A method of data visualization	The steps must be performed in order
Claims 19-22	Manufacture claims which require actual execution of the method, not merely the capability to do so
Contour sub-clause	Sub-clause in the display clause that identifies a variable used for generating the graphical representation
Key performance indicator	A variable that enables performance to be quantified
Specifying a spatial representation	Specifying a spatial layout of some location, such as a merchant

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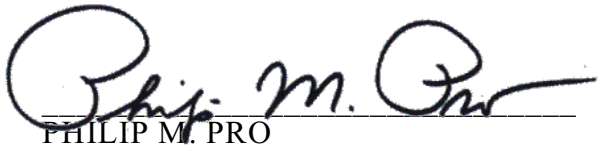

PHILIP M. PRO
United States District Judge