PROSPECTIVE IN MULTIMEDIA SEARCH

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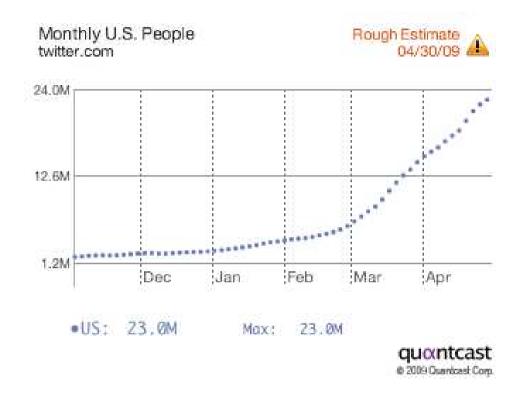
To Understand Future of Search:

Name 3 most popular companies that emerged in the last 3 years.

- YouTube
- Facebook
- Twitter



Twitter's Growth



This is a growth pattern I have never seen in terms of speed - not in the nearly 25 years I've been watching this industry. --- John Battelle



Reverse the Roles of Business and Transferred Our Culture below Bustelle

nesh Jain

Name 3 most popular Internet concepts in the last 3 years.

- Social Networks
- Micro-blogging (Ambient Awareness)
- Tags

Interestingly, they did not come from GYM or Academia.



Interesting!!!

- YouTube
- Facebook
- Twitter

- Social Networks
- Microblogging
- Tags

What does this tell us?



Message for Multimedia Search Community

People want:

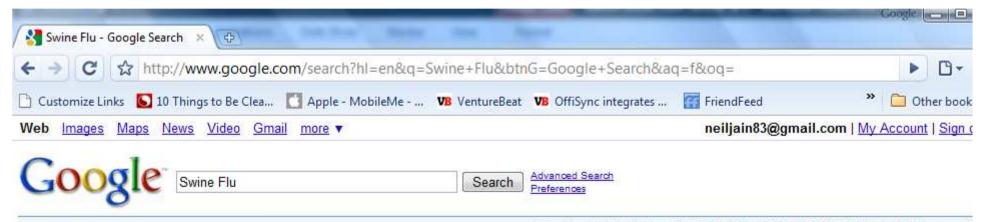
- New media: Text based media is not enough.
- Experiences: People want to experience and share experiences – with minimal latency.
- Socialize: Family and friends remain a strong influence in all facets of life.
 - Family and friends are closer to each other today than ever!!!



Emerging Landscape of Search

People, particularly media and venture capitalists, like to talk about the NEXT GOOGLE.





Web Show options...

Results 1 - 10 of about 12,800,000 for Swine Flu [definition]. (0.15 seconds

Related searches: japan swine flu swine flu china

CDC H1N1 Flu ♠ ×

Novel influenza A (H1N1) is a new flu virus of swine origin that was first detected in April, 2009. The virus is infecting people and is spreading from ...

www.cdc.gov/swineflU/ - 39k - Cached - Similar pages - Review this site

CDC H1N1 Flu | Key Facts About Swine Influenza | | | |

Swine Influenza (swine flu) is a respiratory disease of pigs caused by type A influenza virus that regularly causes outbreaks of influenza in pigs. ... www.cdc.gov/SWINEFLU/KEY_FACTS.HTM - 37k - Cached - Similar pages - Review this site More results from www.cdc.gov »

Swine influenza - Wikipedia, the free encyclopedia 🔺 🗵

Swine influenza (also called swine flu, hog flu and pig flu) refers to ... In humans, the symptoms of swine flu are similar to those of influenza and of ... en.wikipedia.org/wiki/Swine_influenza - 228k - Cached - Similar pages - Review this site

2009 swine flu outbreak - Wikipedia, the free encyclopedia

However, other scientists have stated that analysis of the 2009 swine flu (A/H1N1) viral genome suggests that all RNA segments are of swine origin, ... en.wikipedia.org/wiki/2009_swine_flu_outbreak - 422k - Cached - Similar pages - Review this site

More results from en.wikipedia.org »

Video results for Swine Flu





Sponsored Links

Info On The Swine Flu

Get The Facts. What You Need To Know About The **Swine Flu** Outbreak. www.AOLhealth.com

Swine Flu

Objective and unbiased coverage of the emerging Swine Flu pandemic www.npr.org/news

Swine Flu Treatment

Treat Swine Flu with drugs from CanDrugstore. Order today! www.CanDrugstore.com/Tamiflu

Swine Flu facts & info

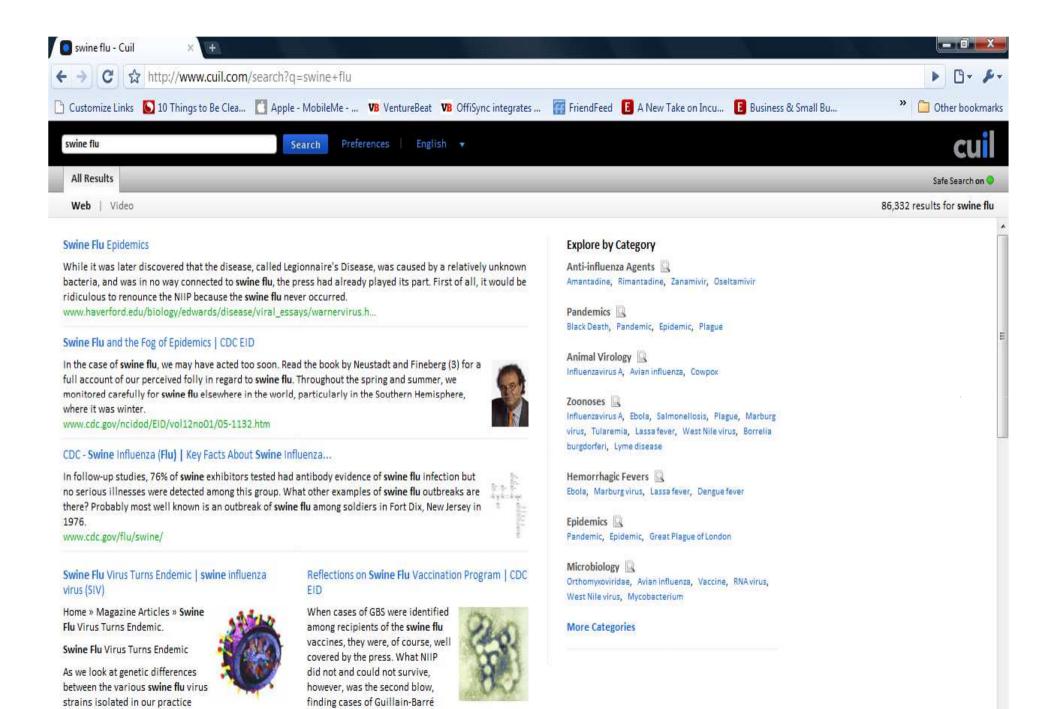
Swine Flu fact sheet Swine Flu information & resources stopgerms.org/swineflu

Swine Flu:

The New Terror in the Middle East Watch Middle East News Analysis LinkTV.org

swine flu

How to protect yourself against

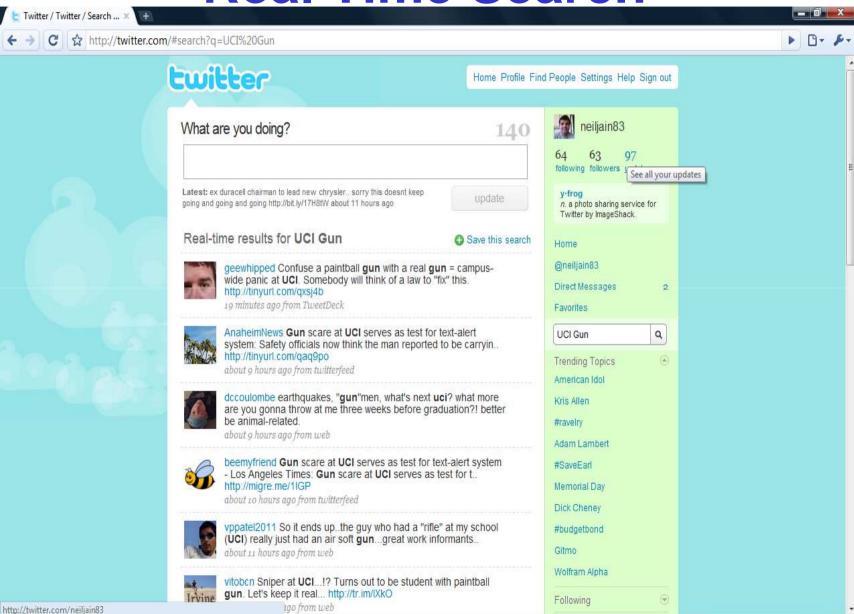


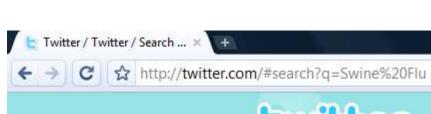
About Cuil Your Privacy Feedback

syndrome (GBS) among persons receiving swine flu

area, and within farms, we will see the virus change

Real Time Search



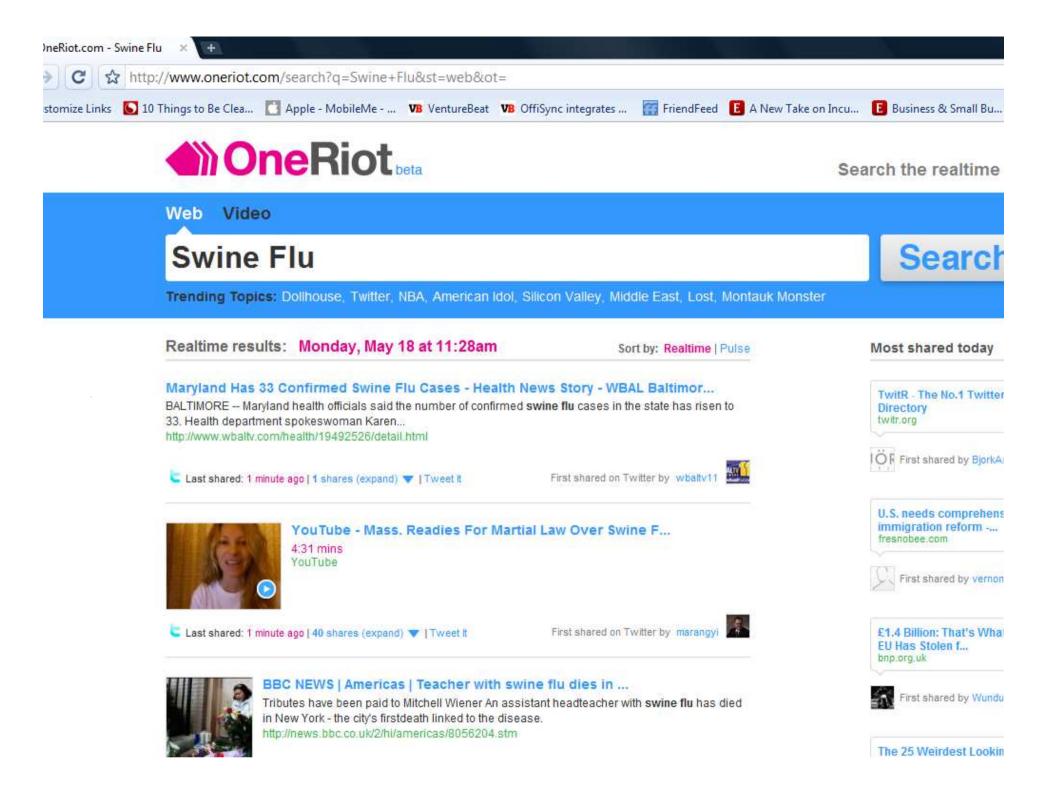


twitter

Home Profile Find People Settings Help S

#CoveEarl

What are you doing?	neiljain83 64 63 97 following followers upd
atest: ex duracell chairman to lead new chrysler,, sorry this do poing and going and going http://bit.ly/17H8tW about 11 hours ag	pesnt keep updato Twit-goo
Real-time results for Swine Flu	Remove this saved search Home
37 more results since you started searching, Refresh to	Direct Messages
Swine Flu?! less than 5 seconds ago from web	Swine Flu
el_friendo RT: @TheOnion Swine Flu By! http://bit.ly/zBALB less than 20 seconds ago from web	Season Is Really Flu-ing Saved Searches Swine Flu
cybillegayle Swine Flu in the Philippine half a minute ago from web	s. OH NO http://bit.ly/3dr1V Trending Topics #ravelry American Idol
vvurdsmyth H1N1 (swine flu) susceptible levels of arsenic exposure- http://twurl.r	l/kmi50v #budgetbond
Mountiehunter wonder if I caught swine Amsterdam hmmmmmmm 2 minutes ago from Power Twitter	p flu on the boat or in Adam Lambert Memorial Day





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The Free Encyclopedia

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search



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- Community portal
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toolbox

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This article is about the swine influenza virus. For the 2009 outbreak in humans, see 2009 swine flu outbreak.

Swine influenza (also called swine flu, hog flu and pig flu) refers to influenza caused by those strains of influenza virus, called swine (SIV), that usually infect (is endemic in) pigs. [2] As of 2009 these strains are all found in Influenza C virus and the subtypes of Influenza A H1N2, H3N1, H3N2, and H2N3. Swine influenza is common in pigs in the midwestern United States (and occasionally in other states), Me America, Europe (including the United Kingdom, Sweden, and Italy), Kenya, Mainland China, Taiwan, Japan and other parts of eastern As

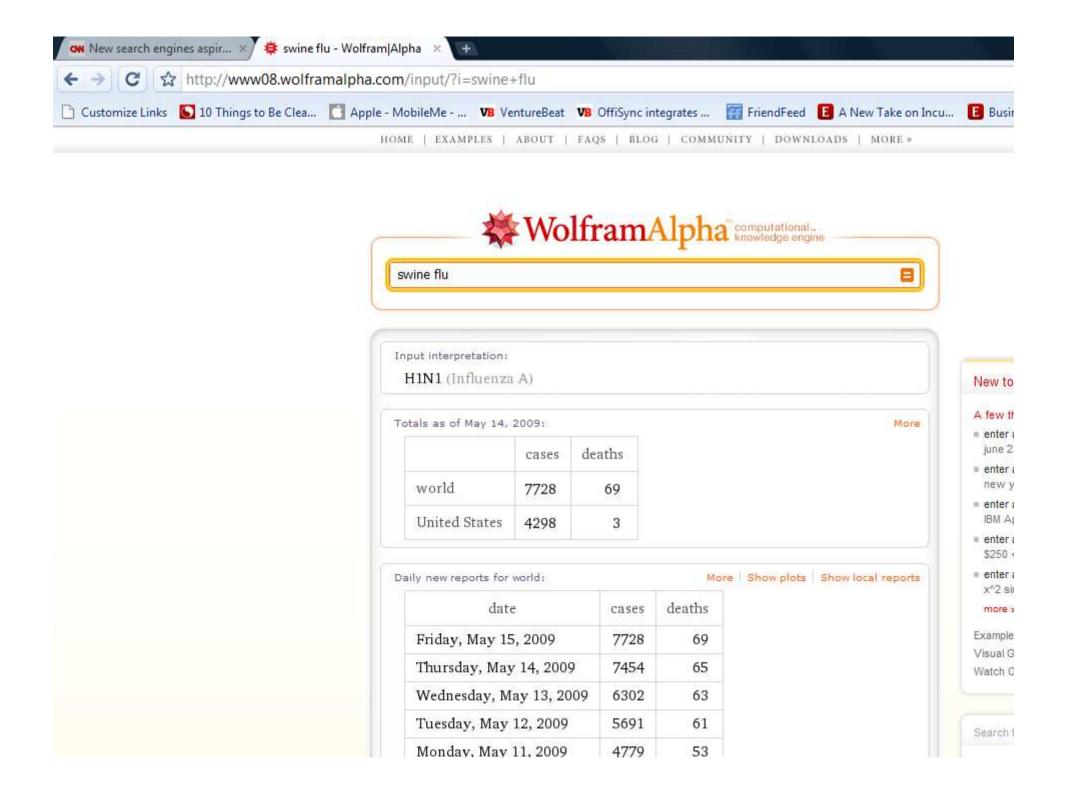
Transmission of swine influenza virus from pigs to humans is not common and does not always cause human influenza, often only resulting antibodies in the blood. The meat of the animal poses no risk of transmitting the virus when properly cooked. If transmission does cause h called zoonotic swine flu. People who work with pigs, especially people with intense exposures, are at increased risk of catching swine flu century, identification of influenza subtypes became possible, this allows accurate diagnosis of transmission to humans. Since then, fifty transmissions have been recorded. Rarely, these strains of swine flu can pass from human to human. In humans, the symptoms of swine of influenza and of influenza-like illness in general, namely chills, fever, sore throat, muscle pains, severe headache, coughing, weakness discomfort.

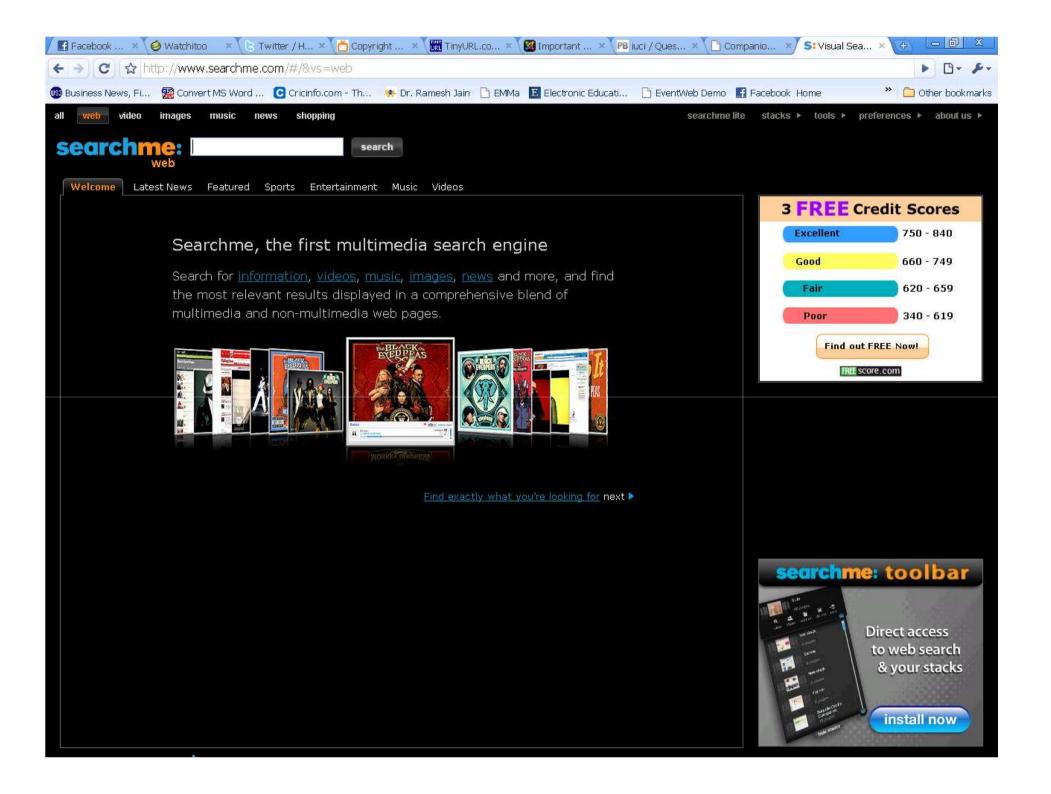
The 2009 flu outbreak in humans, known as "swine flu", is due to a new strain of influenza A virus subtype H1N1 that contains genes close influenza. [3] The origin of this new strain is unknown. However, the World Organization for Animal Health (OIE) reports that this strain has pigs. [4] This strain can be transmitted from human to human, [5] and causes the normal symptoms of influenza. [6]

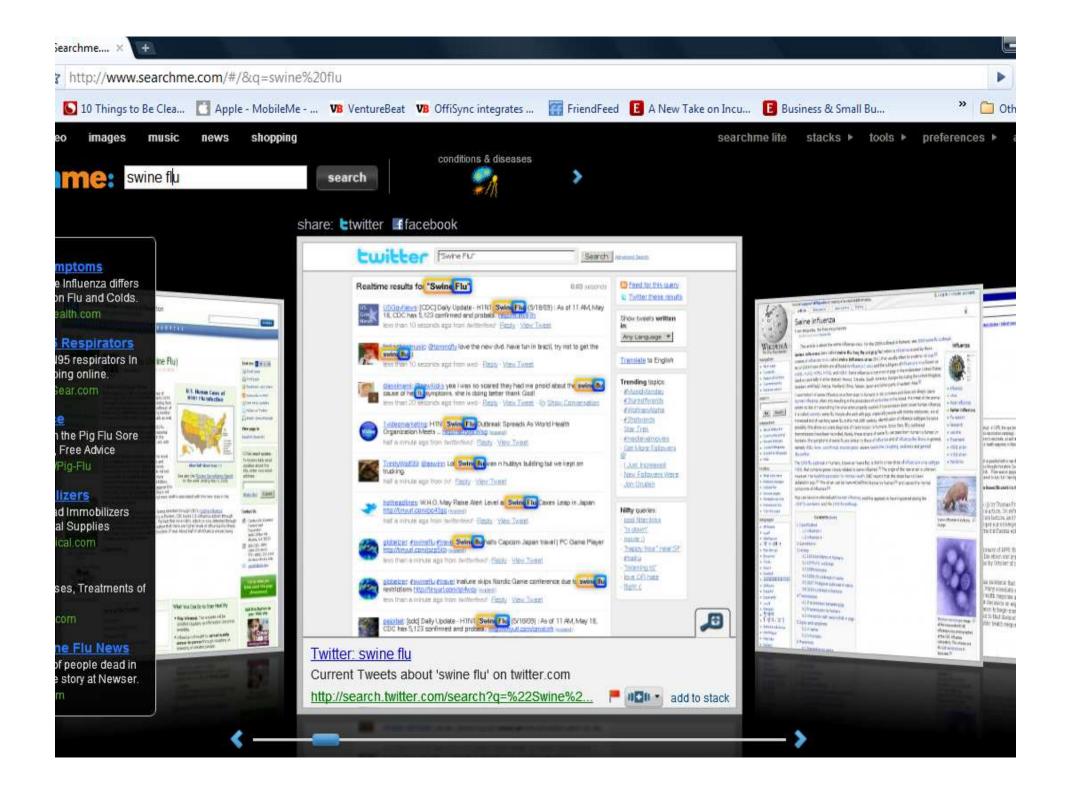
Pigs can become infected with human influenza, and this appears to have happened during the 1918 flu pandemic and the 2009 flu outbrea

Contents [hide]

- 1 Classification
 - 1.1 Influenza C
 - 1.2 Influenza A
- 2 Surveillance
- 3 History
 - 3.1 1918 pandemic in humans
 - 3.2 1976 U.S. outbreak
 - 3.3.1988 zoonosis







Emerging Landscape of Search

- User Generated Content (Multimedia)
- Real Time/Live Sensor
- Answers/Stories



Lets talk about Multimedia Search

- Historical Perspective
- Current Research
- Re-Defining the problem
- Challenges
- Some examples



History of Multimedia Search: A personal perspective

- Databases of images
- My personal interest
 - Feature indexed hypothesis
- NSF workshop in 1991
 - Jain and Petkovic in Redmond, CA
- VIMSYS and Xenomania (at U. Michigan)
- QBIC, Virage, Query by Pictorial Example
- **■** Features, Video Segmentation, Tags
- MPEG 7, LSCOM, COMM



Current Approaches

- **■** Feature-based indexing: remains strong.
- Tags: initial resistance; quite popular now.
- Text-based approaches: Gained popularity.
- Context: Started receiving attention.
- Social networking: becoming popular.



Observations: ACM MIR2008 Submitted (264) Papers

- Most papers are on media processing. In particular, most papers address single media processing. Most common topic was images, followed by image sequences, and then by audio. In fact, in a similar list for a conference on similar topic in 1998, topics of many papers will be the same. Clearly, there is a big overlap between media processing and computer vision.
- Most papers dealt with archived media. There were a few papers that talked about live applications related to surveillance and monitoring and immersive media. Even in these cases, live MIR was not the major emphasis.
- Machine learning approaches remain popular for annotation and concept detection. Manual tags and Folksonomy is receiving some attention.



Observations: ACM MIR2008

- Semantic Gap is mentioned by many papers. It appears that many papers allude to that, but no paper addressed the issue of semantic gap directly.
- Web environment is considered by many papers.
- Semantic Web tools are slowly finding their way into this community. Influence of TRECVid is clear on video processing [39].
- Query environment remains dominated by keywords and query by pictorial examples. There is some attention to interactivity at query time. It is clear that 'search' based on one query remains a dominant theme.
- Presentation and distribution environment is considered similar to the dominant environment in text search. Research has started in mobile, but here also, the approaches seem to be early straightforward extension of existing approaches.



Observations: ACM MIR2008

- Indexing is almost an unknown problem.
- Influenced by success of 'word' and 'Bag of Words', some effort has started in defining visual words and BoW models.
- Personal photo album is becoming an important topic. This and some video problems have resulted in popularizing the role of human faces.
- I particularly liked that very few papers talked about Corel Data set. People are emphasizing other datasets. Flickr dataset is becoming more common than Corel – a very good development for the longterm health of the field.
- System building is not very popular. Most papers address a very narrow aspect of MIR.



What is the Real Problem in (MM) Search?

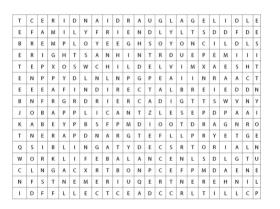
SEMANTIC GAP



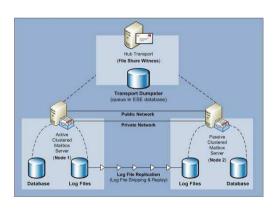








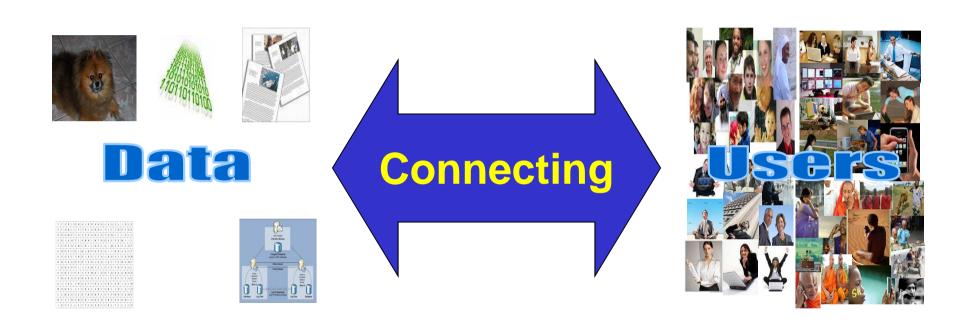








The Challenge





Semantic Gap

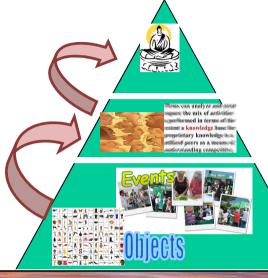
The semantic gap is the lack of coincidence between the information that one can extract from the (visual) data and the interpretation that the same data have for a user in a given situation. A linguistic description is almost always contextual, whereas an (image) may live by itself.

Content-Based Image Retrieval at the End of the Early Years

Found in: <u>IEEE Transactions on Pattern Analysis and Machine Intelligence</u> Arnold Smeulders, et. al., December 2000



Transformations













Lists, Arrays, Documents, Images ...







Alphanumeric Characters



Bits and Bytes







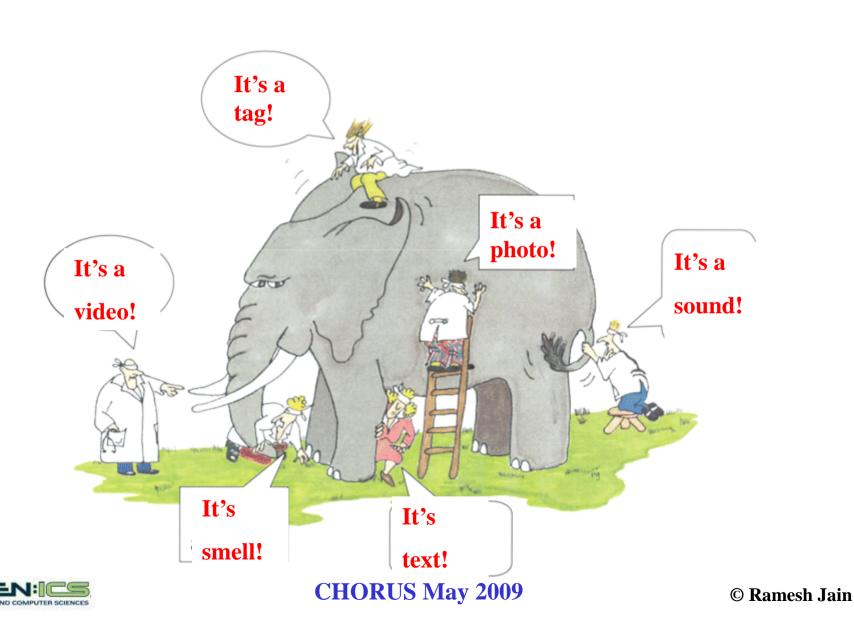
Modeling the World

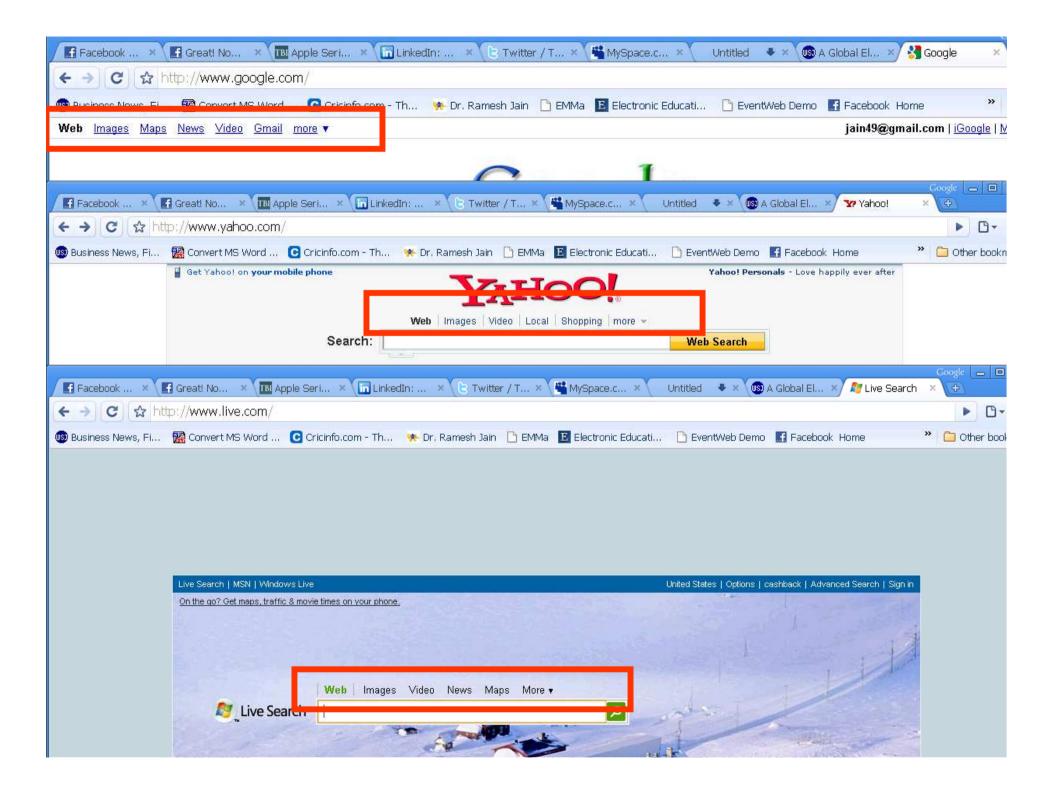
- Data (Semantic Web)
- Objects (Search Companies, ...)
- Events (Relationships among objects and attributes)

Both Objects and Events are essential to model the world.

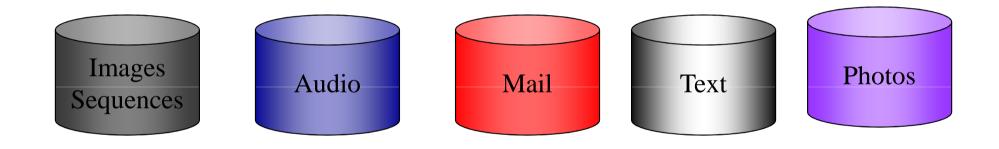


What is Multimedia: Elephant and the Blind Men



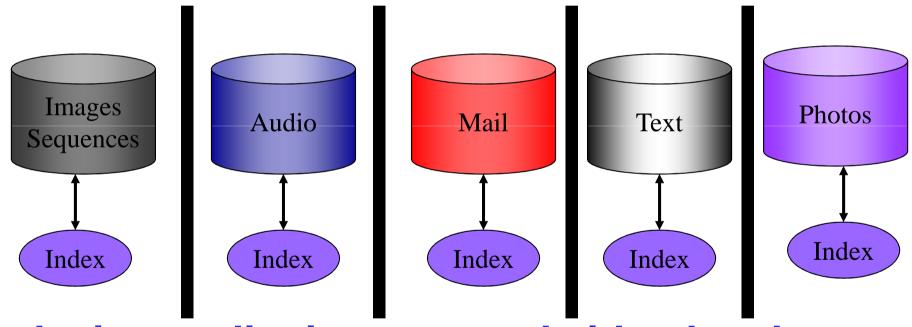


Multimedia Information





Multimedia Information: Retrieval Today



Indexing audio, images, and video has been extremely difficult.



Events, Experiences, and Multimedia

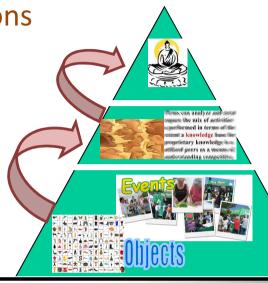
- Experiences are associated with Events.
- Events take place in the real world.
- We experience using our sensors and capture them using multimedia data.
 - Multimedia data is a just medium to understand real world events



Bridge: Unified Indexing



Transformations













Text, Images, Audio, Video, Tactile...







Alphanumeric, Pixel, Characters







Bits and Bytes



Future Internet:

Can we take the Web beyond the Cyberspace?

- Can things in real world be connected to other things?
- Does this even make sense?



Connectors

- My 5 Senses are connectors between 'me' and the world.
- We use our sensors (vision, audio, ...) to experience the world.
- Sensors could be the interface between the Cyberspace and the Real World.
- Sensors are placed for 'detecting events'.
 - How do you decide what sensors to put at any place?
 - Would you put a sensor if nothing interesting ever happens at a place?

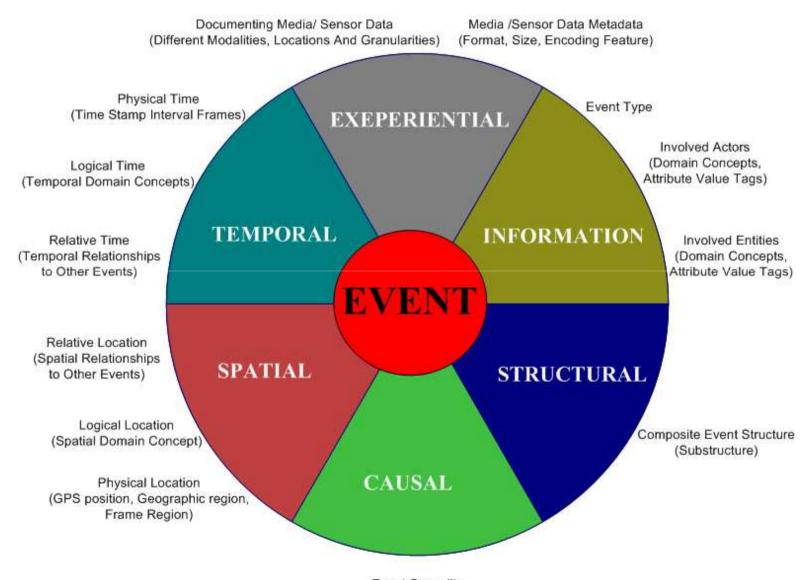


Continuing the Evolution of the Web

- Consider a Web in which each node
 - Is an event
 - Has informational as well as experiential data
 - Is connected to other nodes using
 - Referential links
 - Structural links
 - Relational links
 - Causal links
 - Explicit links can be created by anybody
- This EventWeb is connected to other Webs.



Event Representation





Content

Contenxt

Context

- **■** Contenxt = Content + Context
- Context is as powerful as, possibly more than, content in understanding audio-visual information.
- Events facilitate utilization of context.



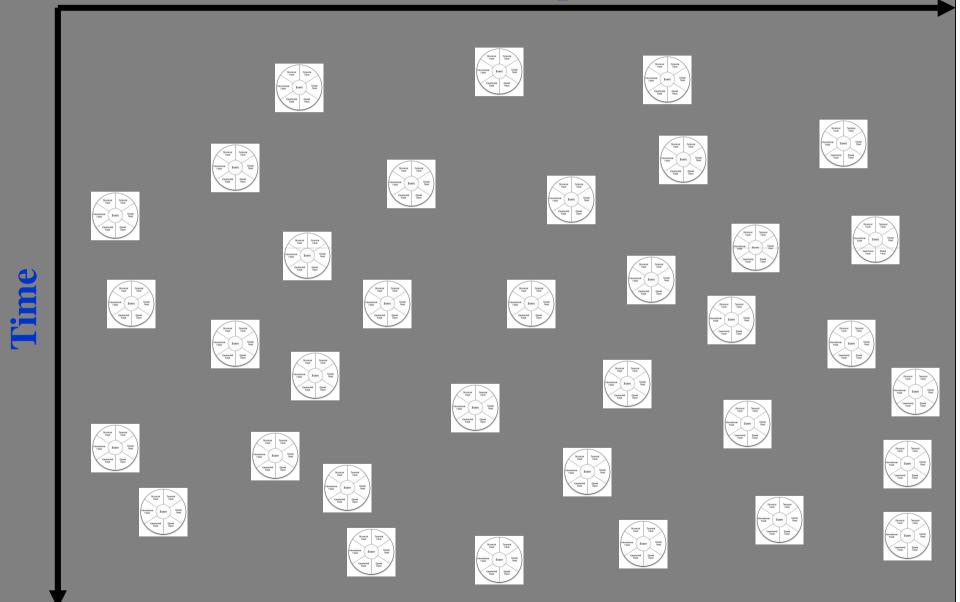
Towards EventWeb

- Isolated Events are good, but
- Things really become interesting when we create an EventWeb.



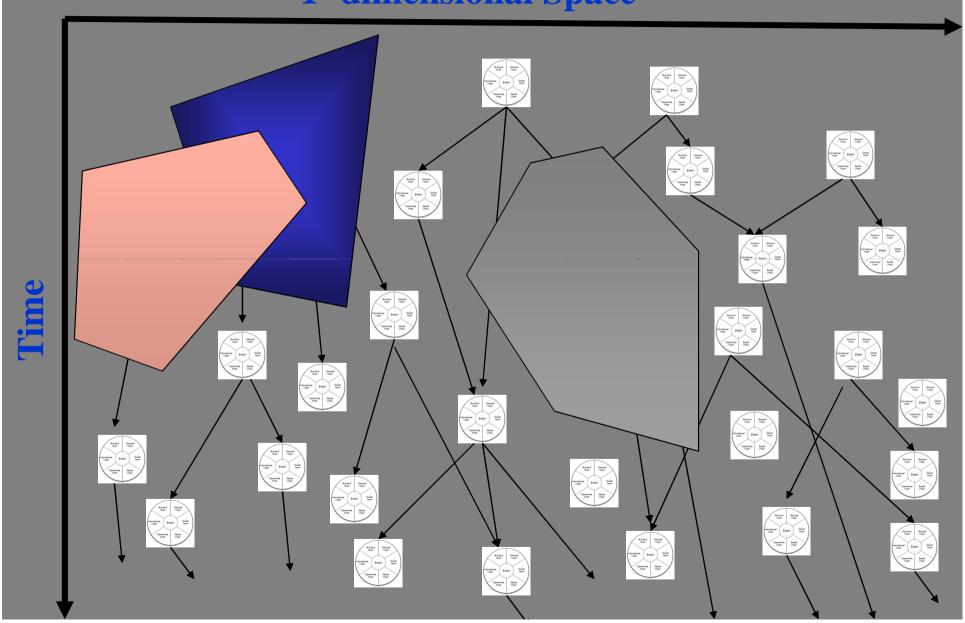
Events

1- dimensional Space



EventWeb

1- dimensional Space



Potential Questions that use EventWeb

- How is a sheep herder in Mongolia affected by actions of Californians? (Answer in recent Wall Street Journal.)
- What does Roe Vs. Wade has to do with reduction of crime in US cities? (Answer in Freakonomics)

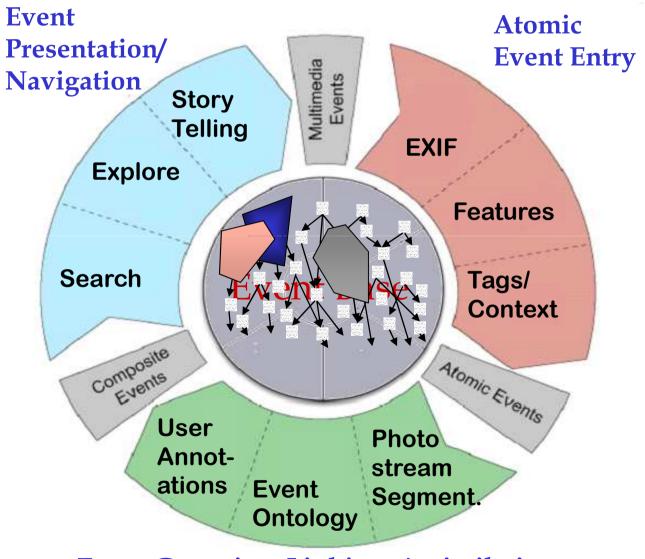


MMSE: 3 Key Guidelines

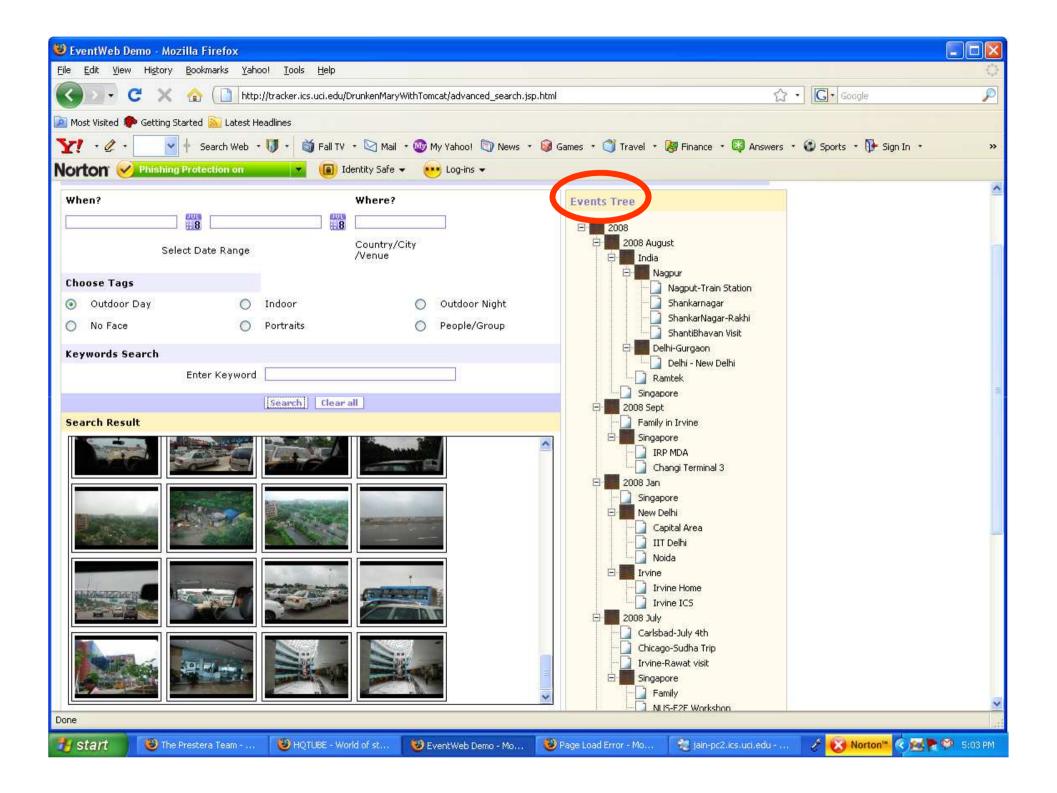
- Should be able to deal with 'multimedia'
 - Photos
 - Audio
 - Video
 - Text
 - Information and data
 - ...
- Searching based on events, objects, and media.
- Provide Answers/Stories using appropriate media.

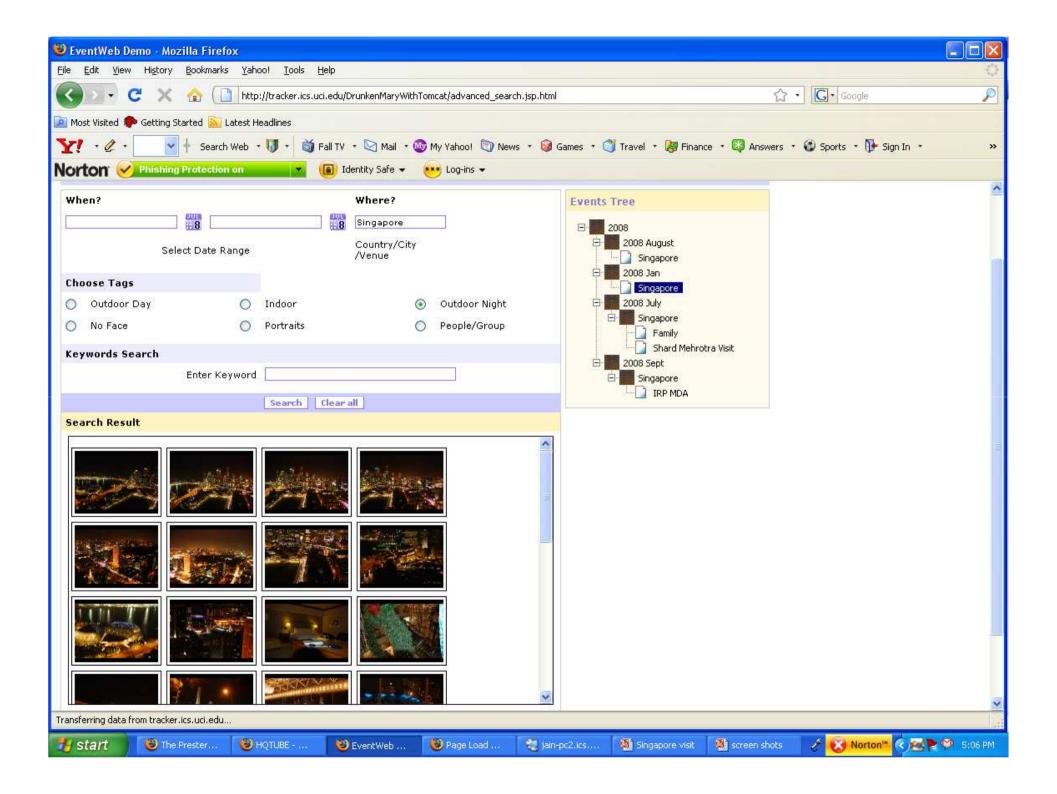


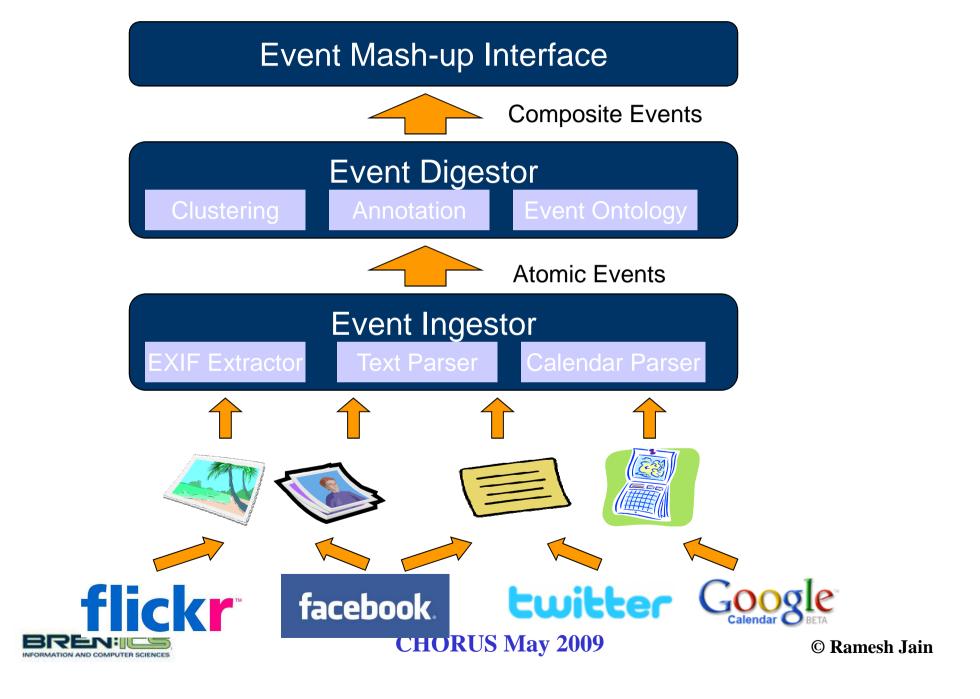
Event Cycle: Searching Based on Events



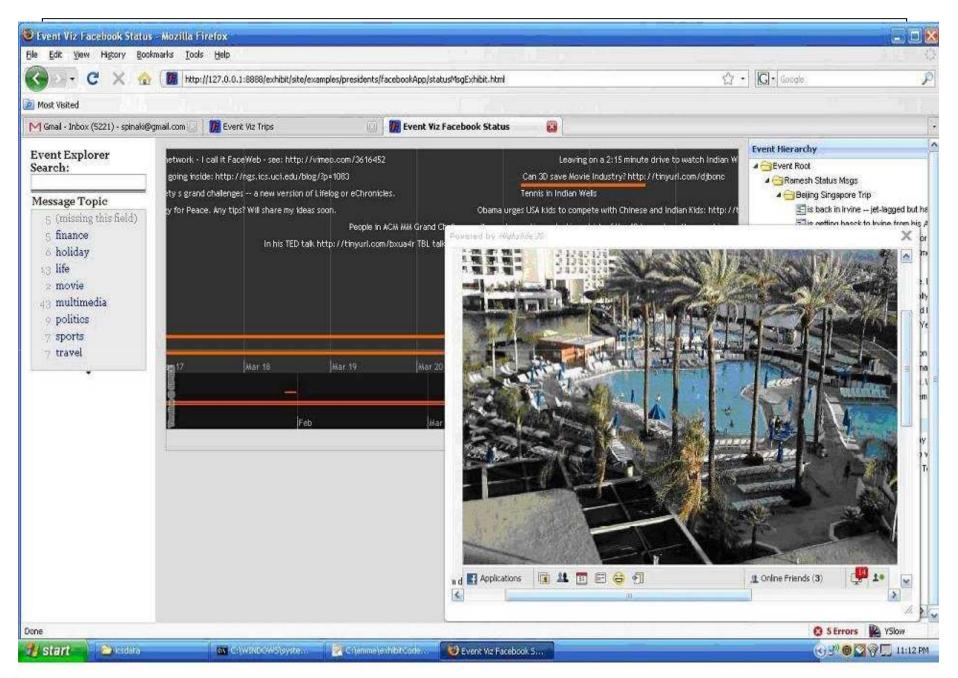














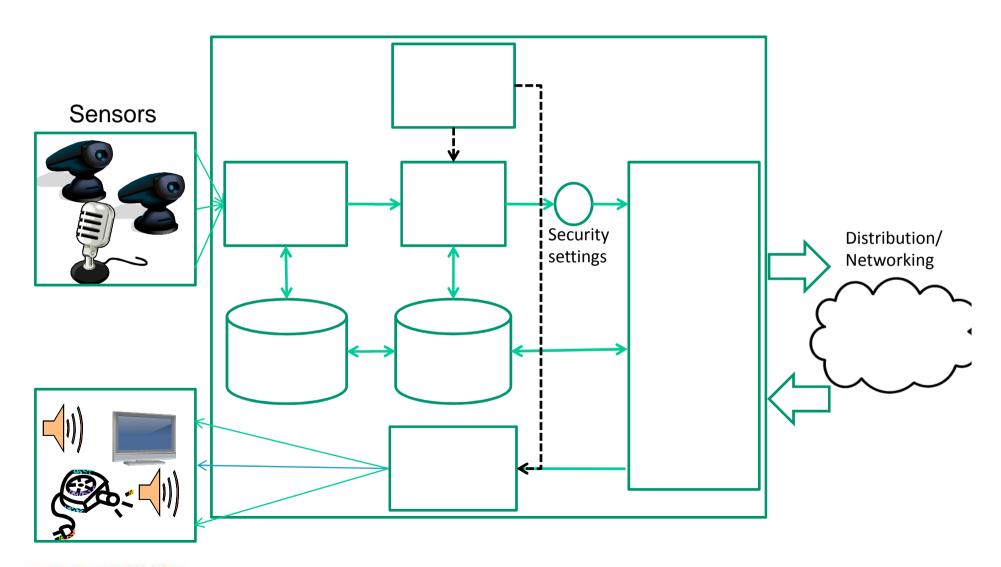
Sentient EventWeb

- Use sensors to create events.
 - This conference
- Infrastructure to create and link all such events.
 - Index
 - Search
 - Present
- Capture events and put them on the Web.

Imagine each sensor tweeting.



Node Architecture





Joint Situation Model Env. 2 Env. 1 JSM 1 JSM 2 Env. 3 Env. 5 Env. 4

These Concepts are already finding applications for 'Folk Computing' using *Mobile Phones*.

TATA Consultancy Services started a working project in this area.

(Disclosure: I am working with them.)



Farmer's Queries

My Soil

Which crop I should grow?

Which fertilizer I should apply? In what quantity? When?

Can I grow grapes?

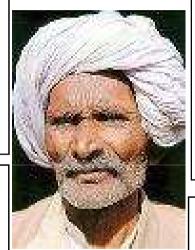
I plan to dig a well. Will it hit water?

My Produce

What is the rate for cotton in nearby market?

How can I get better rates?

Is there a space in nearby warehouse for storage for a month?



My Crop

Which seeds I should buy?

Should I spray pesticide? Which one? When?

Leaves look Yellowish? What should I do?

Can I get Rs 25000 loan in a week for sowing operation?

My Family

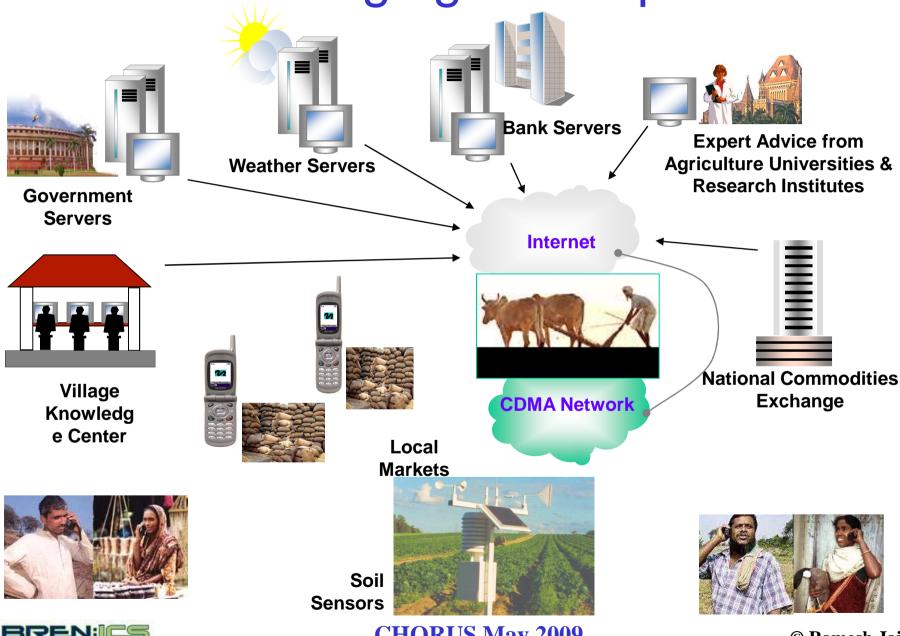
Where can I find doctor nearby?

My son will complete high school this year? Should he do computer courses?

How I can earn additional income?



Bridging the Gap

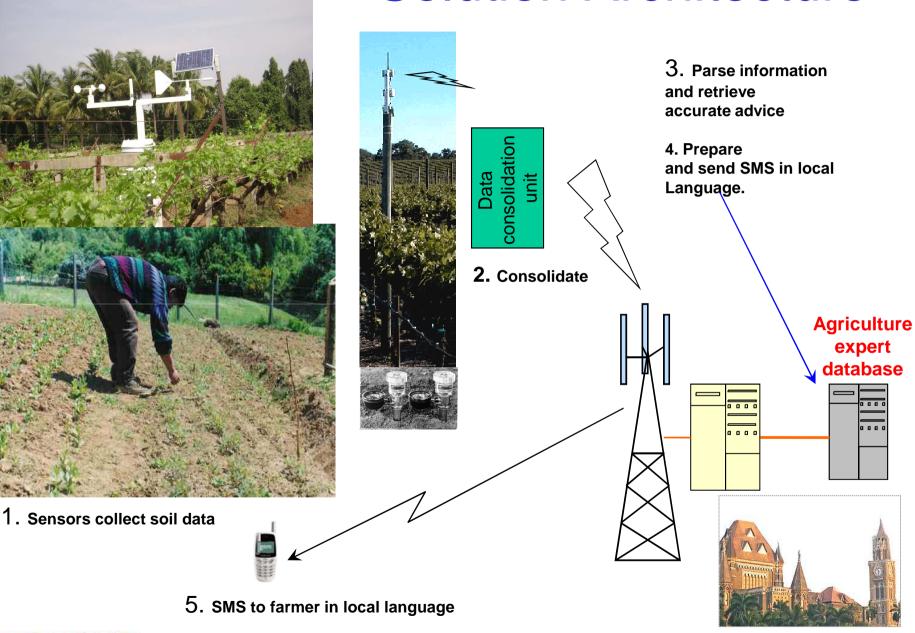




CHORUS May 2009

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Solution Architecture

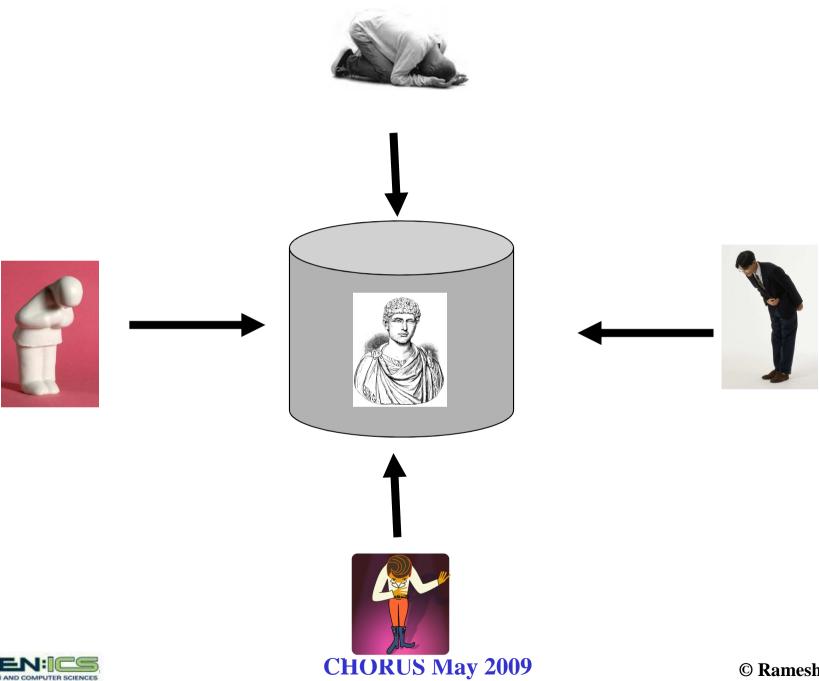




Copernican Revolution in Computing

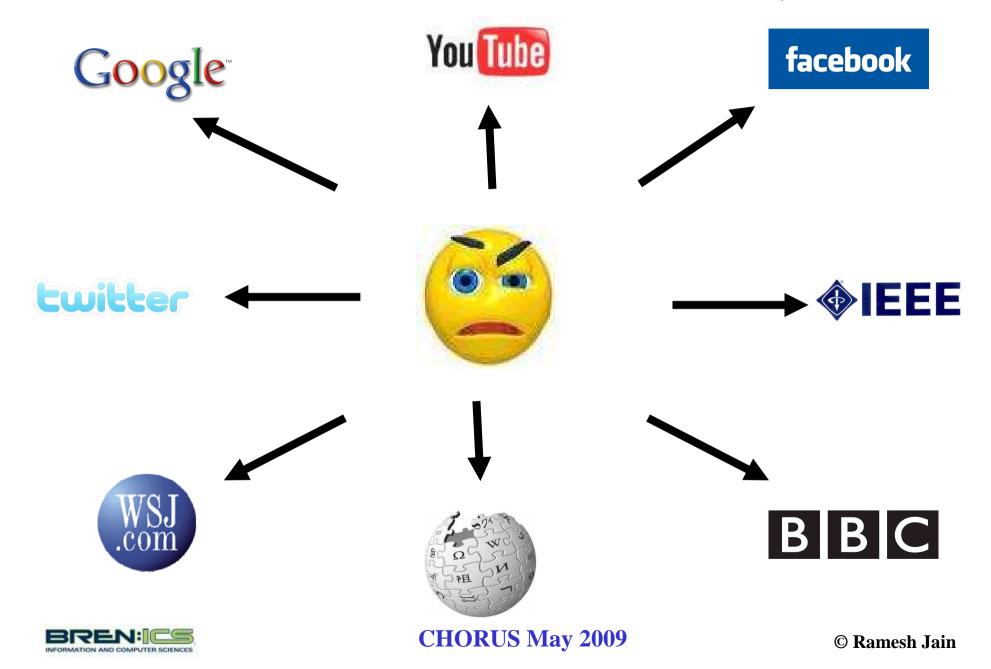
Who is the King: Content (Data) or User?



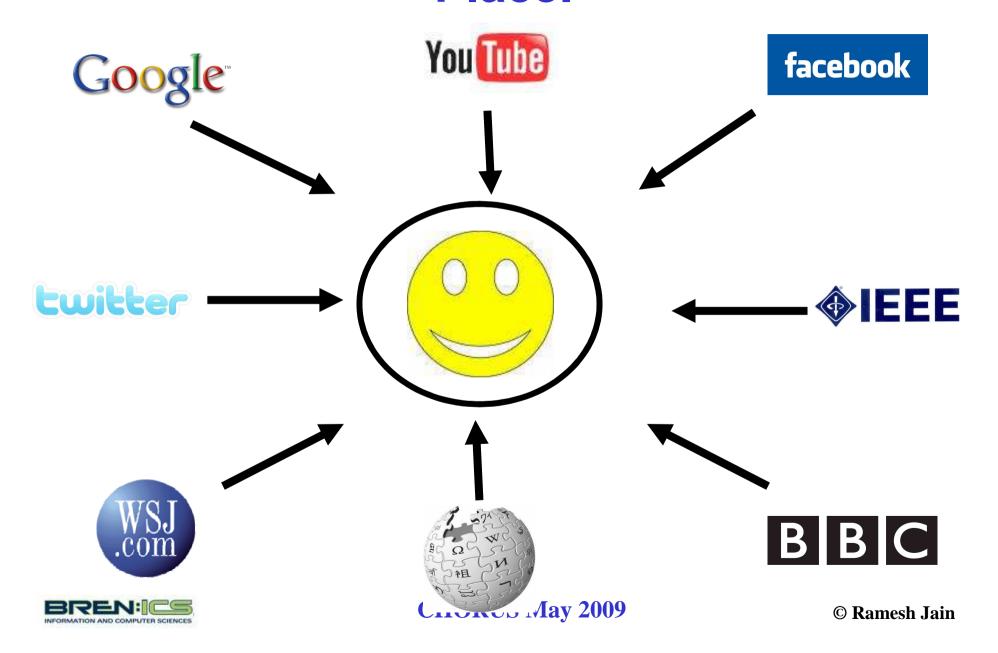




All Information is Available, BUT



Right Information, at Right Time, at Right Place.



Exciting Directions

- Information/Experiences are important medium is just that the medium.
- In the days of abundance of data, usercentric approaches are critical.
- Real time (Live) multimedia data is becoming the norm.
- Events are critical for bridging the semantic gap.



Thanks.

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