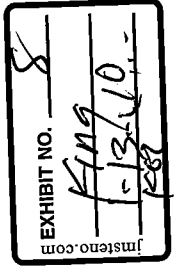
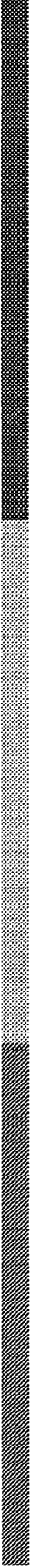


**Fingerprinting & Other
Research Technologies
Workshop (5/4/07)**

**YouTube - Audio & Video Fingerprinting
David King / Franck Chastagnol**





Contents



- 1. Overview
- 2. Use cases
- 3. Next steps



1. Fingerprinting - YouTube Integration

- Reference fingerprint database
 - Populated with all partner videos as they have clear ownership
 - Or directly by partners generating reference fingerprints - music labels produce FP's and send to Audible Magic
- Policy database
 - Metadata and policy associated with content (Rev Share, Track, Block)
- Matching service
 - For every new user video uploaded to site, YT extracts audio and video fingerprint
 - Fingerprint sent to match service for identification
 - Result of identification is either:
 - MISS or
 - HIT with list of videos it matched against with confidence score

1. Fingerprinting - YouTube Integration (cont'd)

- YT generates build list for Audible Magic based on license data
 - need to have a policy before we want a match
- Policy gets executed on uploaded video by “Claim” engine
 - If Block: video taken down
 - If Rev Share: video playbacks are tracked and monetized
 - If Track: video playbacks are tracked, not monetized
- Rev Share engine and Reporting back to partners
 - Weekly marketing report
 - Monthly financial report

1. Fingerprinting

- How well does it work
 - Audio fingerprinting from 3rd party solution is very accurate (Audible Magic). No false positives, false negatives are unknown
 - Video fingerprinting being developed by Jay/Michele very promising. Still training the algorithm. Too early to give data

2. Use cases

- YT launched audio fingerprinting in mid-Feb for all 200k daily uploads
- Reference fingerprint database populated with ~100k references, mostly songs from Music Labels
- Fast: fingerprint lookup and business logic executed within minutes of upload

3. Next Steps

- What needs improvement
 - Policy DB (Rights management) is very complex
 - International: different companies control rights in different countries
 - Music industry: Labels, Publishers. Very difficult to build a global DB
 - Identification: interesting cases
 - Movie and TV clips with music, owner vs. distributor (MTV videos), mashups
 - Building a large reference fingerprint DB requires huge outreach to partners, and ongoing cooperation
- Goals for 2007
 - 100% YT uploads going thru Google based audio and video fingerprinting solution
 - Build policy database for US content, extend to Int'l

3. Next Steps

- Team is working on VERY aggressive timelines to build world class video and audio fingerprinting system for YouTube - we need to maintain focus to meet these deadlines - please help
- By end of Q3 timeframe, we should have more time to open the platform to other needs
- The success and timely launch of this program is a top priority for YouTube. This is the linchpin for building relationships with media companies, and monetizing video watch pages
- Media companies and press are all very interested in this work so confidentiality very important