

Filed on behalf of: Google Inc.

By:
James J. Elacqua
james.elacqua@skadden.com
(650) 470-4510

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Google Inc.
Petitioner,
v.
Network-1 Technologies, Inc.
Patent Owner.

Case IPR2015-00348
U.S. Patent 8,656,441

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 8,656,441 UNDER 35 U.S.C. §§ 311-319

TABLE OF CONTENTS

| | <u>Page</u> |
|--|-------------|
| I. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(a)(1) | 1 |
| II. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103 | 1 |
| III. GROUNDS FOR STANDING UNDER 37 C.F.R. § 42.104(a) | 1 |
| IV. SUMMARY OF CHALLENGE AND RELIEF REQUESTED | 2 |
| V. SUMMARY OF THE '441 PATENT | 2 |
| A. Algorithms for Automatic Content Recognition | 2 |
| B. Summary of the '441 Claims | 3 |
| C. Person of Ordinary Skill in the Art of the '441 Patent | 4 |
| D. Claim Construction Under 37 C.F.R. § 42.104(b)(3) | 4 |
| VI. ANALYSIS OF GROUNDS FOR TRIAL..... | 7 |
| A. Ground 1: Claims 1-3, 6-14, 18-19, 21-26, and 30 of the '441 Patent Are Obvious Over Levy In View Of Arya 35 U.S.C. § 103..... | 7 |
| 1. Summary of Levy | 7 |
| 2. Summary of Arya..... | 8 |
| 3. A Person Having Ordinary Skill in the Art Would Have Been Motivated to Combine Levy with Arya..... | 8 |
| 4. The Combination of Levy and Arya Discloses Every Limitation of Claims 1-3, 9, 11-14, 18-19, 21-26, and 30..... | 9 |
| 5. The Combination of Levy and Arya Additionally Renders Obvious Claims 6-8 and 10 | 20 |
| B. Ground 2: Claims 1-3, 6, 8-14, 19, 21-26, and 30 of the '441 Patent Are Anticipated By Conwell Under 35 U.S.C. § 102(e)..... | 21 |
| 1. Summary of Conwell | 22 |
| 2. Conwell Discloses Every Limitation of Claims 1-3, 6, 8- 14, 19, 21-26, and 30 of the '441 Patent..... | 22 |
| C. Ground 3: Claims 1-3, 8-14, 19, 21-22, 25, 27, and 29-30 of the '441 Patent Are Anticipated By Wood Under 35 U.S.C. § 102(e)..... | 34 |
| 1. Summary of Wood..... | 34 |
| 2. Wood Discloses Every Element of Claims 1-3, 8-14, 19, 21-22, 25, 27, and 29-30..... | 35 |
| D. Ground 4: Claims 1-3, 8, 10-14, 18-19, 21-27 and 29-30 Are Obvious Under 35 U.S.C. § 103(a) Over Ghias in View of Philyaw | 45 |
| 1. Summary of Ghias | 45 |

| | | |
|------|--|----|
| 2. | Summary of Philyaw | 45 |
| 3. | The Combination of Ghias and Philyaw Discloses Every Element of Claims 1-3, 8, 10-14, 18-19, 21-27, and 29-30 | 46 |
| 4. | A Person Having Ordinary Skill in the Art Would Have Been Motivated to Combine Ghias and Philyaw | 49 |
| VII. | CONCLUSION..... | 60 |

EXHIBIT LIST

- 1001** U.S. Patent No. 8,656,441 to Cox
- 1002** Prosecution History of U.S. Patent No. 8,656,441
- 1003** Visual Summary of Petition Grounds
- 1004** December 3, 2014 Declaration of Dr. Pierre Moulin
- 1005** Curriculum Vitae of Dr. Pierre Moulin
- 1006** Sunil Arya, et al., "An Optimal Algorithm for Approximate Nearest Neighbor Searching in Fixed Dimensions" ("Arya")
- 1007** Christian Böhm, et al., "Efficient Similarity Search in Digital Libraries" ("Böhm")
- 1008** U.S. Patent No. 7,444,353 ("Chen")
- 1009** U.S. Patent No. 6,970,886 ("Conwell")
- 1010** U.S. Patent No. 5,874,686 ("Ghias")
- 1011** U.S. Patent No. 6,597,405 ("Iggulden")
- 1012** U.S. Patent No. 6,188,010 ("Iwamura")
- 1013** U.S. Patent No. 6,505,160 ("Levy")
- 1014** U.S. Patent No. 6,098,106 ("Philyaw")
- 1015** U.S. Patent No. 7,743,092 ("Wood")
- 1016** Prosecution History of U.S. Patent App. No. 09/438,469
- 1017** Timo Raita, "Tuning the Boyer–Moore–Horspool String Searching Algorithm"
- 1018** Aristides Gionis, et al., "Similarity Search in High Dimensions via Hashing"
- 1019** Plaintiff Network-1 Technologies, Inc.'s Responses to Defendants Google, Inc. and YouTube, LLC's First Set of Interrogatories (Nos. 1-

4) in *Network-1 Technologies, Inc. v. Google, Inc., et al.* (S.D.N.Y. Case No. 14-cv-2396-PGG)

Google Inc. ("Petitioner"), petitions for *inter partes* review ("IPR") under 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42 of claims 1-3, 6-14, 18-19, 21-27, and 29-30 ("the '441 Claims") of U.S. Patent No. 8,656,441 ("the '441 patent") (Ex. 1001).

I. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(a)(1)

Petitioner and YouTube, LLC, a subsidiary of Petitioner, are real parties-in-interest with respect to the instant petition.

The '441 patent is asserted in an action captioned *Network-1 Technologies, Inc. v. Google Inc., et al.*, Case No. 1:14-cv-2396 (S.D.N.Y.), filed April 4, 2014.

Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney accompanies this petition. Service of any documents via hand-delivery may be made at the postal mailing address of the respective lead or back-up counsel designated below:

| Lead Counsel | Back-Up Counsel |
|---|--|
| James J. Elacqua (Reg. # 28,412) SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP 525 University Avenue - Suite 1400 Palo Alto, California 94301 Telephone: (650) 470-4510 James.Elacqua@skadden.com | Douglas R. Nemec (Reg. # 41,219) SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP Four Times Square New York, New York 10036-6522 Telephone: (212) 735-2419 Douglas.Nemec@skadden.com |

II. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

Petitioner authorizes the Patent and Trademark Office to charge Deposit Account No. 19-2385 for the fee set in 37 C.F.R. § 42.15(a) for this Petition and authorize payment of any additional fees to be charged to this Deposit Account.

III. GROUNDS FOR STANDING UNDER 37 C.F.R. § 42.104(a)

Petitioner certifies that the '441 patent is available for IPR and that: (1) Petitioner does not own the '441 patent; (2) prior to the date this Petition was filed, neither Petitioner nor any real party-in-interest filed a civil action challenging the validity of a claim in the '441 patent; (3) this Petition has been filed less than one year after April 11, 2014, which was the date on which Petitioner was served with a complaint alleging infringement of the '441 patent; and (4) neither Petitioner, any real parties-in-interest, nor any privies of Petitioner, are estopped from challenging the claims on the grounds identified in this Petition.

IV. SUMMARY OF CHALLENGE AND RELIEF REQUESTED

Petitioner asserts the following specific grounds of rejection under 35 U.S.C. §§ 102 and 103. These grounds are visually summarized in Exhibit 1003.

| Ground | '441 patent Claims | Grounds for Trial |
|---------------|-------------------------------------|-----------------------------------|
| 1 | 1-3, 6-14, 18-19, 21-26, 30 | Obvious over Levy in view of Arya |
| 2 | 1-3, 6, 8-14, 19, 21-26, 30 | Anticipated by Conwell |
| 3 | 1-3, 8-14, 19, 21-22, 25, 27, 29-30 | Anticipated by Wood |
| 4 | 1-3, 8, 10-14, 18-19, 21-27, 29-30 | Obvious over Ghias and Philyaw |

V. SUMMARY OF THE '441 PATENT

A. Algorithms for Automatic Content Recognition

In the 1990s, numerous individuals concurrently developed systems for computer-automated recognition of audio and video content. Ex. 1004 at ¶ 9. Such

systems universally relied on two widely known technologies: feature extraction and neighbor searching. *Id.* Feature extraction refers to quantifying a media work in a form that—unlike a raw video feed—is easily parsed by a computer. *Id.* at ¶ 11. Neighbor searching refers to comparing a first set of extracted features with one or more additional sets of extracted features to locate a close, but not necessarily exact, match. *Id.* at ¶ 12. Neighbor searching is computationally intensive, so content recognition schemes typically increased efficiency by intelligently searching only a subset of potential matches (i.e., "non-exhaustive" algorithms). *Id.*

B. Summary of the '441 Claims

The '441 patent issued from U.S. Patent Application No. 13/829,717, filed on March 14, 2013, and claims priority to Provisional Application No. 60/232,618, filed on September 14, 2000. Ex. 1001.

The '441 Claims relate to identifying an unknown media work and, based on its determined identity, performing an action. Ex. 1001 at Abstract, Claims 1, 13, 25. The independent '441 Claims are directed to five elements for identifying an electronic work and performing a corresponding action: (1) a database with "first electronic data related to identification" of "reference electronic works" and "second electronic data related to action information . . . corresponding to" the reference electronic works; (2) "electronically **extracting features** from the electronic work"; (3) "electronically **determining an identification** of the

electronic work based on the extracted features" by performing "**a non-exhaustive search identifying a neighbor**"; (4) "electronically **determining an action based on the identification** of the electronic work"; and (5) "electronically **performing the action**." *Id.* at Claim 13; *see id.* at Claims 1, 25; Ex. 1004 at ¶ 15.

C. Person of Ordinary Skill in the Art of the '441 Patent

In 2000, a person of ordinary skill in the art of the '441 patent would have been highly skilled, and typically would have possessed at least an M.S. in computer science, electrical engineering, or mathematics; knowledge of video and audio processing techniques; and 1-2 years of experience in audio, video, or image processing. Ex. 1004 at ¶ 6.

D. Claim Construction Under 37 C.F.R. § 42.104(b)(3)

The claim terms should be given their "broadest reasonable construction in light of the specification." 37 C.F.R. § 42.100(b). Petitioner reserves the right to present different constructions in related litigation (under the appropriate standard). Proposed broadest reasonable constructions are set forth below.

The terms "**extracted features**," "**compact electronic representation**," and "**compact electronic representation comprising an extracted feature vector**" appear in all independent claims '441 patent, and should all be construed to mean "a quantitative representation of the features of a media work, or a subset of the features of a media work." Ex. 1004 at ¶¶ 36-39. The patent specification

recognizes that "[t]he recognition literature contains many different" extraction algorithms, including "pseudo-random sample[s] of pixels," "the average intensities of nxn blocks of pixels," "frequency-based decomposition of the signal, such as produced by the Fourier, wavelet and or discrete cosine transforms," or "a combination of these." *E.g.*, Ex. 1001 at 6:56-7:16. The only unifying characteristic of these methods is that they generate a quantitative representation of the features of a media work. Ex. 1004 at ¶ 37. In 2000, persons skilled in the art consistently employed this definition. Ex. 1004 at ¶ 38.

The '441 specification further demonstrates that "compact electronic representation" and "compact electronic representation comprising an extracted feature vector" are synonymous with "extracted features." In a single passage, the specification equates all three terms: "[the purpose of the **feature extraction** operation is to derive a **compact representation** of the work that can subsequently be used for the purpose of recognition. In the case of images and video, **this feature vector** might be . . ." Ex. 1001 at 6:61-65. *E.g., id.* at 19:43-44, 5:45-46, 6:35; 6:41-43; 7:47-49; 7:59-60; 8:8-10; 8:32-54; 9:21-34. In 2000, persons skilled in the art understood that these terms were synonymous. Ex. 1004 at ¶ 39.

The term "**non-exhaustive . . . search**" appears in all independent claims of the '441 patent, and should be construed—under the "broadest reasonable construction" standard—to mean "a search that locates a match without conducting

a brute force comparison of all possible matches, and all data within all possible matches." Ex. 1004 at ¶¶ 40-44. The specification never uses the term "non-exhaustive" or "exhaustive." Ex. 1001. However, in 2000, persons skilled in the art employed multiple constructions, the broadest of which was consistent with the above definition. Ex. 1004 at ¶ 40. Any search algorithm that is not guaranteed to find an existing match is necessarily non-exhaustive under this definition. *Id.* at ¶ 41.

The term "**neighbor search**" appears in all independent claims of the '441 patent, and should be construed to mean "identifying a close, but not necessarily exact, match." In 2000, persons skilled in art consistently employed this definition. Ex. 1004 at ¶ 45. Consistent with the above, the term "**neighbor**" should be construed to mean "a close, but not necessarily exact, match." *Id.* at ¶ 47.

Slight variations of the term "**associating . . . the determined action with the first electronic work**" appear in all independent claims of the '441 patent, and should be construed to mean "establishing any relationship between an action and an identified work, including performing the action in response to identifying the work." Ex. 1004 at ¶ 48. Though the '441 specification notes that the database "may associate" known works "with associated information 136, such as an action" (Ex. 1001 at 6:26-28), it never discloses the association of a *newly identified work* with an action. However, the specification makes clear that associating an action with a

newly identified work cannot refer to recording in the database that the action and the work correspond, because the database already contains this information. That is, because the '441 patent determines an action by retrieving a database record relating the work to the action (*e.g.*, *id.* at 6:49-52), it would be nonsensical for the system to subsequently rewrite the same information back to the same database. Thus, in the absence of guidance from the specification, this term should be construed to include establishing any relationship between a work and an action. This includes performing an action in response to determining an identification, which requires establishing a relationship between a work and an action.

For all other claim terms, the plain and ordinary meaning should apply.

VI. ANALYSIS OF GROUNDS FOR TRIAL

A. Ground 1: Claims 1-3, 6-14, 18-19, 21-26, and 30 of the '441 Patent Are Obvious Over Levy In View Of Arya 35 U.S.C. § 103

Levy was filed on May 2, 2000, and issued on January 7, 2003. Ex. 1013. Accordingly, Levy is prior art to the '441 patent under 35 U.S.C. § 102(e). Arya was published on July 6, 1998, and is therefore prior art under 35 U.S.C. § 102(b). Levy was before the examiner during prosecution of the '441 patent but was never cited. Arya was not before the examiner during prosecution.

1. Summary of Levy

Levy discloses identifying a media work and executing a related action. Ex. 1013 at Abstract. In particular, Levy teaches "a decoding process that extracts [an]

identifier from a media object" (*id.*); "a server [that] maps the identifier to an action" (*id.*); and "executing the action" (*id.* at 16:31-42).

Levy discloses embodiments that "derive the identifier from the signal" in which case "the embedding process is unnecessary." Ex. 1013 at 9:42-61. A client may perform extraction (*id.* at 16:60-61) or transmit a work to a server to perform the extraction (*id.* at 17:11-13). *Id.* at 4:35-37. Levy discloses using a determined identity to display "title, artist, lyrics," and other information (*id.* at 2:46-53) or "perform[] an electronic transaction (selling products like CDs, DVDs, concert tickets, etc. via computer transaction using credit cards . . .)." *Id.* at 13:50-67.

2. Summary of Arya

Arya discloses a neighbor search algorithm wherein "set S of n data points" is "preprocess[ed] . . . into a data structure, so that given any query point q . . . the k nearest neighbors of q can be computed." Ex. 1006 at 1. This neighbor search is non-exhaustive, and "can provide significant improvements over brute-force search." *Id.* at 4, 2, 19 (explaining that, unlike brute force search, Arya "can enumerate the m nearest cells to q in $O(md \log n)$ time").

3. A Person Having Ordinary Skill in the Art Would Have Been Motivated to Combine Levy with Arya

A person having ordinary skill in the art would have been motivated to combine Levy with Arya. Ex. 1004 at ¶¶ 60-61. Levy discloses extracting a "fingerprint of the audio signal based on a specified fingerprinting algorithm" (Ex.

1013 at 9:42-61) "to identify the media object" (*id.* at 1:48-55). Persons skilled in the art at the time understood that fingerprinting algorithms were designed to generate a "*statistically* unique identifier of" the media work, but that disparities in the source of a fingerprinted work led to slight discrepancies in generated fingerprints. *Id.* at 9:42-61; Ex. 1004 at ¶ 61. Thus, persons skilled in the art understood that identifying a media work required not only locating exact fingerprint matches, but also near matches. Ex. 1004 at ¶ 61. Arya expands on the teachings of Levy by providing an algorithm to run such a search for "approximate nearest neighbor[s]." Ex. 1006 at 1. Indeed, Arya explicitly envisioned that such "[n]earest neighbor searching is an important problem in a variety of applications, including . . . pattern recognition . . . [and] multimedia databases." *Id.* at 2.

4. The Combination of Levy and Arya Discloses Every Limitation of Claims 1-3, 9, 11-14, 18-19, 21-26, and 30

The combination of Levy and Arya discloses all five elements of the independent '441 Claims. Ex. 1004 at ¶¶ 63-68. First, the '441 Claims require "databases" containing "compact electronic representation[s] of one or more reference electronic works" and "electronic data related to an action . . . corresponding to each of the one or more reference electronic works." Ex. 1001 at Claims 1, 13, 25. As depicted in Figure 1, Levy discloses a database including first identifying information that is mapped to second action information. Ex. 1013 at Fig. 1, 4:40-61, 17:32-35 ("searching a database for additional information related

to the audio signal from which the fingerprint is derived").

Second, the '441 Claims require obtaining "extracted features of a first electronic work." Ex. 1001 at Claims 1, 13, 25. Levy teaches that identifiers can be "derive[d] from the audio signal," including the use of hash algorithms to create statistically-unique "fingerprints" of content. Ex. 1013 at 2:29-37, 3:59-64, 9:40-61.

Third, the '441 Claims require "identifying . . . the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search." Ex. 1001 at Claims 1, 13, 25. Levy teaches that the decoded identifier is transmitted to the server, which then uses the identifier to determine the identity of the electronic work and the actions associated with it. Ex. 1013 at 4:49-56, Fig. 1. Arya discloses a neighbor search wherein a "set S of n data points" is "preprocess[ed] . . . into a data structure, so that given any query point q . . . the k nearest neighbors of q can be computed." Ex. 1006 at 1. This neighbor search is non-exhaustive, and "can provide significant improvements over brute-force search." *Id.* at 4, 2, 19 (explaining that, unlike brute force search, Arya "can enumerate the m nearest cells to q in $O(md \log n)$ time"). Ex. 1004 at ¶ 66.

Fourth, the '441 Claims require "determining . . . the action information corresponding to the identified first electronic work based on the second electronic data in the database" Ex. 1001 at Claims 1, 13, 25. In Levy, the server uses the

identifier and mapping process to determine the proper action(s) associated with that identifier. Ex. 1013 at 2:46-48, 4:49-61, Fig. 1, Abstract, 1:48-55.

Fifth, the '441 Claims require "associating . . . the determined action information with the identified first electronic work," which encompasses performing an action. Ex. 1004 at ¶ 68. Levy discloses "executing the action" after mapping the identifier to an action. Ex. 1013 at 16:31-42, 16:58-17:3, 17:9-18, 4:62-5:16, 13:50-67, 6:60-65.

As demonstrated above and in the below chart¹, claims 1-3, 9, 11-14, 18-19, 21-26, and 30 of the '441 patent are anticipated by Levy. Ex. 1004 at ¶ 69.

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|--|--|
| 1. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Levy teaches a user device that is an electronic device. 14:35-42. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Levy teaches use of computers and other electronic devices, which contain processors. 4:65-67, 14:35-42. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Levy teaches the use of computers and other electronic devices, which contain computer readable media connected to the processors. 14:35-42. |
| (a) maintaining, by the computer system, a database comprising: | Levy teaches a database of content identifiers and actions that are linked to the content. Fig. 1, 4:49-61. |
| (1) first electronic data related to identification of one or more reference | Levy teaches a first electronic data that has content-identifying information. |

¹ Unless otherwise indicated, citations in this claim chart are to Levy (Ex. 1013).

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|--|--|
| electronic works; and | Fig. 1, 4:49-61. |
| (2) second electronic data related to action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Levy teaches second electronic data that contains the action or actions to be associated with the content-identifying information. Fig. 1, 4:49-61. |
| (b) obtaining, by the computer system, extracted features of a first electronic work; | Levy obtains the extracted features (i.e., the identifier) by extracting them from an audio signal. 4:33-39, 3:59-61, 9:40-61, 12:37-41, 16:60-61. In one embodiment, the extraction process comprises "comput[ing] a fingerprint of the audio signal based on a specified fingerprinting algorithm." 9:42-61. "[T]he decoding process may be implemented in a variety of" computers. 14:35-42. |
| (c) identifying, by the computer system, the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search; | Levy teaches that the server uses the identifier to identify the work. 4:49-61. The "decoding device or programmatic process extracts the identifier from the object and uses it to retrieve related data or actions ('metadata'). In the case of an audio object, like a song, the metadata typically includes the title, artist." 2:46-53. The server provides the identification to the decoder by "performing database look up to uniquely identify a media object." 13:62-63. Arya further discloses identifying a neighbor using a non-exhaustive search that "can provide significant improvements over brute force search" in part because it allows some "relatively small average error." Ex. 1006 at 4, 3, 19-21; Ex. 1004 at ¶¶ 60-61. |
| (d) determining, by the computer | Levy discloses that "[t]he server, in |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|--|--|
| system, the action information corresponding to the identified first electronic work based on the second electronic data in the database; and | turn, maps the identifier to an action" to determine action information corresponding to the first electronic work. Abstract, 1:48-55. "To find the associated action or actions, the server . . . may: 1) look up the data and actions in a local database stored in its memory subsystem; 2) route the identifier to one or more other servers via the network, which in turn look up related actions and data associated with the identifier; or 3) perform some combination." 4:53-61. |
| (e) associating, by the computer system, the determined action information with the identified first electronic work. | Levy discloses "executing the action." 16:31-32, 16:58-17:3, 17:9-18. Levy further discloses that the action could be any of a "variety of actions," including "downloading media signals in streaming or file format" or "returning data and HTML links" on a portable client device. 13:50-67. |
| 2. The computer system of claim 1, wherein the step of obtaining comprises receiving the first electronic work and extracting the extracted features from the first electronic work. | Levy teaches that the user device may receive the first electronic work from "ambient audio waves" "and then extract[] the [extracted features] from the signal." 4:33-39. Alternatively, Levy discloses receiving the first electronic work from "wire networks," "wireless networks," "broadcast," "Digital Versatile Disc (DVD), minidisk, or compact disk (CD)" (2:7-21, 2:29-37) and subsequently extracting features (4:33-39, 3:59-61, 9:40-61, 12:37-41). |
| 3. The computer system of claim 2, wherein the first electronic work is received from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device. | Levy teaches that "a user ultimately receives the linked object in a player, tuner, or capture device" by "transferring an audio object over a computer network, streaming the object |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|---|--|
| | over a computer network, or broadcasting" from a computer. 4:26-32, Fig. 1. |
| <p>9. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device, and wherein the action information comprises commercial transaction data, and the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of:</p> | <p>Levy teaches that the server obtains the extracted features from the user device, which can be a computer or portable device such as a player, tuner, or other capture device. 4:33-43. Levy further teaches that action information can comprise commercial transaction data, such as "performing an electronic transaction (selling products like CDs, DVDs, concert tickets, etc. via computer transaction using credit cards, digital money, etc.)" (13:56-58, 2:59-61) or "information about themselves" that users provide "when they register their decoding device" (2:67-3:2).</p> |
| <p>electronically performing the commercial transaction through the at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device using the commercial transaction data.</p> | <p>Levy discloses, through a computer, "perform[ing] an electronic transaction" using the commercial transaction data. 13:56-58. Levy additionally discloses, through a computer, performing a commercial transaction using the commercial transaction data consisting of user registration data. 2:67-3:2</p> |
| <p>11. The computer system of claim 1, wherein the action comprises at least one of directing a user to a website related to the first electronic work, initiating an e-commerce transaction, or dialing a phone number.</p> | <p>Levy teaches that the linked action can provide URLs to web sites and information about buying and sampling opportunities. 2:48-53, 3:4-21, 6:43-59, 13:53-54.</p> |
| <p>12. The computer system of claim 1, wherein the action comprises providing and/or displaying additional information in association with the first electronic work.</p> | <p>Levy teaches providing "metadata" that is associated with the electronic work, which may include the title, artist, lyrics, copyright owner, and other information. 2:46-53, 13:50-67, 16:31-43 ("returning data to the player</p> |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|--|---|
| | device"), 4:49-53 ("the server determines an associated action to perform, such as . . . returning metadata"), Abstract ("returning metadata"). |
| 13. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Levy regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation of one or more reference electronic works; and | Petitioner incorporates the above discussion of Levy regarding Claim 1(a)(1). |
| (2) second electronic data related to an action, the action comprising providing and/or displaying an advertisement corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Levy regarding Claim 1(a)(2). Levy further teaches an action that is providing and/or displaying an advertisement, such as "electronic buying opportunities for music, concert tickets, clothing, etc." 3:4-21, 5:39-50, 6:54-59, 17:9-18, 17:21-26, 2:48-53. |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation of a first electronic work; | Petitioner incorporates the above discussion of Levy regarding Claim 1b. As explained above, the term "compact electronic representation" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic | Petitioner incorporates the above discussion of Levy and Arya regarding |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
|--|---|
| work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation using a non-exhaustive neighbor search; | Claim 1c. |
| (d) determining, by the computer system, the action corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Levy regarding Claim 1d. |
| (e) associating, by the computer system, the determined action with the first electronic work. | Petitioner incorporates the above discussion of Levy regarding Claim 1e. |
| 14. The computer system of claim 13, wherein the action further comprises providing a link to a site on the World Wide Web associated with the advertisement. | Levy teaches that action can be "returning data and HTML links (e.g., in the form of an HTML document, scripts, etc.)" on the Web. 13:53-54, 6:43-49. |
| 18. The computer system of claim 13, wherein the action further comprises collecting competitive market research data related to the advertisement. | Levy collects competitive market research data, wherein, "where identifier linking transactions are monitored, it enables the vendors of music to gather data about electronic transactions triggered by the link." 2:62-3:2. |
| 19. The computer system of claim 13, wherein the action further comprises purchasing a product or service related to the advertisement. | Levy discloses "performing an electronic transaction (selling products like CDs, DVDs, concert tickets, etc. via computer transaction using credit cards, digital money, etc.)." 13:56-58, 2:53-56, 2:62-3:23. |
| 21. The computer system of claim 1, further comprising the step of transmitting, by the computer system, the determined action as associated with the first electronic work. | Levy teaches transmitting the action from the computer system to the user's device, for example, using Internet protocols. 5:11-16, 5:51-6:2, 6:43-59. |
| 22. The computer system of claim 1, wherein the one or more electronic works comprise at least one of a video | Levy discloses electronic works that are "audio" or "still images, video, graphics |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
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| work, an audio work, or an image work. | models, etc." 10:4-17. |
| 23. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second electronic work; | Levy obtains the extracted features (i.e., the identifier) by extracting them from an audio signal. 4:33-39, 3:59-61, 9:40-61, 12:37-41, 16:60-61. The extraction process "computes a fingerprint of the audio signal based on a specified fingerprinting algorithm" (9:42-61) and "may be implemented in a variety of " computers (14:35-42). |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Levy teaches that the server uses the identifier to search for the identification of the work. 4:49-61, 13:62-63. Arya further discloses identifying a neighbor using a non-exhaustive search that "can provide significant improvements over brute force search" in part because it allows some "relatively small average error." Ex. 1006 at 4, 3, 19-21; Ex. 1004 at ¶¶ 60-61. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Levy teaches that the system can determine when the electronic work is not identified (i.e., no link exists). 6:60-7:12. The system can then offer the link for purchase. <i>Id.</i> |
| 24. The computer system of claim 13, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second | Petitioner incorporates the above |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
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| electronic work to be identified; | discussion of Levy regarding Claim 23f. |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Petitioner incorporates the above discussion of Levy regarding Claim 23g. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Petitioner incorporates the above discussion of Levy regarding Claim 23h. |
| 25. A computer system comprising: | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| one or more electronic communications devices; | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Petitioner incorporates the above discussion of Levy regarding Claim 1. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Levy regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation comprising an extracted feature vector of one or more reference electronic works; and | Petitioner incorporates the above discussion of Levy regarding Claim 1(a)(1). |
| (2) second electronic data related to action information, the action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Levy regarding Claim 1(a)(2). |
| (b) obtaining, by the computer system, | Petitioner incorporates the above |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
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| a second digitally created compact electronic representation comprising an extracted feature vector of a first electronic work; | discussion of Levy regarding Claim 1b. As explained above, the term "compact electronic representation comprising an extracted feature vector" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation of the first electronic work using a non-exhaustive neighbor search; | Petitioner incorporates the above discussion of Levy and Arya regarding Claim 1c. |
| (d) determining, by the computer system, the action information corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Levy regarding Claim 1d. |
| (e) associating, by the computer system, the determined action information with the first electronic work. | Petitioner incorporates the above discussion of Levy regarding Claim 1e. |
| 26. The computer system of claim 25, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, a third digitally created compact electronic representation comprising an extracted feature vector of a second electronic work; | Petitioner incorporates the above discussion of Levy regarding Claim 23f. |
| (g) searching, by the computer system, for a matching reference electronic work that matches the second electronic work by comparing the third digitally created compact electronic | Petitioner incorporates the above discussion of Levy regarding Claim 23g. |

| '441 Patent | Levy (Ex. 1013) and Arya (Ex. 1006) |
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| representation of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | |
| (h) determining, by the computer system, that a matching reference electronic work that matches the second electronic work does not exist based on results of the searching step. | Petitioner incorporates the above discussion of Levy regarding Claim 23h. |
| 30. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of transmitting, by the computer system, the determined action information as associated with the first electronic identified work. | Petitioner incorporates the above discussion of Levy regarding Claim 21. |

5. The Combination of Levy and Arya Additionally Renders Obvious Claims 6-8 and 10

Claim 8 depends from claim 1. For the reasons expressed above, Levy discloses all elements of claim 1. Claim 8 further requires that "at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device that stores commercial transaction data, and wherein the action information comprises a commercial transaction, and the method further comprises: electronically performing the commercial transaction using the stored commercial transaction data." Levy teaches that the server obtains the extracted features from the user device, which can be a computer or portable device such as a player, tuner,

or other capture device. Ex. 1013 at 4:33-43. Levy further teaches that action information can comprise "performing an electronic transaction (selling products like CDs, DVDs, concert tickets, etc. via computer transaction using credit cards, digital money, etc.)" (*id.* at 13:56-58, 2:59-61) or "information about themselves" that users provide "when they register their decoding device" (*id.* at 2:67-3:2).

It would be obvious to a person skilled in the art to modify Levy to further store the commercial transaction data on a computer or portable device. Ex. 1004 ¶ 74. This could be achieved using routine techniques, such as simply including a data entry form to allow a user to input and store commercial transaction data—such as a credit card number—prior to attempting to identify a media work. *Id.* A person skilled in the art would be motivated to make this modification because the "electronic transaction . . ." (Ex. 1013 at 13:50-67) would be less burdensome for the user if credit card information were stored in the user's computer in advance. Ex. 1004 at ¶ 74.

Claim 10 depends from claim 8, and additionally requires that the "commercial transaction data comprises at least one of a purchaser's name, a purchaser's address, or credit card information." Levy discloses that the commercial transaction data may be information relating to "credit cards" or "digital money." Ex. 1013 at 13:56-58.

B. Ground 2: Claims 1-3, 6, 8-14, 19, 21-26, and 30 of the '441 Patent Are Anticipated By Conwell Under 35 U.S.C. § 102(e)

1. Summary of Conwell

Conwell was filed May 25, 2000, and issued on November 29, 2005.

Conwell is therefore prior art to the '441 Claims under 35 U.S.C. §102(e). Conwell was not before the examiner during prosecution of the '441 patent. Conwell discloses a method for directing users of digital content to websites related to the content being played. *See* Ex. 1009 at Abstract. The identifier can be derived from the content, for example by applying a hashing algorithm to some or all of the content to generate the identifier. *Id.* at 1:60-2:3, 4:64-5:3 (suggesting the use of "hashing algorithms by which similar or related, but non-identical, inputs map to the same hash outputs"). Each identifier is stored in a database along with a corresponding web address. *Id.* at 3:43-45, Figs. 3-4.

When a user plays digital content with a compatible device, the identifier is generated and sent to the database, which uses the identifier to look up the corresponding URL in the database and sends that URL back to the user device, which accesses the URL. Ex. 1009 at 3:46-60, Figs. 3-4. In the event that the content identifier is not associated with a URL, the user can opt to purchase the right to associate the content with a link to a specified page, that can include banner advertisements, sponsored links to online retailers, or other methods of generating revenue. *Id.* at 4:14-21, 4:30-34.

2. Conwell Discloses Every Limitation of Claims 1-3, 6, 8-14, 19, 21-26, and 30 of the '441 Patent

Conwell discloses all five elements of the independent '441 Claims. Ex. 1004 at ¶¶ 83-88. First, the '441 Claims require "one or more databases" comprising "first electronic data related to identification of one or more reference electronic works" and "second electronic data related to action information comprising an action to perform corresponding to each of the one or more reference electronic works." Ex. 1001 at Claims 1, 13, 25. Conwell discloses a look-up table containing identifiers extracted from reference works and an associated URL constituting the action information. *See* Ex. 1009 3:43-45, Fig. 3.

Second, the '441 Claims require obtaining "extracted features of a first electronic work." Ex. 1001 at Claims 1, 13, 25. Conwell discloses user devices that extract identifiers from content, for example, sampling bits of the work or applying a hash algorithm. Ex. 1009 at 1:60-67, Abstract.

Third, the '441 Claims require "identifying . . . the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search." Ex. 1001 at Claims 1, 13, 25. Conwell teaches table look-up using the identifier decoded from the electronic work. *See* Ex. 1009 at 3:43-62, Figs. 1, 3. Because the hash algorithm generates the same output identifier for similar, but non-identical, inputs, the table look-up will return similar "neighbor" results even when the input work is not identical to the reference work. *Id.* at 4:64-5:3; Ex. 1004 at ¶ 86. This search is non-

exhaustive because it does not require a brute force comparison of all possible hashes, but rather requires a single lookup in a numerically sorted lookup table that uses hash identifiers as an index. Ex. 1009 at 3:43-50, 5:58-64; Ex. 1004 at ¶ 86.

Fourth and fifth, the '441 Claims require "determining . . . the action information corresponding to the identified first electronic work based on the second electronic data in the database" and "associating . . . the determined action information with the identified first electronic work." Ex. 1001 at Claims 1, 13, 25. Conwell discloses performing the table look-up using the identifier and selecting the corresponding URL that is stored as the second electronic data associated with the identifier (the first electronic data that is determined to match the first electronic work). Ex. 1009 at 3:43-59, Fig. 3. Conwell then returns the URL in response to the user's query using the derived identifier, and the user's device accesses the URL. *Id.* The associated URL can be, for example, "a portal to a web site dedicated to the music artist, a web site giving concert schedules for the artist, a web site offering CDs," and can include "banner advertising." *Id.* at 3:50-55, 4:30-34, 2:45-46.

As demonstrated above and in the below chart, claims 1-3, 6, 8-14, 19, 21-26 and 30 of the '441 patent are anticipated by Conwell.

| '441 Patent | Conwell (Ex. 1009) |
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| 1. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Conwell teaches an electronic communications device, for example a personal computer or a wireless internet |

| '441 Patent | Conwell (Ex. 1009) |
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| | appliance. 3:46-50, Fig. 1. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Conwell teaches processors connected to the electronic communications devices, for example a personal computer. 3:46-50, Fig. 1. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Conwell teaches computer readable media storing instructions in the form of the communications devices (e.g., a personal computer) and the Internet-accessible database. 3:46-50, Fig. 1. |
| (a) maintaining, by the computer system, a database comprising: | Conwell has a database where "each active record includes an identifier and a corresponding URL." 3:43-44, Figs. 3-4. |
| (1) first electronic data related to identification of one or more reference electronic works; and | Conwell teaches first electronic data in the form of identifiers that are derived from content. 1:60-67, 3:43-62, Figs. 3-4. |
| (2) second electronic data related to action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Conwell teaches second electronic data comprising an action to perform, which is a "URL corresponding to" each of the first electronic data (i.e., the identifiers). 3:43-62, Figs. 3-4. |
| (b) obtaining, by the computer system, extracted features of a first electronic work; | Conwell obtains extracted features by deriving them from the work, e.g., using a "hashing" algorithm. Abstract, 3:43-62, 1:65-67. |
| (c) identifying, by the computer system, the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search; | Conwell identifies a first electronic work by accessing a lookup table in a computer system to "decode an identifier [i.e., extracted features] from the audio content and send the identifier to the database, [which] responds by returning the URL corresponding to that identifier back to the user device." 3:43-62, Figs. 3-4. This is a neighbor search because "non-identical versions of the same basic content may nonetheless correspond to the same identifier." 4:64-5:3; Ex. 1004 at |

| '441 Patent | Conwell (Ex. 1009) |
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| | ¶ 86. This neighbor search is non-exhaustive because it uses a sorted lookup table that uses work identifiers as an index. 3:43-50, 5:58-64; Ex. 1004 at ¶ 86. |
| (d) determining, by the computer system, the action information corresponding to the identified first electronic work based on the second electronic data in the database; and | Conwell determines an action: "the database responds by returning the URL corresponding to that identifier back to the user device." 3:43-62, Figs. 3-4. Alternatively, if the identifier is not found, Conwell determines the action of offering the database association for sale. 4:9-21, 5:4-14. |
| (e) associating, by the computer system, the determined action information with the identified first electronic work. | Conwell associates the action information with the electronic work by "returning the URL corresponding to that identifier back to the user device. The user device then directs an internet browser to that URL." 3:43-62. Alternatively, if the identifier is not found, Conwell associates by offering the database association for sale. 4:9-21, 5:4-14. |
| 2. The computer system of claim 1, wherein the step of obtaining comprises receiving the first electronic work and extracting the extracted features from the first electronic work. | Conwell teaches that the consumer device receives the electronic work, for instance from a "CD or DVD" (2:4-10) or an MP3 file (1:60-2:3, 7:24-25), and extracts its features (3:43-55). |
| 3. The computer system of claim 2, wherein the first electronic work is received from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device. | Conwell teaches that the consumer device receives the electronic work, for instance from a "CD or DVD" (2:4-10) or an MP3 file (1:60-2:3, 7:24-25), both of which are digital files generated by a computer. |
| 6. The computer system of claim 1, wherein the step of obtaining comprises receiving the first electronic work and the extracted features of the first electronic work. | Conwell teaches that the computer system receives the first electronic work (at the user device) and the extracted features (at the database). 3:43-62. |

| '441 Patent | Conwell (Ex. 1009) |
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| <p>8. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device that stores commercial transaction data, and wherein the action information comprises a commercial transaction, and the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of:</p> | <p>The database receives the extracted features from a computer or a portable device. (3:43-62) which at least temporarily stores commercial transaction data such as a "credit card" number or payment information for "one of several emerging web currencies" (4:22-24). The action information comprises a commercial transaction, such as processing "the payment by various known methods (e.g., via credit card, by one of several emerging web currencies, etc.)" (4:14-29) or holding an auction (5:4-14).</p> |
| <p>electronically performing the commercial transaction using the stored commercial transaction data.</p> | <p>Conwell performs the commercial transaction using the stored commercial transaction data by processing "the payment by various known methods (e.g., via credit card, by one of several emerging web currencies, etc.)" or holding an auction. 4:14-29, 5:4-14.</p> |
| <p>9. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device, and wherein the action information comprises commercial transaction data, and the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of:</p> | <p>Conwell teaches that the database receives the extracted features from a computer or a portable device. 3:43-62. The action information comprises commercial transaction data, such as data relating to processing "the payment by various known methods (e.g., via credit card, by one of several emerging web currencies, etc.)" (4:14-29) or holding an auction (5:4-14).</p> |
| <p>electronically performing the commercial transaction through the at least one of a set-top-box, a video</p> | <p>Conwell performs the commercial transaction through the computer using the stored commercial transaction data by</p> |

| '441 Patent | Conwell (Ex. 1009) |
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| recorder, a cell phone, a computer, or a portable device using the commercial transaction data. | processing "the payment by various known methods (e.g., via credit card . . .)" or holding an auction. 4:14-29, 5:4-14. |
| 10. The computer system of claim 8, wherein the stored commercial transaction data comprises at least one of a purchaser's name, a purchaser's address, or credit card information. | Conwell stores commercial transaction data such as a "credit card" number or payment information for "one of several emerging web currencies." 4:22-24. |
| 11. The computer system of claim 1, wherein the action comprises at least one of directing a user to a website related to the first electronic work, initiating an e-commerce transaction, or dialing a phone number. | The action may comprise initiating an e-commerce transaction, such as "payment by various known methods (e.g., via credit card . . .)" (4:14-29) or holding an auction (5:4-14); or "returning the URL corresponding to that identifier back to the user device," which "then directs an internet browser to that URL" (3:43-62). |
| 12. The computer system of claim 1, wherein the action comprises providing and/or displaying additional information in association with the first electronic work. | The action displays additional information in association with the electronic work, such as information related to a payment (4:14-29), an auction (5:4-14), or an associated web page (3:43-62). |
| 13. A computer system comprising: | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| one or more electronic communications devices; | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |

| '441 Patent | Conwell (Ex. 1009) |
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| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Conwell regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation of one or more reference electronic works; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1(a)(1). |
| (2) second electronic data related to an action, the action comprising providing and/or displaying an advertisement corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Conwell regarding Claim 1(a)(2). Conwell further discloses that the action comprises providing an advertisement, such as "banner advertising, co-op links to on-line retailers (e.g., Amazon.com), or other revenue-producing uses." 3:51-55, 4:30-34. |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation of a first electronic work; | Petitioner incorporates the above discussion of Conwell regarding Claim 1b. As explained above, the term "compact electronic representation" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation using a non-exhaustive neighbor search; | Petitioner incorporates the above discussion of Conwell regarding Claim 1c. |
| (d) determining, by the computer system, the action corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1d. |
| (e) associating, by the computer system, the determined action with the first electronic work. | Petitioner incorporates the above discussion of Conwell regarding Claim 1e. |

| '441 Patent | Conwell (Ex. 1009) |
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| 14. The computer system of claim 13, wherein the action further comprises providing a link to a site on the World Wide Web associated with the advertisement. | Conwell teaches the action providing a URL link to a website that is associated with the advertisement (e.g., for CDs). 3:51-55. |
| 19. The computer system of claim 13, wherein the action further comprises purchasing a product or service related to the advertisement. | Conwell provides "opportunities to purchase CDs, etc." (Abstract) such as "banner advertising, co-op links to on-line retailers (e.g., Amazon.com), or other revenue-producing uses" (4:30-34) related to an advertisement. Conwell further discloses making a payment to effect such a purchase. 4:14-29. |
| 21. The computer system of claim 1, further comprising the step of transmitting, by the computer system, the determined action as associated with the first electronic work. | Conwell teaches transmitting of the determined action (e.g., transmitting the associated URL). 3:43-62. |
| 22. The computer system of claim 1, wherein the one or more electronic works comprise at least one of a video work, an audio work, or an image work. | Conwell teaches that the electronic work is an audio work (3:51-55), or a video work or still image (1:23-27). |
| 23. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second electronic work; | Conwell obtains extracted features by deriving them from the features of the work, e.g., using a "hashing" algorithm. Abstract, 3:43-62, 1:65-67. |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a | Conwell searches for a first electronic work by accessing a lookup table in a computer system to "decode an identifier [i.e., extracted features] from the audio content and send the identifier to the database, [which] responds by returning |

| '441 Patent | Conwell (Ex. 1009) |
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| non-exhaustive neighbor search; and | the URL corresponding to that identifier back to the user device." 3:43-62, Figs. 3-4. This is a neighbor search because "non-identical versions of the same basic content may nonetheless correspond to the same identifier." 4:64-5:3; Ex. 1004 at ¶ 86. This neighbor search is non-exhaustive because it uses a sorted lookup table that uses work identifiers as an index. 3:43-50, 5:58-64; Ex. 1004 at ¶ 86. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Conwell determines when the work is not identified in the database. 3:66-4:12 ("Instead, the Registry reports, (e.g., by a default web page) that there is no further information related to that MP3 (i.e., there is no database record corresponding to identifier '883')."). |
| 24. The computer system of claim 13, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second electronic work to be identified; | Petitioner incorporates the above discussion of Conwell regarding Claim 23f. |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Petitioner incorporates the above discussion of Conwell regarding Claim 23g. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Petitioner incorporates the above discussion of Conwell regarding Claim 23h. |
| 25. A computer system comprising: | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |

| '441 Patent | Conwell (Ex. 1009) |
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| one or more electronic communications devices; | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Petitioner incorporates the above discussion of Conwell regarding Claim 1. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Conwell regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation comprising an extracted feature vector of one or more reference electronic works; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1(a)(1). |
| (2) second electronic data related to action information, the action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Conwell regarding Claim 1(a)(2). |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation comprising an extracted feature vector of a first electronic work; | Petitioner incorporates the above discussion of Conwell regarding Claim 1b. As explained above, the term "compact electronic representation comprising an extracted feature vector" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation of the first electronic | Petitioner incorporates the above discussion of Conwell regarding Claim 1c. |

| '441 Patent | Conwell (Ex. 1009) |
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| work using a non-exhaustive neighbor search; | |
| (d) determining, by the computer system, the action information corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Conwell regarding Claim 1d. |
| (e) associating, by the computer system, the determined action information with the first electronic work. | Petitioner incorporates the above discussion of Conwell regarding Claim 1e. |
| 26. The computer system of claim 25, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, a third digitally created compact electronic representation comprising an extracted feature vector of a second electronic work; | Petitioner incorporates the above discussion of Conwell regarding Claim 23f. |
| (g) searching, by the computer system, for a matching reference electronic work that matches the second electronic work by comparing the third digitally created compact electronic representation of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Petitioner incorporates the above discussion of Conwell regarding Claim 23g. |
| (h) determining, by the computer system, that a matching reference electronic work that matches the second electronic work does not exist based on results of the searching step. | Petitioner incorporates the above discussion of Conwell regarding Claim 23h. |
| 30. The computer system of claim 1, wherein the one or more computer | Petitioner incorporates the above discussion of Conwell regarding Claim |

| '441 Patent | Conwell (Ex. 1009) |
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| readable media have stored thereon further computer instructions for carrying out the additional step of transmitting, by the computer system, the determined action information as associated with the first electronic identified work. | 21. |

C. Ground 3: Claims 1-3, 8-14, 19, 21-22, 25, 27, and 29-30 of the '441 Patent Are Anticipated By Wood Under 35 U.S.C. § 102(e)

1. Summary of Wood

Wood was filed on August 28, 2003, but claims priority to continuation-in-part Application No. 09/438,469, filed on November 12, 1999. Ex. 1015. Wood issued as a patent on June 22, 2010. *Id.* The disclosure of App. No. 09/438,469 properly supports the subject matter of Wood relied upon here. Ex. 1016; Ex. 1004 at ¶ 93. Accordingly, Wood is prior art under 35 U.S.C. § 102(e). Wood was not before the examiner during prosecution of the '441 patent.

Wood discloses a computer system for identifying over the Internet a song hummed or sung by a user. Ex. 1015 at Abstract. "[A] musical composition can be recognized by extracting features from a specimen that has been vocalized by a person, generating a pattern from the extracted features, comparing this pattern with patterns in a pattern library, and identifying at least one musical composition as a result of this comparison." *Id.* at 2:34-39. After the song is identified, "identifiers such as title and singer or group . . . are transmitted to the customer for display on

the customer's monitor." *Id.* at 6:19-46. The customer may then purchase a copy of the song "by entering a credit card number" and subsequently "download[ing] a file containing the selection, such as an MP3 file." *Id.* at 5:8-23.

2. Wood Discloses Every Element of Claims 1-3, 8-14, 19, 21-22, 25, 27, and 29-30

Wood discloses all five elements of the independent '441 Claims. Ex. 1004 at ¶¶ 96-103. First, the '441 Claims require "databases" containing "compact electronic representation[s] of one or more reference electronic works" and "electronic data related to an action . . . corresponding to each of the one or more reference electronic works." Ex. 1001 at Claims 1, 13, 25. Wood discloses that "pattern library 88 stores normalized features extracted from all of the songs or other musical compositions that are stored in a music library 90," which constitutes a database storing compact representations of works. Ex. 1015 at 5:66-6:7, Fig. 4 at 88. Wood further discloses a "music library 90" which stores "not only the encoded songs, but also identification information such as the title of the song and the name of the singer or group." *Id.* at 6:19-23.

Second, the '441 Claims require "obtaining . . . a second digitally created compact electronic representation"—or, synonymously, "extracted features" or a "feature vector"—of an unknown work. Ex. 1001 at Claims 1, 13, 25. Wood discloses a "feature extraction unit" which "extracts from the specimen musical features which characterize the song." Ex. 1015 at 5:50-55, 2:34-46, 7:34-8:13.

Third, the '441 Claims require "identifying" the unknown work "using a non-exhaustive neighbor search." Ex. 1001 at Claims 1, 13, 25. Wood discloses "comparing [the extracted] pattern with patterns in a pattern library, and identifying at least one musical composition." *Id.* at 2:34-39. This constitutes a neighbor search because, "typically a distan[ce] score is calculated between the specimen and each entry in the pattern library, and a particular entry is determined to be a candidate if the distance is smaller than a predetermined value." *Id.* at 6:8-19, 10:56-11:19.

Wood further discloses that "the speed of the pattern matching could be increased considerably" by performing a non-exhaustive search that compares "only . . . portions of each composition, possibly the chorus and one or two other memorable stretches of music." *Id.* at 11:28-42. Alternatively, Wood discloses a non-exhaustive search that "ignore[s] periods of silence." *Id.* at 8:5-12, 6:3-7.

Fourth and fifth, the '441 Claims require "determining" an appropriate action based on the "electronic data related to an action," and "associating . . . the determined action with the" identified work, which encompasses performing an action. Ex. 1001 at 1, 13, 25. Wood discloses determining an action to perform such as transmitting a "corrupted version" of the song (i.e., a version "with superimposed noise" that will assist the user to confirm the identity of the song, but is not a substitute for purchasing a copy of an uncorrupted version) (Ex. 1015 at 2:29-33) and/or transmitting information about the song "for display on the customer's

monitor" (*id.* at 6:44-46), and performing the action. Ex. 1004 at ¶ 102.

As demonstrated above and in the chart below, claims 1-3, 8-14, 19, 21-22, 25, 27, and 29-30 of the '441 patent are anticipated by Wood. Ex. 1004 at ¶ 105.

| '441 patent | Wood (Ex. 1015) |
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| 1. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| (a) maintaining, by the computer system, a database comprising: | Wood discloses a pattern library database (Fig. 4 at 88) and a "music library" database (Fig. 4 at 90). 5:66-6:7, 6:19-23. |
| (1) first electronic data related to identification of one or more reference electronic works; and | The "pattern library [database] stores" data related to identification, such as "normalized features extracted from all of the songs or other musical compositions that are stored in a music library [database]." 5:66-6:7, Fig. 4 at 88. |
| (2) second electronic data related to action information comprising an action to perform corresponding to each of the one or more reference electronic works; | The "music library" database which stores "not only the encoded songs, but also [data related to the action of displaying an identification,] such as the title of the song and the name of the singer or group." 6:19-23. |
| (b) obtaining, by the computer system, extracted features of a first | Wood obtains extracted features by "extract[ing] from the specimen musical |

| '441 patent | Wood (Ex. 1015) |
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| electronic work; | features which characterize the song." 5:50-55, 2:34-46, 7:34-8:13. |
| (c) identifying, by the computer system, the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search; | Wood identifies the work using a neighbor search wherein "a distan[ce] score is calculated between the specimen and each entry in the pattern library [database], and a particular entry is determined to be a candidate if the distance is smaller than a predetermined value." 6:8-19, 10:56-11:19. The search is non-exhaustive and compares "only . . . portions of each composition, possibly the chorus and one or two other memorable stretches of music" (11:28-42) or "ignore[s] periods of silence in the specimen" (8:5-12, 6:3-7). |
| (d) determining, by the computer system, the action information corresponding to the identified first electronic work based on the second electronic data in the database; and | Wood determines an action to perform, such as transmitting a "corrupted version" of the song (2:29-33) and/or transmitting information about the song "for display on the customer's monitor" (6:44-46) that was retrieved from the "music library" database (6:19-23). |
| (e) associating, by the computer system, the determined action information with the identified first electronic work. | Wood associates an action by performing an action on a user's computer, such as playing a "corrupted version" of the song (2:29-33) and/or transmitting information about the song "for display on the customer's monitor" (6:44-46). |
| 2. The computer system of claim 1, wherein the step of obtaining comprises receiving the first electronic work and extracting the extracted features from the first electronic work. | Wood receives the electronic work "provided by a customer (as by humming, singing, or otherwise vocalizing the specimen . . .)." 1:15-18. The system subsequently "extracts from the specimen musical features which characterize the song." 5:50-55, 2:34-46, 7:34-8:13. |
| 3. The computer system of claim 2, wherein the first electronic work is | Wood receives the electronic work from the user's computer. 5:24-42 ("the result of |

| '441 patent | Wood (Ex. 1015) |
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| received from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device. | the customer's audibilization of the song . . . is an audio file that is conveyed to the music distribution company 18 via the internet"); 2:6-7. |
| 8. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device that stores commercial transaction data, and wherein the action information comprises a commercial transaction, and the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of: | Wood obtains from a computer either the first electronic work (2:7-8, 5:24-42) or the extracted features (2:8-12). The computer at least temporarily stores the commercial transaction data of "a credit card number," and that the action information comprises a commercial transaction such as purchasing a copy of the song and subsequently "download[ing] a file containing the selection, such as an MP3 file." 5:8-23. |
| electronically performing the commercial transaction using the stored commercial transaction data. | Wood performs a commercial transaction by purchasing a copy of the song and subsequently "download[ing] a file containing the selection, such as an MP3 file" using the commercial transaction data of the user's "credit card number." 5:8-23. |
| 9. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device, and wherein the action information comprises commercial transaction data, and the one or more computer readable media have stored thereon further computer instructions for carrying out the | Wood obtains from a computer either the first electronic work (2:7-8, 5:24-42) or the extracted features (2:8-12). Wood further discloses that the action information comprises commercial transaction data, such as purchasing a copy of the song and subsequently "download[ing] a file containing the selection, such as an MP3 file." 5:8-23. |

| '441 patent | Wood (Ex. 1015) |
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| additional step of: | |
| electronically performing the commercial transaction through the at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device using the commercial transaction data. | Wood performs a commercial transaction through the computer by purchasing a copy of the song and subsequently "download[ing] a file containing the selection, such as an MP3 file" using the commercial transaction data of the user's "credit card number." 5:8-23. |
| 10. The computer system of claim 8, wherein the stored commercial transaction data comprises at least one of a purchaser's name, a purchaser's address, or credit card information. | Wood discloses that the commercial transaction data is the user's "credit card number," which is at least temporarily stored on the device. 5:8-23. |
| 11. The computer system of claim 1, wherein the action comprises at least one of directing a user to a website related to the first electronic work, initiating an e-commerce transaction, or dialing a phone number. | Wood discloses initiating an e-commerce transaction "by entering a credit card number" and subsequently "download[ing] a file containing the selection, such as an MP3 file." 5:8-23. |
| 12. The computer system of claim 1, wherein the action comprises providing and/or displaying additional information in association with the first electronic work. | Wood discloses that "identifiers such as title and singer or group . . . are transmitted to the customer for display on the customer's monitor." 6:19-46, 2:20-23, Fig. 5 at 102, 14:28-29 ("sending information to identify the musical compositions in writing to the person over the internet"), 15:18-20, 16:21-22. |
| 13. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| one or more processors operatively connected to the one or more electronic communications devices; | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." |

| '441 patent | Wood (Ex. 1015) |
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| and | 3:25-27. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Wood regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation of one or more reference electronic works; and | Petitioner incorporates the above discussion of Wood regarding Claim 1(a)(1). |
| (2) second electronic data related to an action, the action comprising providing and/or displaying an advertisement corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Wood regarding Claim 1(a)(2). The action may be an advertisement, such as providing the customer the option to purchase a copy of the song "by entering a credit card number" and "download[ing] a file containing the selection, such as an MP3 file." 5:8-23. |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation of a first electronic work; | Petitioner incorporates the above discussion of Wood regarding Claim 1b. As explained above, the term "compact electronic representation" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation using a non-exhaustive neighbor search; | Petitioner incorporates the above discussion of Wood regarding Claim 1c. |
| (d) determining, by the computer system, the action corresponding to | Petitioner incorporates the above |

| '441 patent | Wood (Ex. 1015) |
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| the matching reference electronic work based on the second electronic data in the database; and | discussion of Wood regarding Claim 1d. |
| (e) associating, by the computer system, the determined action with the first electronic work. | Petitioner incorporates the above discussion of Wood regarding Claim 1e. |
| 14. The computer system of claim 13, wherein the action further comprises providing a link to a site on the World Wide Web associated with the advertisement. | The action may comprise providing links on a Web page: "The customer starts by logging on with the customer's internet service provider 14 and then addressing the music distribution company (step 52) by typing in the company's worldwide web address or URL. The company thereupon downloads the selection options available to the customer (step 54)." 4:27-41, 3:49-52. |
| 19. The computer system of claim 13, wherein the action further comprises purchasing a product or service related to the advertisement. | Wood discloses purchasing an advertised song "by entering a credit card number" and subsequently "download[ing] a file containing the selection, such as an MP3 file." 5:8-23. |
| 21. The computer system of claim 1, further comprising the step of transmitting, by the computer system, the determined action as associated with the first electronic work. | Wood discloses that "[t]he identification information (i.e., identifiers such as title and singer or group) is . . . transmitted to the customer for display on the customer's monitor" (6:19-46) along with a "corrupted version" of the identified song (2:29-33) and an offer to purchase the song (5:8-23). |
| 22. The computer system of claim 1, wherein the one or more electronic works comprise at least one of a video work, an audio work, or an image work. | Wood discloses that the electronic work is a "song," i.e., an audio work, that the user "may hum or otherwise vocalize." Abstract. |
| 25. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." |

| '441 patent | Wood (Ex. 1015) |
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| | 3:25-27. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Wood discloses "a computer 28 having a hard disk 30, a drive 32 for a removable recording medium, and a speaker 34." 3:25-27. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Wood regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation comprising an extracted feature vector of one or more reference electronic works; and | Petitioner incorporates the above discussion of Wood regarding Claim 1(a)(1). |
| (2) second electronic data related to action information, the action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Wood regarding Claim 1(a)(2). |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation comprising an extracted feature vector of a first electronic work; | Petitioner incorporates the above discussion of Wood regarding Claim 1b. As explained above, the term "compact electronic representation comprising an extracted feature vector" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation of the first | Petitioner incorporates the above discussion of Wood regarding Claim 1c. |

| '441 patent | Wood (Ex. 1015) |
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| electronic work using a non-exhaustive neighbor search; | |
| (d) determining, by the computer system, the action information corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Wood regarding Claim 1d. |
| (e) associating, by the computer system, the determined action information with the first electronic work. | Petitioner incorporates the above discussion of Wood regarding Claim 1e. |
| 27. The computer system of claim 1, wherein the extracted feature is extracted using frequency based decomposition. | Wood extracts features by frequency based decomposition: "dividing the specimen into a plurality of frequency bands, finding a first one of the frequency bands that has the strongest signal . . . , detecting when the strongest signal shifts to a second one of the frequency bands . . . , and detecting the number of half tones between the first one of the frequency bands and the second one of the frequency bands." 14:22-57, 1:50-53 ("identify[ing] a range of frequencies that are present during extremely brief slices of time and the power at those frequencies"). Ex. 1004 at ¶ 104. |
| 29. The computer system of claim 1, wherein the extracted feature is extracted using temporal sequence of feature vectors. | Wood extracts a temporal sequence of feature vectors in the form of "a sequence of notes in the specimen without rests between the notes, and information about the time interval between the beginning of one note in the sequence and the beginning of the next note." 16:14-42, 16:49-17:8, 12:40-57. "The net result would be somewhat like creating a pitch-with-respect-to-time graph of the customer's specimen." 10:66-11:1. |

| '441 patent | Wood (Ex. 1015) |
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| 30. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of transmitting, by the computer system, the determined action information as associated with the first electronic identified work. | Petitioner incorporates the above discussion of Wood regarding Claim 21. |

D. Ground 4: Claims 1-3, 8, 10-14, 18-19, 21-27 and 29-30 Are Obvious Under 35 U.S.C. § 103(a) Over Ghias in View of Philyaw

1. Summary of Ghias

Ghias was filed on October 31, 1996, and issued as a patent on February 23, 1999. *See* Ex. 1010. Accordingly, it is prior art under 35 U.S.C. § 102(b). Ghias was not before the examiner during prosecution of the '441 patent. Ghias identifies a melody hummed by a user. As illustrated by Figure 1 of Ghias, a "tune 12 is hummed by a person 18 into a microphone 20." Ex. 1010 at 2:41-42. The recorded melody is fed into "pitch tracking module 22 in computer 16" which extracts "a contour representation" of the melody. *Id.* at 2:46-49. The computer then "searches the melody database 14" to locate a matching melody. *Id.* at 2:50-59. Then, the computer takes the action of "output[ting] a ranked list of approximately matching melodies." *Id.* at 2:50-52, 6:60-63, 7:4-5, 8:26-28, 8:61-63.

2. Summary of Philyaw

Philyaw was filed on September 11, 1998, and issued on August 1, 2000. Ex.

1014. Accordingly, it is prior art under 35 U.S.C. § 102(a). Philyaw was not before the examiner during prosecution of the '441 patent. Philyaw discloses extracting identifying information embedded into a broadcast signal and, based upon that identifying information, viewing corresponding information, such as an advertisement. *E.g.*, Ex. 1014 at Abstract, 1:66-2:8. Specifically, a PC "extract[s] the unique identifier information" (*id.* at 16:18-23, 4:30-33) from a broadcast "program having embedded therein an encoded signal having unique identifier information contained therein" (*id.* at 15:48-16:2, 2:1-3, 5:47-52, 9:37-39). Using this identifying information, the PC queries an Advertiser Reference Server ("ARS") (*id.* at 5:52), which contains "a database . . . of product codes and associated manufacturer URLs" (*id.* at 5:57-58, Abstract. "[T]he ARS . . . responds by returning the URL of advertiser server 312 to the PC 302," which uses the URL to view the advertisement. *Id.* at 8:10-18, Abstract, 5:23-27, 5:64-6:2.

3. The Combination of Ghias and Philyaw Discloses Every Element of Claims 1-3, 8, 10-14, 18-19, 21-27, and 29-30

The combination of Ghias and Philyaw discloses all five elements of the independent '441 Claims. Ex. 1004 at ¶¶ 117-126. First, the '441 Claims require "databases" containing "compact electronic representation[s] of one or more reference electronic works" and "electronic data related to an action . . . corresponding to each of the one or more reference electronic works." Ghias discloses "a database of melodies each including a plurality of notes in a form of a

sequence of digitized representations of relative pitch differences," which constitute compact extracted features, electronic representations, and/or feature vectors. Ex. 1010 at 1:59-62, 5:66-6:1. Philyaw discloses an Advertiser Reference Server ("ARS"), which contains "a database . . . of product codes and associated manufacturer URLs" (*id.* at 5:57-58, Abstract).

Second, the '441 Claims require "obtaining . . . a second digitally created compact electronic representation"—or, synonymously, "extracted features" or a "feature vector"—of an unknown work. Ex. 1001 at Claims 1, 13, 25. Ghias extracts "a contour representation" of the melody. Ex. 1010 at 2:46-49. Specifically, user humming "is converted into a sequence of relative pitch transitions, as follows . . . To accomplish this conversion, a sequence of pitches in the melody must be isolated and tracked." *Id.* at 3:8-22.

Third, the '441 Claims require "identifying" the unknown work "using a non-exhaustive neighbor search." Ex. 1001 at Claims 1, 13, 25. Ghias discloses "search[ing] the melody database 14" to locate a matching melody. *Id.* at 2:50-59, Abstract ("A melody database is searched for at least one sequence of digitized representations of relative pitch differences . . . which at least approximately matches the sequence of digitized representations of relative pitch differences between successive notes of the melody."). Ghias further discloses that this search may be non-exhaustive: "it is considered desirable to use an efficient approximate

pattern matching algorithm" rather than an algorithm that is guaranteed to yield a match. *Id.* at 6:7-11, 6:23-35 ("Several Algorithms have been developed that address the problem of approximate string matching. Running times have ranged from $O(mn)$ for the brute force algorithm to $O(kn)$ or $O(n\log(m))$ "). This search locates a neighbor by determining "a ranked list of approximately matching melodies, as illustrated at 26" or "the single most approximate matching melody." *Id.* at 2:50-59, 6:60-63.

Fourth, the '441 Claims require "determining" an appropriate action based on the "electronic data related to an action." Philyaw discloses determining the appropriate advertisement to display to a user by querying the ARS database. Ex. 1014 at 5:64-65 ("advertiser server address URL is obtained from the ARS database"), 7:4-7, 8:34-36, 9:21-24.

Fifth, the '441 Claims require "associating . . . the determined action with the" identified work, which encompasses performing an action." Ex. 1001 at Claims 1, 13, 25. Ghias discloses that, after generating the list of matches, the system performs the action of "output[ting] the ranked list of approximately matching melodies." *Id.* at 2:50-52, 6:60-63, 7:4-5, 8:26-28, 8:61-63.

Alternatively, Philyaw performs the action of "returning the URL of advertiser server 312 to the PC 302," using the URL to view the advertisement (*id.* at 8:10-18, Abstract, 5:23-27, 5:64-6:2), directly transmitting an advertisement to a

user (*id.* at 7:43-56), or performing an interactive action, such as displaying "additional statistics associated with [a] sports program" (*id.* at 4:50-54).

4. A Person Having Ordinary Skill in the Art Would Have Been Motivated to Combine Ghias and Philyaw

A person having ordinary skill in the art would have been motivated to combine Ghias with Philyaw. Ex. 1004 at ¶¶ 113-115. Philyaw discloses a system for displaying advertisements related to broadcast content. *E.g.*, Ex. 1014 at Abstract, 1:66-2:8. To identify the broadcast content, Philyaw requires both embedding identifying information in the content (*id.* at 15:47-16:2, 2:1-3, 5:47-52, 9:37-39) and subsequently extracting the identifying information (*id.* at 16:18-24, 4:30-33). By contrast, Ghias allows identification of content based on intrinsic characteristics alone, and therefore does not require the step of embedding identifying information. *E.g.*, Ex. 1010 at Abstract, 2:41-59. A person skilled in the art would have been motivated to combine Ghias and Philyaw to present advertisements related to content without undertaking the time consuming and expensive step of embedding identifying information in content. Ex. 1004 at ¶ 114.

As demonstrated above and in the below chart, claims 1-5, 8, 10-14, 16, 18-27, and 29-30 are obvious over Ghias in view of Philyaw. Ex. 1004 at ¶ 129.

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| 1. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Ghias discloses a general purpose computer that can contain a database or be configured |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | to communicate with a database. 2:27-40. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Ghias discloses a general purpose computer that has at least a processor. 2:27-40. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Ghias discloses a general purpose computer that includes a computer readable media connected to the processor. 2:27-40. |
| (a) maintaining, by the computer system, a database comprising: | Ghias discloses "a database of melodies." 1:59-62, 5:66-6:1. Philyaw discloses an Advertiser Reference Server ("ARS") (Ex. 1014 at 5:52), which contains "a database . . . of product codes and associated manufacturer URLs" (5:57-58, Abstract). Ex. 1004 at ¶¶ 113-115. |
| (1) first electronic data related to identification of one or more reference electronic works; and | Ghias discloses "a database of melodies each including a plurality of notes in a form of a sequence of digitized representations of relative pitch differences between successive notes" (1:59-62, 5:66-6:1). |
| (2) second electronic data related to action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Philyaw discloses an Advertiser Reference Server ("ARS"), which contains "a database . . . of product codes and associated manufacturer URLs" (Ex. 1014 at 5:57-58, Abstract) used to determine the appropriate advertisement (or other content) to display to a user (<i>id.</i> at 5:64-65, 7:4-7, 8:34-36, 9:21-24). Ex. 1004 at ¶¶ 113-115. |
| (b) obtaining, by the computer system, extracted features of a first electronic work; | Ghias obtains extracted features, specifically "a contour representation" of the hummed melody "converted into a sequence of relative pitch transitions, as follows . . . To accomplish this conversion, a sequence of pitches in the melody must be |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | isolated and tracked." 2:46-49, 3:8-22. |
| (c) identifying, by the computer system, the first electronic work by comparing the extracted features of the first electronic work with the first electronic data in the database using a non-exhaustive neighbor search; | Ghias discloses "search[ing] the melody database 14" to identify a matching melody. 2:50-59, Abstract ("A melody database is searched for at least one sequence of digitized representations of relative pitch differences . . . match[ing] the sequence of digitized representations of relative pitch differences . . . of the melody."). This search may be non-exhaustive: "it is considered desirable to use an efficient approximate pattern matching algorithm" rather than an algorithm that is guaranteed to yield a match. 6:7-11, 6:23-25 ("Several Algorithms have been developed Running times have <u>ranged from</u> 0(mn) for <u>the brute force algorithm</u> to O(kn) or O(nlog(m)"). This is a neighbor search that determines "a ranked list of approximately matching melodies, as illustrated at 26" or "the single most approximate matching melody." 2:50-59, 6:60-63. |
| (d) determining, by the computer system, the action information corresponding to the identified first electronic work based on the second electronic data in the database; and | Philyaw determines action information, i.e., the appropriate advertisement to display to a user (Ex. 1014 at 5:64-65, 7:4-7, 8:34-36, 9:21-24) based on the second electronic data in the ARS "database . . . of product codes and associated . . . URLs" (Ex. 1010 at 5:57-58, Abstract). |
| (e) associating, by the computer system, the determined action information with the identified first electronic work. | Ghias associates the action with the identified electronic work by "output[ting] the ranked list of approximately matching melodies." 2:50-52, 6:60-63, 7:4-5, 8:26-28, 8:61-63. Philyaw associates the determined action (the advertisement) with the first electronic work by "returning the URL of advertiser server 312 to the PC 302," which views the advertisement at the URL (Ex. |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | 1014 at 8:10-18, Abstract, 5:23-27, 5:64-6:2), facilitating direct transmission of an advertisement to a user (<i>id.</i> at 7:43-56), or performing another action such as displaying "additional statistics associated with [a] sports program." (<i>id.</i> at 4:50-54). Ex. 1004 at ¶¶ 113-115. |
| 2. The computer system of claim 1, wherein the step of obtaining comprises receiving the first electronic work and extracting the extracted features from the first electronic work. | Ghias receives a hummed user input from which it extracts "a sequence of relative pitch transitions, as follows . . . To accomplish this conversion, a sequence of pitches in the melody must be isolated and tracked." 3:8-22, 2:42-49, 4:31-5:59, 8:29-40, 8:64-10:4. |
| 3. The computer system of claim 2, wherein the first electronic work is received from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device. | Ghias discloses that, "database 14 may be located apart from the computer 16 and suitably connected thereto for communicating between the computer and database," in which case the database receives the extracted features or the entire electronic work from the computer. 2:34-40. |
| 8. The computer system of claim 1, wherein at least one of the first electronic work or the extracted features of the first electronic work is obtained from at least one of a set-top-box, a video recorder, a cell phone, a computer, or a portable device that stores commercial transaction data, and wherein the action information comprises a commercial transaction, and the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of: | Ghias discloses that "database 14 may be located apart from the computer 16" in which case the database receives the extracted features from the computer. 2:34-40; Fig. 1 at 16; 3:8-22. Philyaw further discloses that the computer may contain commercial transaction data in a "profile database" (Ex. 1014 at Fig. 13 at 1302) that "store[s] a profile of the user" (<i>id.</i> at 10:54-55), including "job, income level, general family history, demographic information, and more" (<i>id.</i> at 11:64-67). Philyaw further discloses that the action information may comprise a commercial transaction wherein, when a user views an advertisement, the "user's profile information is uploaded to the [advertiser] node 1312" and "billing |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | information is generated for that [advertiser] 1312 which is stored in a billing database 1316. Therefore, the ARS 308 has the ability to . . . bill for those transactions . . ." <i>Id.</i> at 11:30-43. Ex. 1004 at ¶¶ 113-115. |
| electronically performing the commercial transaction using the stored commercial transaction data. | Philyaw performs the commercial transaction of billing using the stored commercial transaction data in a user's profile information. Ex. 1014 at 11:30-43. Ex. 1004 at ¶¶ 113-115. |
| 10. The computer system of claim 8, wherein the stored commercial transaction data comprises at least one of a purchaser's name, a purchaser's address, or credit card information. | Philyaw discloses "profile database" (Ex. 1014 at Fig. 13 at 1302) "store[s] a profile of the user" (<i>id.</i> at 10:54-55) including commercial transaction information such as "job, income level, general family history, demographic information, and more" (<i>id.</i> at 11:64-67). Ex. 1004 at ¶¶ 113-115. |
| 11. The computer system of claim 1, wherein the action comprises at least one of directing a user to a website related to the first electronic work, initiating an e-commerce transaction, or dialing a phone number. | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 8. Additionally, Philyaw discloses that "the computer web browser . . . is automatically redirected to the advertiser server containing the advertiser product information." Ex. 1014 at Abstract, 5:25-28, 7:25-29, 8:13-17, Fig. 8. Ex. 1004 at ¶¶ 113-115. |
| 12. The computer system of claim 1, wherein the action comprises providing and/or displaying additional information in association with the first electronic work. | Ghias "returns a list of songs." 6:60-63, 2:50-52, 7:4-5, 8:26-28, 8:61-63. This list includes additional information regarding the song, such as a ranking of the strength of the match. 6:60-63, 2:50-52, 8:26-28, 8:61-63. Alternatively, Philyaw discloses that "the computer web browser . . . is automatically redirected to the advertiser server containing the advertiser product information." Ex. 1014 at Abstract, 5:25-28, 7:25-29, 8:13-17, Fig. 8. Philyaw further displays "additional statistics associated |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | with [a] sports program, etc." <i>Id.</i> at 4:50-54. Ex. 1004 at ¶¶ 113-115. |
| 13. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Ghias discloses a general purpose computer that can contain a database or be configured to communicate with a database. 2:27-40. |
| one or more processors operatively connected to the one or more electronic communications devices; and | Ghias discloses a general purpose computer that has at least a processor. 2:27-40. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Ghias discloses a general purpose computer that includes a computer readable media connected to the processor. 2:27-40. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation of one or more reference electronic works; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1(a)(1). |
| (2) second electronic data related to an action, the action comprising providing and/or displaying an advertisement corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1(a)(2). Philyaw further discloses displaying an advertisement corresponding to the reference electronic work by querying the ARS database. Ex. 1014 at 5:64-65 ("the advertiser server address URL is obtained from the ARS database"), 7:4-7, 8:34-36, 9:21-24; Ex. 1004 at ¶¶ 113-115. |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation of a first electronic work; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1b. As explained above, the term "compact electronic representation" is synonymous |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation using a non-exhaustive neighbor search; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1c. |
| (d) determining, by the computer system, the action corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1d. |
| (e) associating, by the computer system, the determined action with the first electronic work. | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1e. |
| 14. The computer system of claim 13, wherein the action further comprises providing a link to a site on the World Wide Web associated with the advertisement. | Philyaw discloses that "the computer web browser . . . is automatically redirected to the advertiser server containing the advertiser product information." Ex. 1014 at Abstract, 5:25-28, 7:25-29, 8:13-17, Fig. 8. Ex. 1004 at ¶¶ 113-115. |
| 18. The computer system of claim 13, wherein the action further comprises collecting competitive market research data related to the advertisement. | Philyaw "monitor[s] the times when either the ads are or the products are purchased" for a "view of how a product is moving," "a very good idea as to how well the advertisement was received," or knowledge of "where the receptive markets were." Ex. 1014 at 13:16-41. Ex. 1004 at ¶¶ 113-115. |
| 19. The computer system of claim 13, wherein the action further comprises purchasing a product or service related to the advertisement. | Philyaw discloses that "the computer web browser . . . is automatically redirected to the advertiser server containing the advertiser product information." Ex. 1014 at Abstract, 5:25-28, 7:25-29, 8:13-17, Fig. 8. Ex. 1004 at ¶¶ 113-115. |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| 21. The computer system of claim 1, further comprising the step of transmitting, by the computer system, the determined action as associated with the first electronic work. | Ghias discloses that the database "may be located apart from the computer 16 and suitably connected thereto for communicating between the computer and database" in which case the database transmits the action to the computer. 2:34-40. Alternatively, Philyaw discloses that, after determining the appropriate advertiser URL, the ARS "transmits the packet," which constitutes an action, "back to source PC." Ex. 1014 at 7:17-18, 8:39-41. Ex. 1004 at ¶¶ 113-115. |
| 22. The computer system of claim 1, wherein the one or more electronic works comprise at least one of a video work, an audio work, or an image work. | Ghias discloses that electronic work is an audio work that is "hummed by a person 18 into a microphone 20" and "suitably digitized." 2:41-43, Fig. 1 at 21. |
| 23. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second electronic work; | Ghias obtains extracted features in the form of "a contour representation" of the melody. 2:46-49. Specifically, "[u]ser input 12 (humming) to the system 10 is converted into a sequence of relative pitch transitions, as follows" 3:8-22. |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Ghias "searches the melody database 14" to identify a matching melody. 2:50-59, Abstract. This search may be non-exhaustive: "it is considered desirable to use an efficient approximate pattern matching algorithm" rather than an algorithm that is guaranteed to yield a match. 6:7-11. "Several Algorithms have been developed Running times have <u>ranged</u> |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| | <u>from</u> $O(mn)$ for <u>the brute force algorithm</u> to $O(kn)$ or $O(n\log(m))$ ". This neighbor search determines "a ranked list of approximately matching melodies, as illustrated at 26" or "the single most approximate matching melody." 2:50-59, 6:60-63. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Philyaw discloses that "[i]f there is no 'hit' indicating a match, then information is returned to the browser indicating such." Ex. 1014 at 7:7-8. Ex. 1004 at ¶¶ 113-115. |
| 24. The computer system of claim 13, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, second extracted features of a second electronic work to be identified; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23f. |
| (g) searching, by the computer system, for an identification of the second electronic work by comparing the second extracted features of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23g. |
| (h) determining, by the computer system, that the second electronic work is not identified based on results of the searching step. | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23h. |
| 25. A computer system comprising: | Non-limiting preamble. |
| one or more electronic communications devices; | Ghias discloses a general purpose computer that can contain a database or be configured to communicate with a database. 2:27-40. |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| one or more processors operatively connected to the one or more electronic communications devices; and | Ghias discloses a general purpose computer that has at least a processor. 2:27-40. |
| one or more computer readable media operatively connected to the one or more processors and having stored thereon computer instructions for carrying out the steps of: | Ghias discloses a general purpose computer that includes a computer readable media connected to the processor. 2:27-40. |
| (a) maintaining, by the computer system, one or more databases comprising: | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1a. |
| (1) first electronic data comprising a first digitally created compact electronic representation comprising an extracted feature vector of one or more reference electronic works; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1(a)(1). |
| (2) second electronic data related to action information, the action information comprising an action to perform corresponding to each of the one or more reference electronic works; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1(a)(2). |
| (b) obtaining, by the computer system, a second digitally created compact electronic representation comprising an extracted feature vector of a first electronic work; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1b. As explained above, the term "compact electronic representation comprising an extracted feature vector" is synonymous with "extracted features." |
| (c) identifying, by the computer system, a matching reference electronic work that matches the first electronic work by comparing the first electronic data with the second digitally created compact electronic representation of the first | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1c. |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| electronic work using a non-exhaustive neighbor search; | |
| (d) determining, by the computer system, the action information corresponding to the matching reference electronic work based on the second electronic data in the database; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1d. |
| (e) associating, by the computer system, the determined action information with the first electronic work. | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 1e. |
| 26. The computer system of claim 25, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional steps of: | Non-limiting preamble. |
| (f) obtaining, by the computer system, a third digitally created compact electronic representation comprising an extracted feature vector of a second electronic work; | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23f. |
| (g) searching, by the computer system, for a matching reference electronic work that matches the second electronic work by comparing the third digitally created compact electronic representation of the second electronic work with the first electronic data in the database using a non-exhaustive neighbor search; and | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23g. |
| (h) determining, by the computer system, that a matching reference electronic work that matches the second electronic work does not | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 23h. |

| '441 patent | Ghias (Ex. 1010) and Philyaw (Ex. 1014) |
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| exist based on results of the searching step. | |
| 27. The computer system of claim 1, wherein the extracted feature is extracted using frequency based decomposition. | Ghias extracts features using frequency based decomposition: "[i]n order to improve the performance and speed and robustness of the pitch-tracking algorithm, <u>a cubic-spline wavelet transform or other suitable wavelet transform</u> may be used." 5:13-16, 5:17-49, 8:37-39, 9:8-10:4. Ex. 1004 at ¶ 127. Further, Ghias discloses extraction using a "Fourier transform" and a "wavelet," (5:13-49) both of which the '441 patent enumerates as examples of frequency-based decomposition (Ex. 1001 at 19:47-50, 6:67-7:3). Ex. 1004 at ¶ 128. |
| 29. The computer system of claim 1, wherein the extracted feature is extracted using temporal sequence of feature vectors. | "User input 12 (humming) to the system 10 is converted into a [temporal] sequence of relative pitch transitions, as follows . . . To accomplish this conversion, a [temporal] sequence of pitches in the melody must be isolated and tracked." 3:8-22; 2:46-49. |
| 30. The computer system of claim 1, wherein the one or more computer readable media have stored thereon further computer instructions for carrying out the additional step of transmitting, by the computer system, the determined action information as associated with the first electronic identified work. | Petitioner incorporates the above discussion of Ghias and Philyaw regarding Claim 21. |

VII. CONCLUSION

For the foregoing reasons, *Inter Partes* Review of claims 1-3, 6-14, 18-19, 21-27, and 29-30 of the '441 Patent is respectfully requested.

Respectfully Submitted,

Date: December 3, 2014

By: /s/ James J. Elacqua
James J. Elacqua
USPTO Reg. No. 28,412
SKADDEN, ARPS, SLATE, MEAGHER &
FLOM LLP
525 University Avenue
Suite 1400
Palo Alto, California 94301
Tel: (650) 470-4510
Fax: (650) 798-6564
Email: James.Elacqua@skadden.com

§ 42.6(e) - CERTIFICATION OF SERVICE

The undersigned certifies service pursuant to 37 C.F.R. §§ 42.6(e) and 42.105 on the Patent Owner of a copy of this Petition for *Inter Partes* Review and supporting materials at the corresponding address of record for the '441 patent:

Amster, Rothstein & Ebenstein LLP
90 Park Avenue
New York, New York 10016

The undersigned further certifies service pursuant to 37 C.F.R. §§ 42.6(e) and 42.105 to the Patent Owner of a copy of this Petition for *Inter Partes* Review and supporting materials at the address of counsel in Case No. 1:14-cv-2396-PGG, filed April 4, 2014, in the United States District Court for the Southern District of New York:

Charles R. Macedo
Amster, Rothstein & Ebenstein LLP
90 Park Avenue
New York, New York 10016
Tel.: (212) 336-8074
Email: cmacedo@arelaw.com

Marc. A Fenster & Brian D. Ledahl
Russ, August & Kabat LLP
12424 Wilshire Boulevard, 12th Floor
Los Angeles, California 90025
Tel.: (310) 826-7474
Email: mfenster@raklaw.com
Email: bledahl@raklaw.com

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/James J. Elacqua/

James J. Elacqua (Reg. # 28,412)

ATTORNEY FOR REAL PARTY IN
INTEREST GOOGLE INC.