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(54) **SUMMARIZATION OF MEDIA OBJECT COLLECTIONS**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,446,891 A 8/1995 Kaplan et al.  
5,493,692 A 2/1996 Theimer et al.

(Continued)

FOREIGN PATENT DOCUMENTS

EP 1362302 11/2003  
JP 2002312559 10/2002

(Continued)

OTHER PUBLICATIONS

Carbonell, J. et al. (Aug. 24-28, 1998). "The Use of MMR, Diversity-Based Reranking for Reordering Documents and Producing Summaries," *SIGIR '98: Proceedings of the 21<sup>st</sup> Annual International ACM SIGIR Conference on Research and Development in Information Retrieval*: Melbourne, Australia W.B. Croft et al. eds., pp. 335-336.

(Continued)

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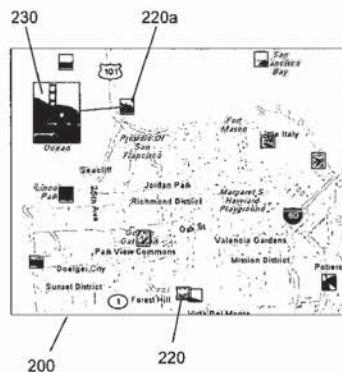
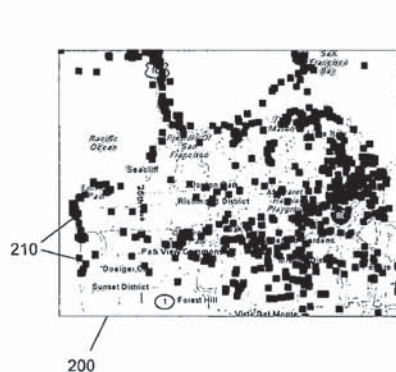
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(57) **ABSTRACT**

In one example, an apparatus and method are provided for summarizing (or selecting a representative subset from) a collection of media objects. A method includes selecting a subset of media objects from a collection of geographically-referenced (e.g., via GPS coordinates) media objects based on a pattern of the media objects within a spatial region. The media objects may further be selected based on (or be biased by) various social aspects, temporal aspects, spatial aspects, or combinations thereof relating to the media objects and/or a user. Another method includes clustering a collection of media objects in a cluster structure having a plurality of subclusters, ranking the media objects of the plurality of subclusters, and selection logic for selecting a subset of the media objects based on the ranking of the media objects.

**24 Claims, 4 Drawing Sheets**



(56)

References Cited

U.S. PATENT DOCUMENTS

5,583,763	A	12/1996	Ateheson et al.	7,219,013	B1	5/2007	Young et al.
5,651,068	A	7/1997	Klemba et al.	7,236,969	B1	6/2007	Skillen et al.
5,761,662	A	6/1998	Dasan	7,254,581	B2	8/2007	Johnson et al.
5,764,906	A	6/1998	Edelstein et al.	7,257,570	B2	8/2007	Riise et al.
5,781,879	A	7/1998	Arnold et al.	7,305,445	B2	12/2007	Singh et al.
5,784,365	A	7/1998	Ikeda	7,320,025	B1	1/2008	Steinberg et al.
5,794,210	A	8/1998	Goldhaber et al.	7,343,364	B2	3/2008	Bram et al.
5,802,510	A	9/1998	Jones	7,395,507	B2	7/2008	Robarts et al.
5,835,087	A	11/1998	Herz	7,404,084	B2	7/2008	Fransdonk
5,903,848	A	5/1999	Takahashi	7,437,312	B2	10/2008	Bhatia et al.
5,920,854	A	7/1999	Kirsch et al.	7,451,102	B2	11/2008	Nowak
6,014,638	A	1/2000	Burge et al.	7,461,168	B1	12/2008	Wan
6,021,403	A	2/2000	Horvitz et al.	7,496,548	B1	2/2009	Ershov
6,047,234	A	4/2000	Cherveney et al.	7,522,995	B2	4/2009	Nortrup
6,098,065	A	8/2000	Skillen et al.	7,529,811	B2	5/2009	Thompson
6,112,181	A	8/2000	Shear et al.	7,562,122	B2	7/2009	Oliver et al.
6,157,924	A	12/2000	Austin	7,577,665	B2	8/2009	Rameer et al.
6,169,992	B1	1/2001	Beall et al.	7,584,215	B2	9/2009	Saari et al.
6,212,552	B1	4/2001	Biliris et al.	7,624,104	B2	11/2009	Berkhin et al.
6,266,667	B1	7/2001	Olsson	7,624,146	B1	11/2009	Brogne et al.
6,314,365	B1	11/2001	Smith	7,634,465	B2	12/2009	Sareen et al.
6,314,399	B1	11/2001	Deligne et al.	7,657,907	B2	2/2010	Fennan et al.
6,324,519	B1	11/2001	Eldering	7,681,147	B2	3/2010	Richardson-Bunbury et al.
6,327,590	B1	12/2001	Chidlovskii et al.	7,725,492	B2	5/2010	Sittig et al.
6,446,065	B1	9/2002	Nishioka et al.	7,729,901	B2	6/2010	Richardson-Bunbury et al.
6,490,698	B1	12/2002	Horvitz et al.	7,769,740	B2	8/2010	Martinez
6,502,033	B1	12/2002	Phuyal	7,769,745	B2	8/2010	Naaman
6,523,172	B1	2/2003	Martinez-Guerra et al.	7,783,622	B1	8/2010	Vandermolen et al.
6,571,279	B1	5/2003	Herz et al.	7,792,040	B2	9/2010	Nair et al.
6,601,012	B1	7/2003	Horvitz et al.	7,802,724	B1	9/2010	Nohr
6,662,195	B1	12/2003	Langseth et al.	7,822,871	B2	10/2010	Stolorz et al.
6,665,640	B1	12/2003	Bennett et al.	7,831,586	B2	11/2010	Reitter et al.
6,694,316	B1	2/2004	Langseth et al.	7,865,308	B2	1/2011	Athsani
6,701,311	B2	3/2004	Biebeshheimer et al.	7,925,708	B2	4/2011	Davis
6,701,315	B1	3/2004	Austin	2001/0013009	A1	8/2001	Greening et al.
6,708,203	B1	3/2004	Maker et al.	2001/0035880	A1	11/2001	Musatov et al.
6,731,940	B1	5/2004	Nagendran	2001/0047384	A1	11/2001	Croy
6,741,980	B1	5/2004	Langseth et al.	2001/0052058	A1	12/2001	Ohran
6,757,661	B1	6/2004	Blaser et al.	2002/0014742	A1	2/2002	Conte et al.
6,773,344	B1	8/2004	Gabai et al.	2002/0019849	A1	2/2002	Tuvey et al.
6,781,920	B2	8/2004	Bates et al.	2002/0019857	A1	2/2002	Harjanto
6,785,670	B1	8/2004	Chiang et al.	2002/0023091	A1	2/2002	Silberberg et al.
6,789,073	B1	9/2004	Lunenfeld	2002/0023230	A1	2/2002	Bolnick et al.
6,813,501	B2	11/2004	Kinnunen et al.	2002/0035605	A1	3/2002	McDowell et al.
6,816,850	B2	11/2004	Culliss	2002/0049968	A1	4/2002	Wilson et al.
6,829,333	B1	12/2004	Frazier	2002/0052786	A1	5/2002	Kim et al.
6,834,195	B2	12/2004	Brandenberg et al.	2002/0052875	A1	5/2002	Smith et al.
6,842,761	B2	1/2005	Diamond et al.	2002/0054089	A1	5/2002	Nicholas
6,845,370	B2	1/2005	Burkey et al.	2002/0065844	A1	5/2002	Robinson et al.
6,850,252	B1	2/2005	Hoffberg	2002/0069218	A1	6/2002	Sull et al.
6,853,913	B2	2/2005	Cherveney et al.	2002/0099695	A1	7/2002	Abajian et al.
6,853,982	B2	2/2005	Smith et al.	2002/0103870	A1	8/2002	Shouji
6,882,977	B1	4/2005	Miller	2002/0111956	A1	8/2002	Yeo et al.
6,904,160	B2	6/2005	Burgess	2002/0112035	A1	8/2002	Carey
6,931,254	B1	8/2005	Egner et al.	2002/0133400	A1	9/2002	Terry et al.
6,961,660	B2	11/2005	Underbrink et al.	2002/0138331	A1	9/2002	Hosea et al.
6,961,731	B2	11/2005	Holbrook	2002/0152267	A1	10/2002	Lennon
6,985,839	B1	1/2006	Motamedi et al.	2002/0169840	A1	11/2002	Sheldon et al.
7,010,492	B1	3/2006	Bassett et al.	2002/0173971	A1	11/2002	Stirpe et al.
7,027,801	B1	4/2006	Hall et al.	2002/0178161	A1	11/2002	Brezin et al.
7,058,508	B2	6/2006	Combs et al.	2002/0198786	A1*	12/2002	Tripp et al. .... 705/26
7,058,626	B1	6/2006	Pan et al.	2003/0008661	A1	1/2003	Joyce et al.
7,062,510	B1	6/2006	Eldering	2003/0009367	A1	1/2003	Morrison
7,065,345	B2	6/2006	Carlton et al.	2003/0009495	A1	1/2003	Adjaoute
7,065,483	B2	6/2006	Decary et al.	2003/0027558	A1	2/2003	Eisinger
7,069,308	B2	6/2006	Abrams	2003/0032409	A1	2/2003	Hutcheson et al.
7,073,129	B1	7/2006	Robarts et al.	2003/0033331	A1	2/2003	Sena et al.
7,110,776	B2	9/2006	Sambin	2003/0033394	A1	2/2003	Stine et al.
7,143,091	B2	11/2006	Charnock et al.	2003/0065762	A1	4/2003	Stolorz et al.
7,149,696	B2	12/2006	Shimizu et al.	2003/0069877	A1	4/2003	Grefenstette et al.
7,181,438	B1	2/2007	Szabo	2003/0069880	A1	4/2003	Harrison et al.
7,185,286	B2	2/2007	Zondervan	2003/0078978	A1	4/2003	Lardin et al.
7,194,512	B1	3/2007	Creemer et al.	2003/0080992	A1	5/2003	Haines
				2003/0126250	A1	7/2003	Jhanji
				2003/0149574	A1	8/2003	Rudman
				2003/0154293	A1	8/2003	Zmolek
				2003/0165241	A1	9/2003	Fransdonk

(56)		References Cited					
		U.S. PATENT DOCUMENTS					
2004/0015588	A1	1/2004	Cotte	2006/0129605	A1	6/2006	Doshi
2004/0030798	A1	2/2004	Andersson et al.	2006/0161894	A1	7/2006	Oustiougov et al.
2004/0034752	A1	2/2004	Ohran	2006/0168591	A1	7/2006	Hunsinger et al.
2004/0043758	A1	3/2004	Sorvari et al.	2006/0173838	A1	8/2006	Garg et al.
2004/0044736	A1	3/2004	Austin-Lane et al.	2006/0173985	A1	8/2006	Moore
2004/0070602	A1	4/2004	Kobuya et al.	2006/0178822	A1	8/2006	Lee
2004/0139025	A1	7/2004	Coleman	2006/0184508	A1	8/2006	Fuselier et al.
2004/0139047	A1	7/2004	Rechsteiner	2006/0184579	A1	8/2006	Mills
2004/0148341	A1	7/2004	Cotte	2006/0212330	A1	9/2006	Savilampi
2004/0152477	A1	8/2004	Wu et al.	2006/0212401	A1	9/2006	Amerally et al.
2004/0183829	A1	9/2004	Kontny et al.	2006/0227945	A1	10/2006	Runge et al.
2004/0201683	A1	10/2004	Murashita et al.	2006/0235816	A1	10/2006	Yang et al.
2004/0203851	A1	10/2004	Vetro et al.	2006/0236257	A1	10/2006	Othmer et al.
2004/0203909	A1	10/2004	Koster	2006/0242126	A1*	10/2006	Fitzhugh ..... 707/3
2004/0205629	A1*	10/2004	Rosenholtz ..... G06F 17/30861 715/207	2006/0242139	A1	10/2006	Butterfield et al.
				2006/0242178	A1	10/2006	Butterfield et al.
				2006/0242259	A1	10/2006	Vallath et al.
				2006/0258368	A1	11/2006	Granito et al.
				2006/0282455	A1	12/2006	Lee
				2007/0013560	A1	1/2007	Casey
				2007/0015519	A1	1/2007	Casey
2004/0209602	A1	10/2004	Joyce et al.	2007/0032244	A1*	2/2007	Counts et al. .... 455/456.1
2004/0243623	A1	12/2004	Ozer et al.	2007/0043766	A1	2/2007	Nicholas et al.
2004/0260804	A1	12/2004	Grabarnik et al.	2007/0067104	A1	3/2007	Mays
2004/0267880	A1	12/2004	Patiejunas	2007/0067267	A1	3/2007	Ives
2005/0005242	A1	1/2005	Hoyle	2007/0072591	A1	3/2007	McGary et al.
2005/0015451	A1	1/2005	Sheldon et al.	2007/0073583	A1	3/2007	Grouf et al.
2005/0015599	A1	1/2005	Wang et al.	2007/0073641	A1	3/2007	Perry et al.
2005/0050027	A1	3/2005	Yeh	2007/0086061	A1	4/2007	Robbins
2005/0050043	A1*	3/2005	Pyhalammi et al. .... 707/6	2007/0087756	A1	4/2007	Hoffberg
2005/0055321	A1	3/2005	Fratkina	2007/0088852	A1	4/2007	Levkovitz
2005/0060381	A1	3/2005	Huynh et al.	2007/0100956	A1	5/2007	Kumar
2005/0065950	A1	3/2005	Chaganti et al.	2007/0112762	A1	5/2007	Brubaker
2005/0065980	A1	3/2005	Hyatt et al.	2007/0115373	A1*	5/2007	Gallagher et al. .... 348/231.3
2005/0076060	A1	4/2005	Finn et al.	2007/0121843	A1	5/2007	Atazky et al.
2005/0086187	A1	4/2005	Grosser et al.	2007/0130137	A1	6/2007	Oliver et al.
2005/0105552	A1	5/2005	Osterling	2007/0136048	A1	6/2007	Richardson-Bunbury et al.
2005/0108213	A1	5/2005	Riise et al.	2007/0136235	A1	6/2007	Hess
2005/0120006	A1	6/2005	Nye	2007/0136256	A1	6/2007	Kapur et al.
2005/0131727	A1	6/2005	Sezan	2007/0136689	A1	6/2007	Richardson-Bunbury et al.
2005/0149397	A1	7/2005	Morgenstern et al.	2007/0143345	A1	6/2007	Jones et al.
2005/0151849	A1	7/2005	Fitzhugh et al.	2007/0150168	A1	6/2007	Balcom et al.
2005/0159220	A1	7/2005	Wilson et al.	2007/0150359	A1	6/2007	Lim et al.
2005/0159970	A1	7/2005	Buyukkokten et al.	2007/0155411	A1	7/2007	Morrison
2005/0160080	A1	7/2005	Dawson	2007/0161382	A1	7/2007	Melinger et al.
2005/0165699	A1	7/2005	Hahn-Carlson	2007/0162850	A1	7/2007	Adler
2005/0166240	A1	7/2005	Kim	2007/0168430	A1	7/2007	Brun et al.
2005/0171955	A1	8/2005	Hull et al.	2007/0173266	A1	7/2007	Barnes
2005/0177385	A1	8/2005	Hull et al.	2007/0179792	A1	8/2007	Kramer
2005/0182824	A1	8/2005	Cotte	2007/0185599	A1	8/2007	Robinson et al.
2005/0183110	A1	8/2005	Anderson	2007/0185858	A1*	8/2007	Lu ..... G06F 17/30864
2005/0187786	A1	8/2005	Tsai	2007/0192299	A1	8/2007	Zuckerberg et al.
2005/0192025	A1	9/2005	Kaplan	2007/0198506	A1	8/2007	Attaran Rezaei et al.
2005/0203801	A1	9/2005	Morgenstern et al.	2007/0198563	A1	8/2007	Apparao et al.
2005/0216295	A1	9/2005	Abrahamsohn	2007/0203591	A1	8/2007	Bowerman
2005/0216300	A1	9/2005	Appelman et al.	2007/0219708	A1	9/2007	Brasche et al.
2005/0219375	A1	10/2005	Hasegawa et al.	2007/0233585	A1	10/2007	Ben Simon et al.
2005/0234781	A1	10/2005	Morgenstern	2007/0239348	A1	10/2007	Cheung
2005/0273510	A1	12/2005	Schuh	2007/0239517	A1	10/2007	Chung et al.
2006/0020631	A1	1/2006	Cheong Wan et al.	2007/0259653	A1	11/2007	Tang et al.
2006/0026013	A1	2/2006	Kraft	2007/0260508	A1	11/2007	Barry et al.
2006/0026067	A1	2/2006	Nicholas et al.	2007/0260604	A1	11/2007	Haeuser et al.
2006/0026170	A1*	2/2006	Kreidler et al. .... 707/10	2007/0271297	A1	11/2007	Jaffe et al.
2006/0031108	A1	2/2006	Oran	2007/0271340	A1	11/2007	Goodman et al.
2006/0036588	A1*	2/2006	Frank et al. .... 707/3	2007/0273758	A1	11/2007	Mendoza et al.
2006/0040719	A1	2/2006	Plimi	2007/0276940	A1	11/2007	Abraham et al.
2006/0047563	A1	3/2006	Wardell	2007/0282621	A1	12/2007	Altman et al.
2006/0047615	A1	3/2006	Ravin	2007/0282675	A1	12/2007	Varghese
2006/0053058	A1	3/2006	Hotchkiss et al.	2007/0288278	A1	12/2007	Alexander et al.
2006/0069612	A1	3/2006	Hurt et al.	2008/0005313	A1	1/2008	Flake et al.
2006/0069616	A1	3/2006	Bau	2008/0005651	A1	1/2008	Grefenstette et al.
2006/0069749	A1	3/2006	Herz et al.	2008/0010206	A1	1/2008	Coleman
2006/0074853	A1	4/2006	Liu et al.	2008/0021957	A1	1/2008	Medved et al.
2006/0085392	A1	4/2006	Wang et al.	2008/0026804	A1	1/2008	Baray et al.
2006/0085419	A1	4/2006	Rosen	2008/0028031	A1	1/2008	Bailey et al.
2006/0089876	A1	4/2006	Boys	2008/0040283	A1	2/2008	Morris
2006/0106847	A1*	5/2006	Eckardt et al. .... 707/101	2008/0046298	A1	2/2008	Ben-Yehuda et al.
2006/0116924	A1	6/2006	Angeles et al.				

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

## U.S. PATENT DOCUMENTS

2008/0086431 A1 4/2008 Robinson et al.  
 2008/0091796 A1 4/2008 Story et al.  
 2008/0096664 A1 4/2008 Baray et al.  
 2008/0102911 A1 5/2008 Campbell et al.  
 2008/0104061 A1 5/2008 Rezaei  
 2008/0104227 A1 5/2008 Birnie et al.  
 2008/0109761 A1 5/2008 Stambaugh  
 2008/0109843 A1 5/2008 Ullah  
 2008/0114751 A1 5/2008 Cramer et al.  
 2008/0120183 A1 5/2008 Park  
 2008/0120308 A1 5/2008 Martinez et al.  
 2008/0120690 A1 5/2008 Norlander et al.  
 2008/0133750 A1 6/2008 Grabarnik et al.  
 2008/0147655 A1 6/2008 Sinha et al.  
 2008/0147743 A1 6/2008 Taylor et al.  
 2008/0148175 A1 6/2008 Naaman et al.  
 2008/0154720 A1 6/2008 Gounares  
 2008/0163284 A1 7/2008 Martinez et al.  
 2008/0172632 A1 7/2008 Stambaugh  
 2008/0177706 A1 7/2008 Yuen  
 2008/0270579 A1 10/2008 Herz et al.  
 2008/0285886 A1 11/2008 Allen  
 2008/0301250 A1 12/2008 Hardy et al.  
 2008/0320001 A1 12/2008 Gaddam  
 2009/0005987 A1 1/2009 Vengroff et al.  
 2009/0006336 A1 1/2009 Forstall et al.  
 2009/0012934 A1 1/2009 Yerigan  
 2009/0012965 A1 1/2009 Franken  
 2009/0043844 A1 2/2009 Zimmet et al.  
 2009/0044132 A1 2/2009 Combel et al.  
 2009/0063254 A1 3/2009 Paul et al.  
 2009/0070186 A1 3/2009 Buiten et al.  
 2009/0073191 A1 3/2009 Smith et al.  
 2009/0076889 A1 3/2009 Jhanji  
 2009/0100052 A1 4/2009 Stern et al.  
 2009/0106356 A1 4/2009 Brase et al.  
 2009/0125517 A1 5/2009 Krishnaswamy et al.  
 2009/0132941 A1 5/2009 Pilskalns et al.  
 2009/0144141 A1 6/2009 Dominowska et al.  
 2009/0150501 A1 6/2009 Davis et al.  
 2009/0150507 A1 6/2009 Davis et al.  
 2009/0165051 A1 6/2009 Armaly  
 2009/0171939 A1 7/2009 Athsani et al.  
 2009/0177603 A1 7/2009 Honisch  
 2009/0187637 A1 7/2009 Wu et al.  
 2009/0204484 A1 8/2009 Johnson  
 2009/0204672 A1 8/2009 Jetha et al.  
 2009/0204676 A1 8/2009 Parkinson et al.  
 2009/0216606 A1 8/2009 Coffman et al.  
 2009/0222302 A1 9/2009 Higgins  
 2009/0222303 A1 9/2009 Higgins  
 2009/0234814 A1 9/2009 Boerries et al.  
 2009/0234909 A1 9/2009 Strandeil et al.  
 2009/0249482 A1 10/2009 Sarathy  
 2009/0265431 A1 10/2009 Janie et al.  
 2009/0281997 A1 11/2009 Jain  
 2009/0299837 A1 12/2009 Steelberg et al.  
 2009/0313546 A1 12/2009 Katpelly et al.  
 2009/0320047 A1 12/2009 Khan et al.  
 2009/0323519 A1 12/2009 Pun  
 2009/0328087 A1 12/2009 Higgins et al.  
 2010/0002635 A1 1/2010 Eklund  
 2010/0014444 A1 1/2010 Ghanadan et al.  
 2010/0063993 A1 3/2010 Higgins et al.  
 2010/0070368 A1 3/2010 Choi et al.  
 2010/0118025 A1 5/2010 Smith et al.  
 2010/0125563 A1 5/2010 Nair et al.  
 2010/0125569 A1 5/2010 Nair et al.  
 2010/0125604 A1 5/2010 Martinez et al.

KR 1020000036897 7/2000  
 KR 1020000054319 9/2000  
 KR 10-2000-0064105 11/2000  
 KR 1020030049173 6/2003  
 KR 10-0801662 2/2005  
 KR 1020060043333 5/2006  
 KR 102007034094 3/2007  
 KR 1020070073180 7/2007  
 KR 1020080048802 6/2008  
 WO WO2006/116196 11/2006  
 WO WO-2006/116196 A2 11/2006  
 WO WO 2007/022137 2/2007  
 WO WO 2007/027453 3/2007  
 WO WO 2007070358 6/2007  
 WO WO2007113546 10/2007

## OTHER PUBLICATIONS

Davis, M. et al. (Oct. 10-16, 2004). "From Context to Content: Leveraging Context to Infer Media Metadata," *MM'04* New York, New York.  
 Davis, M. et al. "From Context to Content: Leveraging Context for Mobile Media Metadata."  
 Davis, M. et al. (Apr. 2-7, 2005). "MMM2: Mobile Media Metadata for Media Sharing," *CHI 2005* Portland, Oregon.  
 Davis, M. et al. "Mobile Media Metadata for Mobile Imaging."  
 Davis, M. et al. "Using Context and Similarity for Face and Location Identification."  
 Flickr. "Welcome to Flickr—Photo Sharing," located at <http://www.flickr.com> visited on Feb. 26, 2007, one page.  
 Goldberger, J. et al. "The Hungarian Clustering Method," located at <http://scholar.google.com/scholar?num=20&hl=en&lr=&9=cache:vbwslm1CisJ:www.openu.ac.il/Personal\_sites/tamirtassa/Publications/hcm.pdf-goldberger+clustering+method+hungarian> visited on Mar. 1, 2007, twelve pages.  
 Graham, A. et al. (Jul. 13-17, 2002). "Time as Essence for Photo Browsing Through Personal Digital Libraries," *JCDL '02* Portland, Oregon.  
 Jaffe, A. et al. (May 23-26, 2006). "Generating Summaries for Large Collections of Geo-Referenced Photographs," *WWW 2006* Edinburgh, Scotland.  
 Jaffe, A. et al. (Oct. 26-27, 2006). "Generating Summaries and Visualization for Large Collections of Geo-Referenced Photographs," *MIR '06* Santa Barbara, California.  
 Joshi, D. et al. (Oct. 15-16, 2004). "The Story Picturing Engine: Finding Elite Images to Illustrate a Story Using Mutual Reinforcement," *MIR '04* New York, New York.  
 Naaman, M. et al. (Nov. 2003). "From Where to What: Metadata Sharing for Digital Photographs with Geographic Coordinates," *In on the Move to Meaningful Internet Systems 2003: CoopIS, DOA, and ODBASE* R. Meersman et al. eds., pp. 196-217.  
 Nair, R. et al. (Nov. 6-11, 2005). "Photo LOL: Browsing Multi-User Photo Collections," *MM'05* Singapore, pp. 223-224.  
 O' Hare, N. et al. "Combination of Content Analysis and Context Features for Digital Photograph Retrieval."  
 Pigeau, A. et al. (Jun. 17, 2005). "Organizing a Personal Image Collection with Statistical Model-Based ICL Clustering on Spatio-Temporal Camera Phone Meta-Data."  
 Sarvas, R. et al. (Jun. 6-9, 2004). "Metadata Creation System for Mobile Images," *MobiSys'04* Boston, Massachusetts, pp. 36-48.  
 Toyama, K. et al. (Nov. 2-8, 2003). "Geographic Location Tags on Digital Images," *MM '03*: Berkeley: California.  
 U.S. Appl. No. 11/593,668, filed Nov. 6, 2006, for Naaman et al.  
 U.S. Appl. No. 11/593,869, filed Nov. 6, 2006, for Naaman et al.  
 U.S. Appl. No. 12/409,867, filed Mar. 24, 2009, King.  
 U.S. Appl. No. 12/540,098, filed Aug. 12, 2009, Martinez.  
 U.S. Appl. No. 12/536,892, filed Aug. 6, 2009, King.  
 U.S. Appl. No. 12/540,588, filed Aug. 13, 2009, Tendjoukian.

(56)

## References Cited

## OTHER PUBLICATIONS

- U.S. Appl. No. 12/180,499, filed Jul. 25, 2008, Higgins.  
 U.S. Appl. No. 12/015,146, filed Jan. 16, 2008, Higgins.  
 U.S. Appl. No. 12/041,088, filed Mar. 3, 2008, Higgins.  
 U.S. Appl. No. 12/041,062, filed Mar. 3, 2008, Higgins.  
 U.S. Appl. No. 12/041,054, filed Mar. 3, 2008, Higgins.  
 U.S. Appl. No. 12/540,269, filed Aug. 12, 2009, Kalaboukis.  
 U.S. Appl. No. 11/969,815, filed Jan. 4, 2004, Davis.  
 U.S. Appl. No. 12/182,111, filed Jul. 29, 2008, Davis.  
 U.S. Appl. No. 12/434,575, filed May 1, 2009, O'Sullivan.  
 U.S. Appl. No. 12/434,580, filed May 1, 2009, O'Sullivan.  
 U.S. Appl. No. 12/407,690, filed Mar. 19, 2009, Davis.  
 U.S. Appl. No. 12/407,681, filed Mar. 19, 2009, Athsani.  
 International Search Report (PCT/US2009/030405) dated Sep. 23, 2009; 2 pages.  
 U.S. Appl. No. 12/041,054, filed Mar. 3, 2008; 64 pgs.  
 U.S. Appl. No. 12/041,062, filed Mar. 3, 2008; 66 pgs.  
 U.S. Appl. No. 12/041,088, filed Mar. 3, 2008; 66 pgs.  
 U.S. Appl. No. 12/169,931, filed Jul. 9, 2008; 66 pgs.  
 U.S. Appl. No. 12/170,025, filed Jul. 9, 2008; 67 pgs.  
 U.S. Appl. No. 12/180,499, filed Jul. 25, 2008; 67 pgs.  
 U.S. Appl. No. 12/180,486, filed Jul. 25, 2008; 65 pgs.  
 International Search Report PCT/US2009/030406 dated Sep. 29, 2009; 5 pages.  
 International Search Report and Written Opinion PCT/US2009/034445 dated Oct. 12, 2009; 7 pages.  
 Office Action U.S. Appl. No. 12/041,054 dated Oct. 27, 2010; 15 pages.  
 Office Action U.S. Appl. No. 12/041,062 dated Oct. 28, 2010; 12 pages.  
 International Search Report PCT/US2009/034444 dated Sep. 18, 2009; 2 pages.  
 Office Action U.S. Appl. No. 12/041,088 dated Oct. 4, 2010; 18 pages.  
 U.S. Appl. No. 11/952,007, filed Dec. 6, 2007, Davis.  
 U.S. Appl. No. 11/958,157, filed Dec. 17, 2007, Hayashi.  
 U.S. Appl. No. 11/952,875, filed Dec. 7, 2007, Davis.  
 U.S. Appl. No. 11/960,368, filed Dec. 19, 2007, Madsen.  
 U.S. Appl. No. 11/953,454, filed Dec. 10, 2007, Davis.  
 U.S. Appl. No. 11/953,494, filed Dec. 10, 2007, Davis.  
 U.S. Appl. No. 12/236,668, filed Sep. 24, 2008, Davis.  
 U.S. Appl. No. 12/595,594, filed Mar. 31, 2008, Martinez.  
 U.S. Appl. No. 12/057,878, filed Mar. 28, 2008, Martinez.  
 U.S. Appl. No. 12/057,943, filed Mar. 28, 2008, Martinez.  
 U.S. Appl. No. 11/969,751, filed Jan. 4, 2008, Martinez.  
 U.S. Appl. No. 12/145,145, filed Jun. 24, 2008, Davis.  
 U.S. Appl. No. 12/163,249, filed Jun. 27, 2008, Kalaboukis.  
 U.S. Appl. No. 12/182,969, filed Jul. 30, 2008, Higgins.  
 U.S. Appl. No. 12/182,813, filed Jul. 30, 2008, Higgins.  
 U.S. Appl. No. 12/163,314, filed Jun. 27, 2008, Higgins.  
 U.S. Appl. No. 12/163,396, filed Jun. 27, 2008, Higgins.  
 U.S. Appl. No. 12/195,969, filed Aug. 21, 2008, Martinez.  
 U.S. Appl. No. 12/234,000, filed Sep. 19, 2008, Martinez.  
 U.S. Appl. No. 12/241,590, filed Sep. 30, 2008, Athsani.  
 U.S. Appl. No. 12/241,687, filed Sep. 30, 2008, Davis.  
 U.S. Appl. No. 12/206,172, filed Sep. 8, 2008, Higgins.  
 U.S. Appl. No. 12/273,291, filed Nov. 18, 2008, Nair.  
 U.S. Appl. No. 12/273,345, filed Nov. 18, 2008, Nair.  
 U.S. Appl. No. 12/241,198, filed Sep. 30, 2008, Higgins.  
 U.S. Appl. No. 12/273,259, filed Nov. 11, 2008, Martinez.  
 U.S. Appl. No. 12/339,355, filed Dec. 19, 2008, Higgins.  
 U.S. Appl. No. 12/329,038, filed Dec. 5, 2008, Higgins.  
 U.S. Appl. No. 12/326,553, filed Dec. 2, 2008, Churchill.  
 U.S. Appl. No. 12/242,656, filed Sep. 30, 2008, Burgener.  
 U.S. Appl. No. 12/273,371, filed Nov. 18, 2008, Nair.  
 U.S. Appl. No. 12/357,311, filed Jan. 21, 2009, Higgins.  
 U.S. Appl. No. 12/357,332, filed Jan. 1, 2009, Higgins.  
 Axup, Jeff et al., "Conceptualizing New Mobile Devices by Observing Gossip and Social Network Formation Amongst the Extremely Mobile", ITEE Technical Report #459, Dec. 19, 2005, pp. 1-71.  
 Conhaim, Wallys W., "Social networks: the Internet continues to evolve: where is the money in all this? That is what venture capitalists are asking. (Perspectives)", Information Today, 22, 9, 35(2), Oct. 2005, (pp. 1-5 of attached).  
 Davis, Marc et al., "From Context to Content: Leveraging Context to Infer Media Metadata", ACM Press, Oct. 10, 2004, pp. 1-8.  
 Kaasinen, E., "Behaviour & Information Technology", Taylor & Francis, vol. 24, No. 1, Jan./Feb. 2005, pp. 37-49, (Abstract only attached).  
 Konomi, Shin'ichi et al., "Supporting Colocated Interactions Using RFID and Social Network Displays", Pervasive Computing, Jul.-Sep. 2006, vol. 5, No. 3, pp. 48-56 (pp. 1-4 of attached).  
 Lin, F. et al., "A unified framework for managing Web-based services.", Information Systems and e-Business Management, vol. 3, Oct. 2005, p. 299, (pp. 1-15 of attached).  
 Metz, Cade, "MySpace Nation", PC Magazine, Jun. 21, 2006, pp. 1-10 attached.  
 Perkowski, Mike et al., "Utilizing Online Communities to Facilitate Physical World Interactions", The International Conference on Communities and Technologies, Sep. 19, 2003, Amsterdam, pp. 1-6.  
 Roush, Wade, "Social Machines", Continuous Computing Blog, Jul. 5, 2005, pp. 1-21.  
 Roush, Wade, "Social Machines", Technology Review, Aug. 2005, pp. 45-51.  
 Sheppard, Brett, "The Rights Stuff: The Integration of Enterprise Digital Rights Management Into an Enterprise Architecture", ECContent, vol. 29, No. 9, Nov. 2006, p. 38, 40-44, (pp. 1-7 of attached).  
 Voight, Joan et al., "Lessons for Today's Digital Market", ADWEEKCOM, Oct. 2, 2006, pp. 1-6.  
 "Companies add new communication features to photo sharing.", Digital Imaging Digest, Feb. 2006, pp. 1-2.  
 "Dave.TV and Eye Music Network Empower Users to Create Their Own Music TV Channel on Their Sites With New IPTV Channel", www.davenw.com/2006, Sep. 13, 2006, pp. 1-2.  
 "Digital rights management: a primer: developing a user-friendly means of protecting content.(Profile)", Screen Digest, No. 420, p. 305, Sep. 2006, (pp. 1-9 of attached).  
 "Emerging Markets: What media 2.0 can offer advertisers.", Campaign, Oct. 27, 2006, p. 26, (pp. 1-5 of attached).  
 "Reality Digital Debuts Opus", www.lightreading.com. Sep. 25, 2006, pp. 1.  
 "Reality Digital—Making Media Move", www.realitydigital.com, Nov. 28, 2006, pp. 1-2.  
 Nedos, A; Singh K., Clarke S, Proximity Based Group Communications for Mobile Ad Hoc Networks, Proximity-Based Group Communication; Global Smart Spaces; D.14; Oct. 3, 2003; 31 pages.  
 Brunato, M; Battiti R. "Pilgrim: A Location Broker and Mobility-Aware Recommendation System"; Technical report DIT-02-0092, Universita di Trento, Oct. 2002; 8 pages.  
 Backstrom et al., Spatial Variation in Search Engine Queries, WWW\*2008, Beijing, China (Apr. 21-25, 2008).  
 Gan et al., Analysis of Geographic Queries in a Search Engine Log, LocWeb 2008, Beijing, China (Apr. 22, 2008).  
 Jones et al., Geographic Intention and Modification in Web Search, International Journal of Geographical Information Science, vol. 22, No. 3, pp. 1-20 (Jul. 2008).  
 Sanderson et al., Analyzing Geographic Queries; Department of Information Studies; University of Sheffield, UK; 2 pages.  
 Go With the Flow, The Economist Technology Quarterly, vol. 382, Issue 8519, 4 pages, (Mar. 10, 2007).  
 International Search Report and Written Opinion (PCT/US2009/060476) dated May 4, 2010; 12 pages.  
 International Search Report and Written Opinion (PCT/US2009/060374) dated Apr. 30, 2010; 12 pages.  
 International Search Report (PCT/US2009/060379) dated Apr. 30, 2010; 3 pages.

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