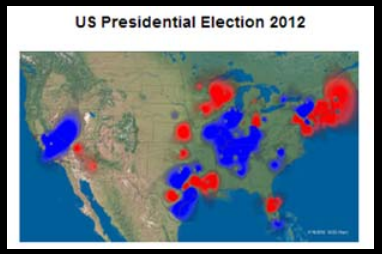
Wonder of Mobile Social Multimedia



Shih-Fu Chang

June 2013, New York

First Digital Camera in 1975

- film-less photography

by Steve Sassan of Kodak

- CCD array, A/D converter, 16 batteries
- 23 seconds to record a photo to cassette
- customized reader on a B/W TV for viewing

Q: quality, size, cost, store, share?

1996

2002, 1st camera phone, 0.3Mp

2007, Apple iPhone iOS

2011, Galaxy S II, 8Mp Android, GPS

2012, Lumia 800 Windows 7 Mobile

1 billion camera phones sold in 2011

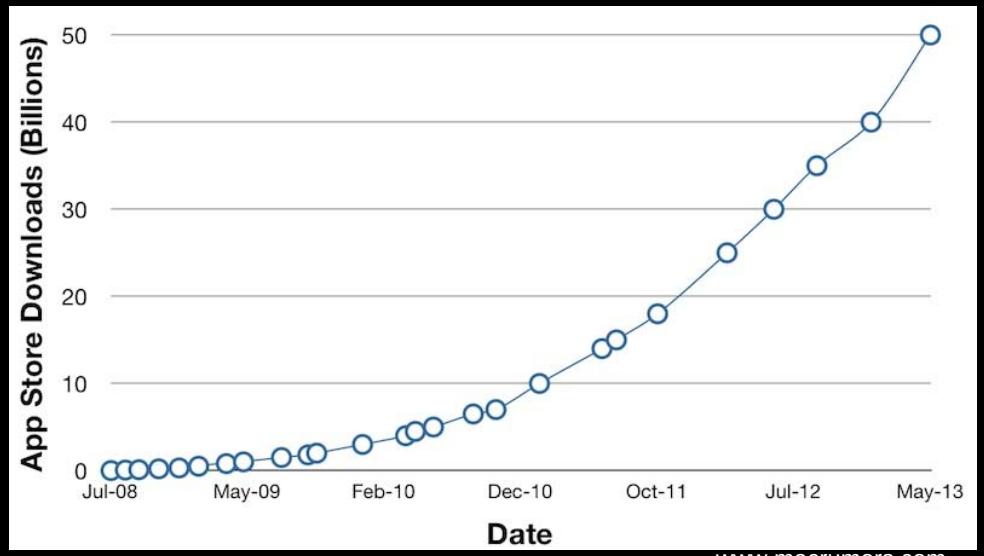
hongkiat.com/blog/evolution-of-mobile-phones/

From Photo Shoebox to Social Multimedia

- Images
  - 300 million photos uploaded to Facebook every day.
- Videos
  - 4 billion videos watched per month on YouTube.
- Social media
  - 30 billion content shared on Facebook per month.

Explosion of Mobile Apps

- July 2008 – 10 million apps downloaded in the first weekend
- May 2013 – 50 billion apps downloaded



www.macrumors.com

www.techsling.com

Wonders of New Mobile Multimedia

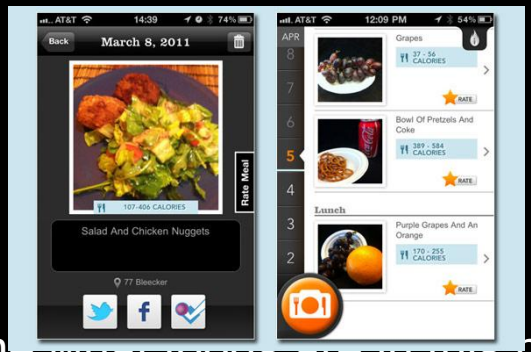
- Recognize music you hear

Shazam App, Prof. Ellis

- Find objects you see

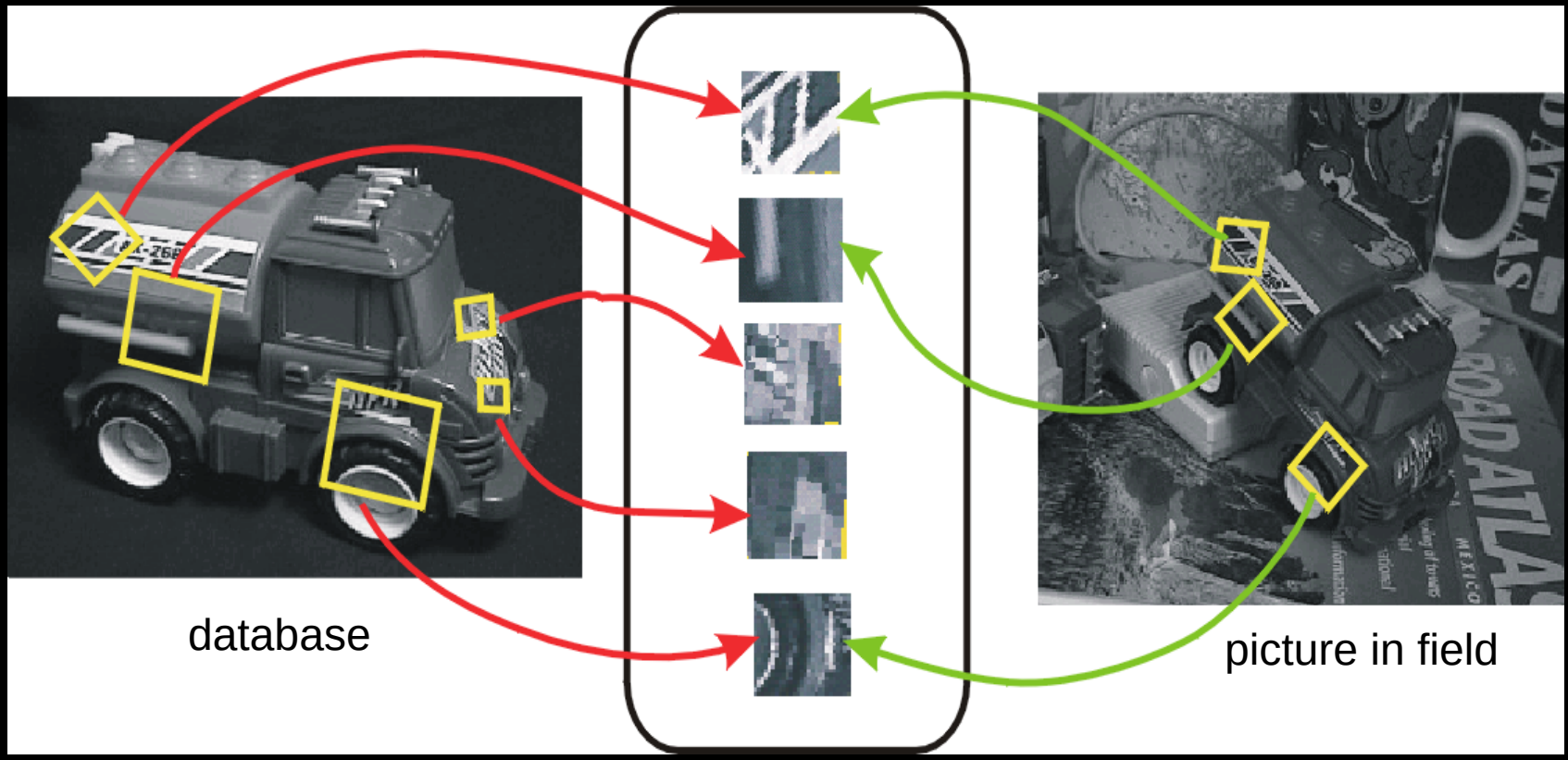
LeafSnap
Prof. Belhumeur

- Watch diet for you



Tell me what foods are in this picture

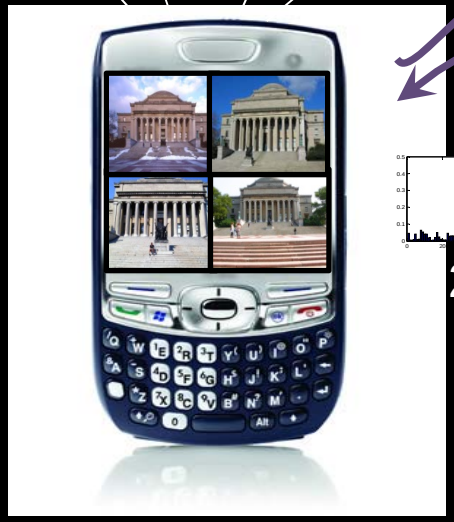
How Does Automatic Recognition Work?



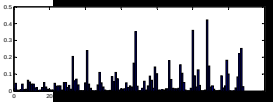
- Find “Important” Feature Points in Pictures, Compute Similarity, and Match Layout

Figure: David Lowe

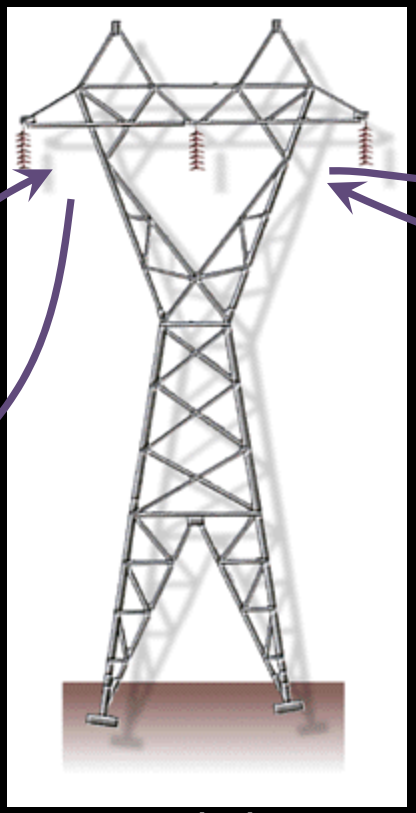
Deploy this over Mobile Networks



1. Take a picture

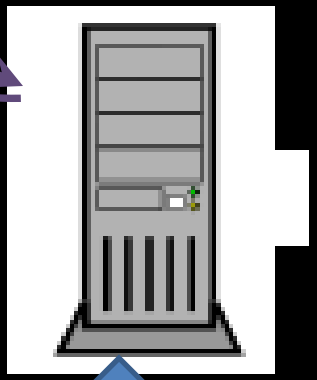


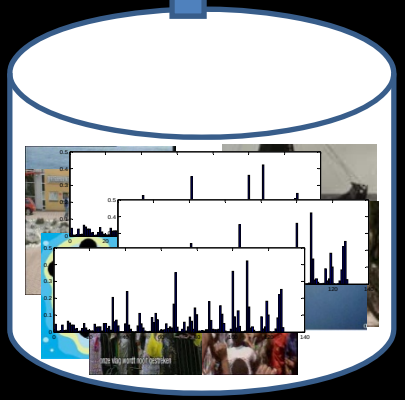
2. Send image features



3. Send via mobile networks

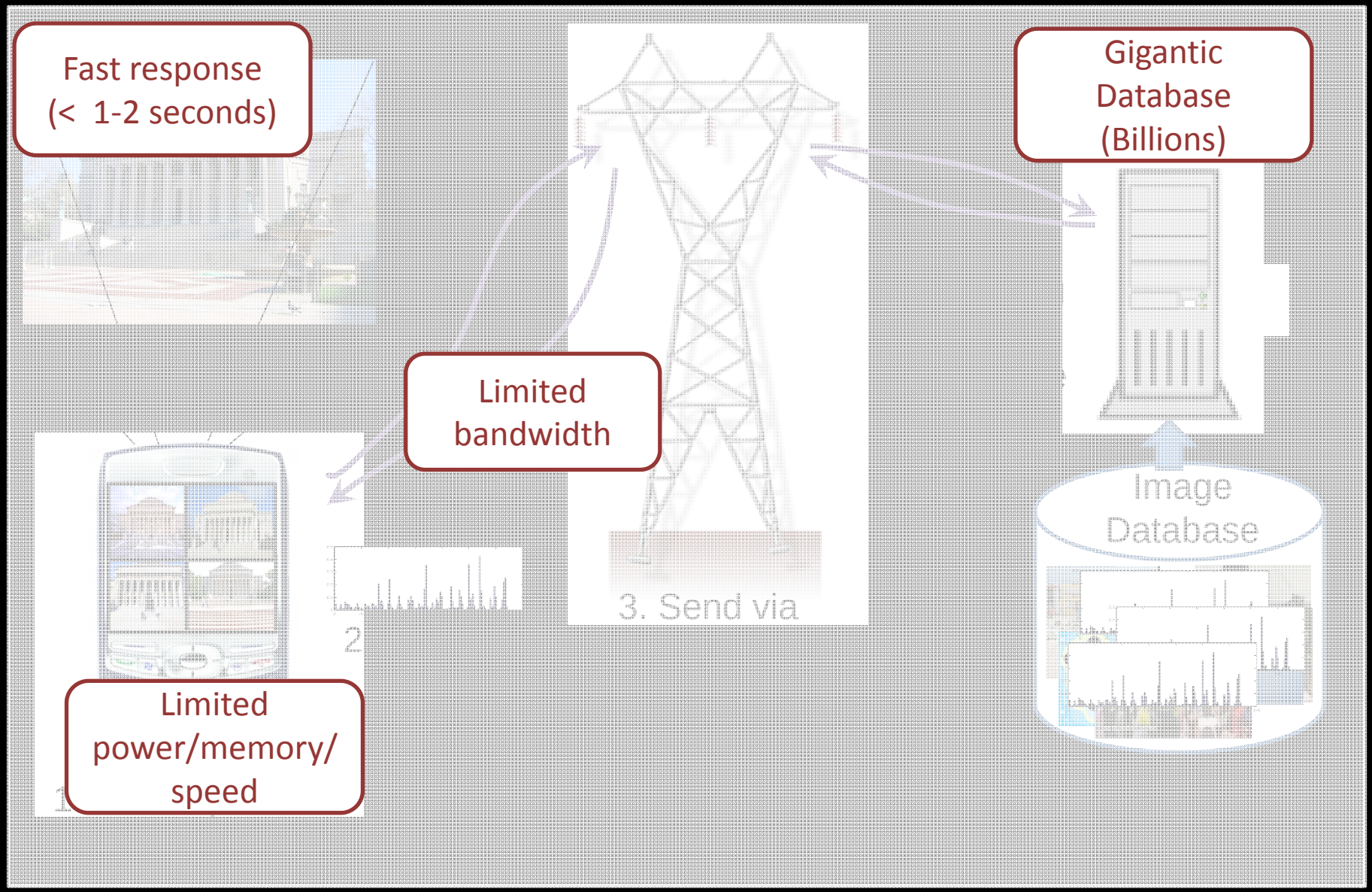
4. Visual matching with database images





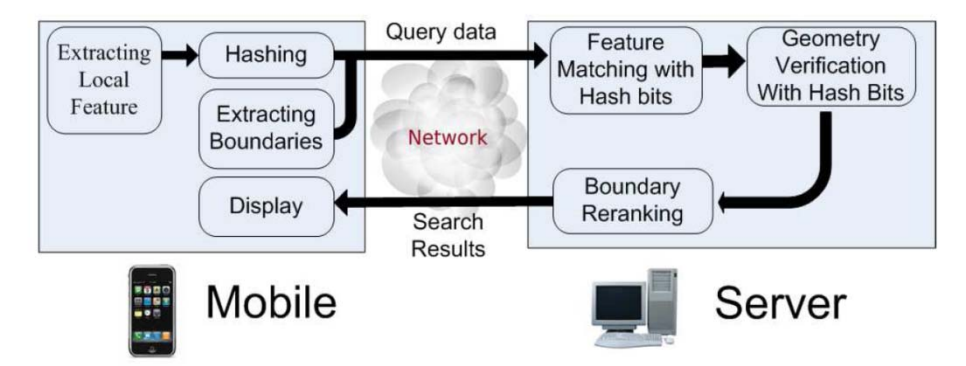
5. Send results back

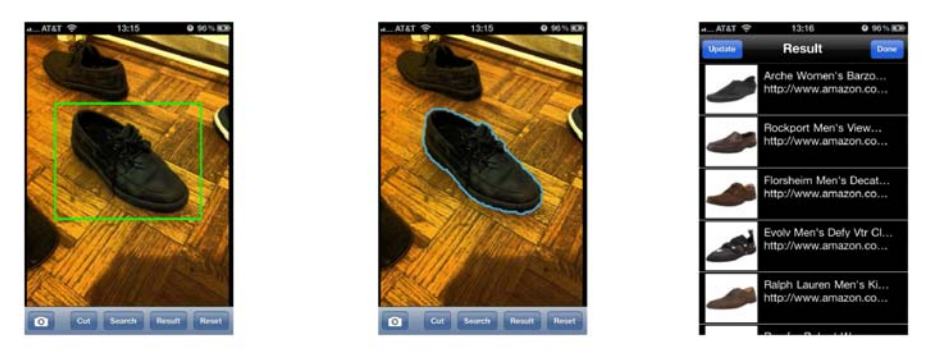
Technical Challenges



Columbia Mobile Product Search System: using Advanced Hash Coding

Columbia DVMM Lab, 2011





Database:

- **400,000 product images of Amazon, eBay, and Zappos**

Performance:

- **Feature extraction: ~1s**
- **Compact code: 1K bytes/image**
- **Large database search: ~0.4s**

video demo

Augmenting Physical Senses

- MIT Six Sense Project (Pranav Mistry and Pattie Maes)
  - Camera and display
  - Visual recognition
  - Gesture interaction
  - Mobile wearable computer
  - Pre-cursor Concept of Google Glass

Mobile Augmented Reality

- Create virtual worlds at finger tip and interact
  - Examples: Smart AR from Qualcomm and SONY
  - Easy creation of 3D virtual space
  - Real-time interaction between characters in physical & virtual worlds

tech.philbuzz.com,

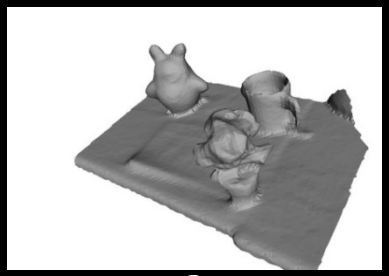
bookmarkblogs.com,

Multi-Player Augmented Reality

Several students go to a coffee shop. They use their smartphones to turn their table into an Augmented Reality (AR) sandbox!

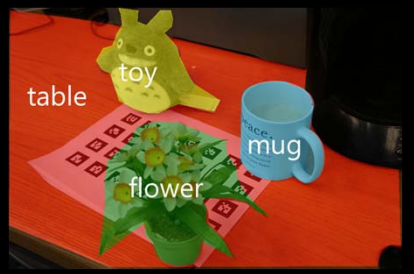
What would be possible if the system could automatically perform 3D scene modeling and semantic labeling?

3D Scene Model

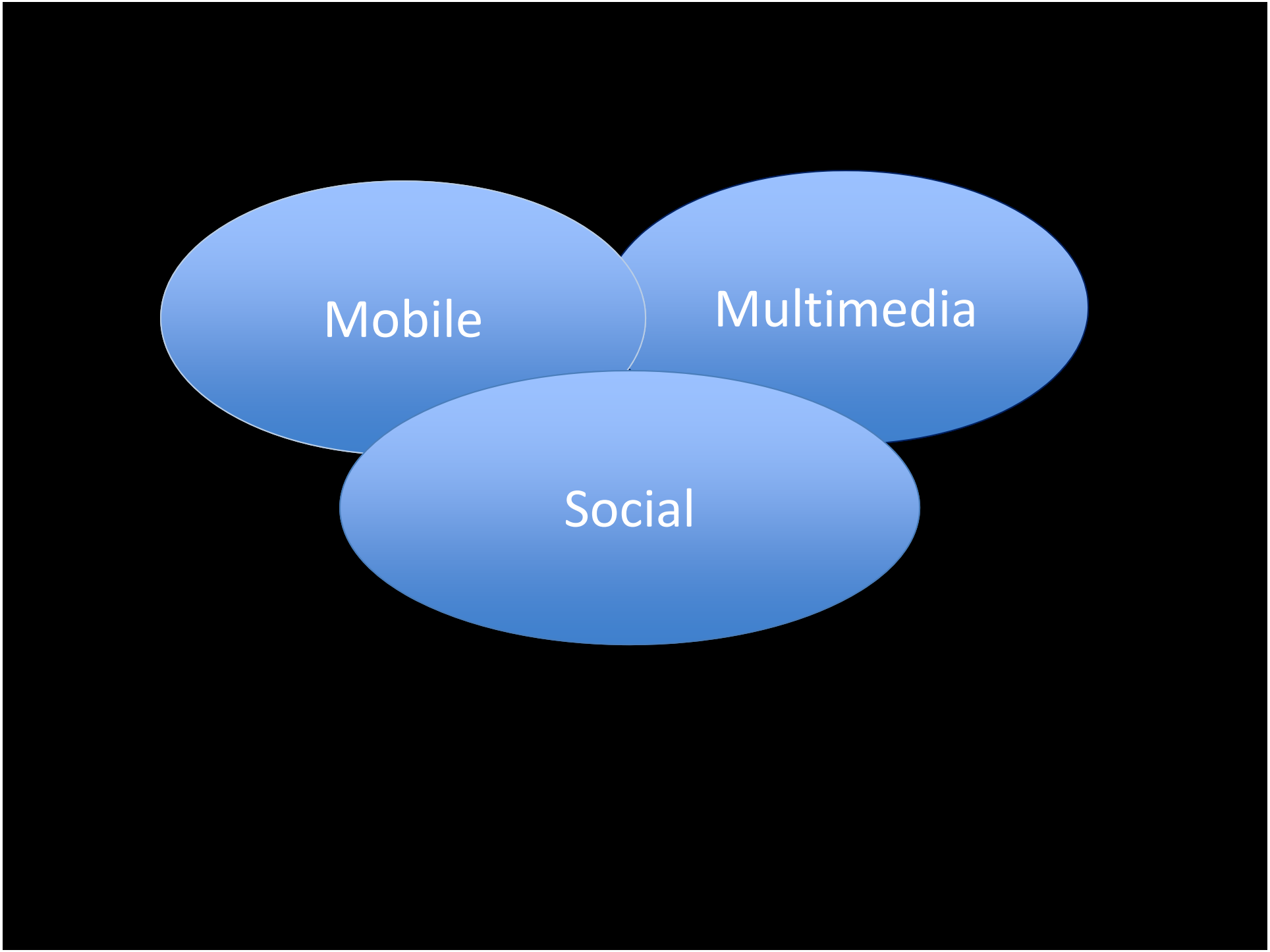


+ = ?

Semantic Labels

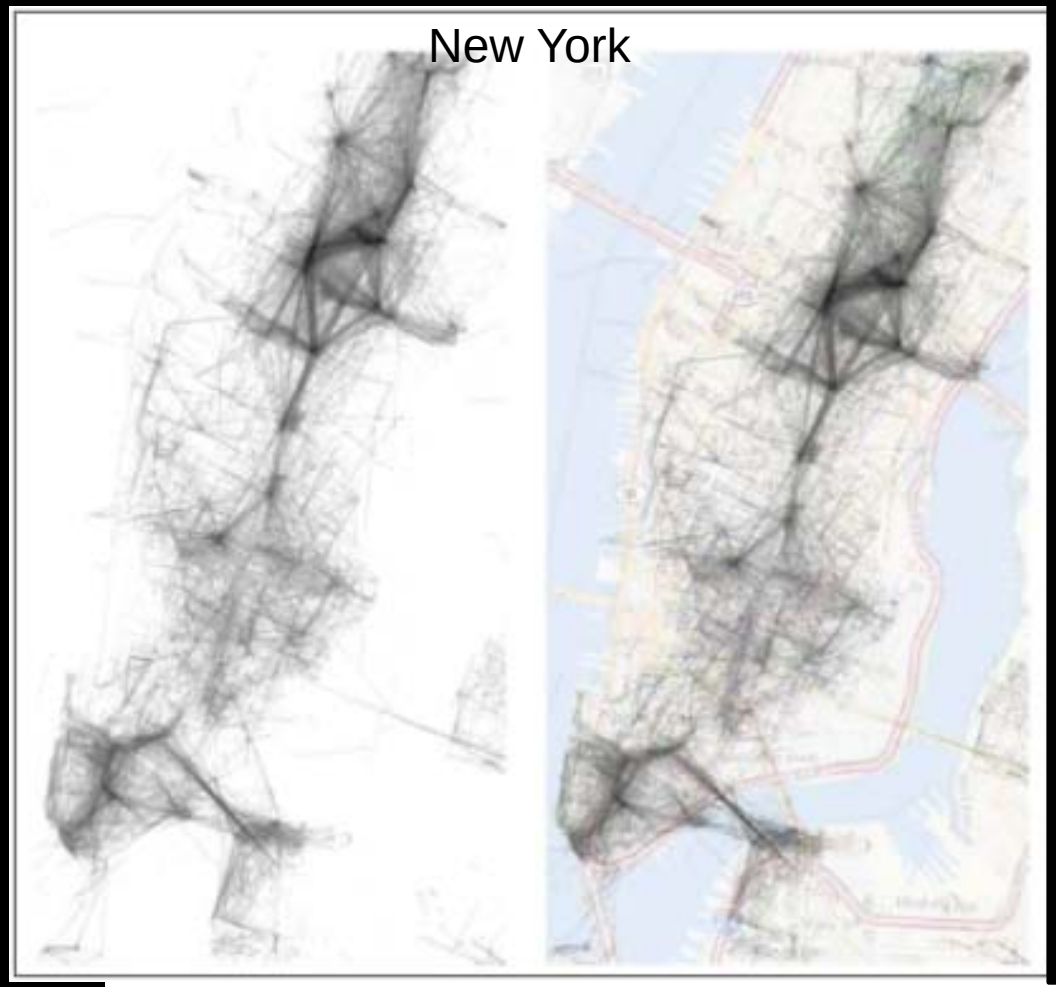


Joint work with Prof. Steve Feiner, CS, Columbia U.

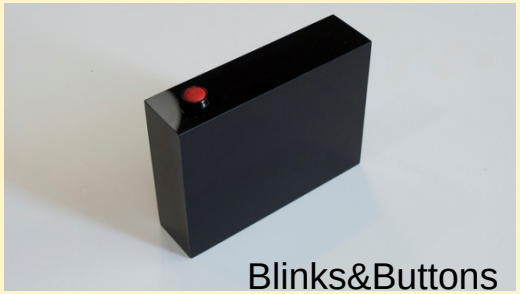

Mobile
Multimedia
Social

Social Behavior

- Crandall et al, 2009, studied 35 million Flickr photos, 300,000 users, photographer movement paths



Lens free camera



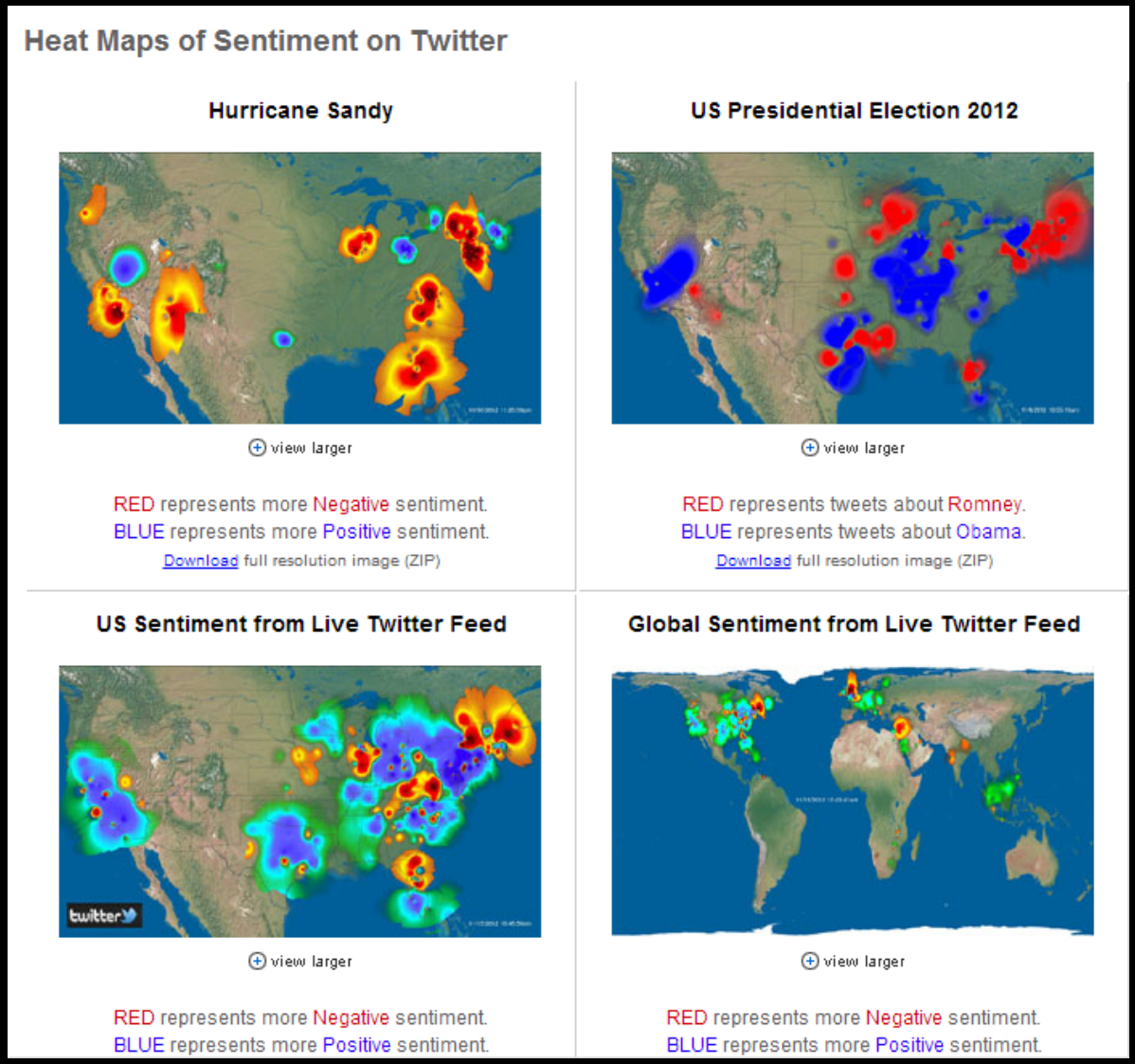
Load others' pictures @ same location/time

Social Sharing -> Opinion Expression

(socialdefender.com)

Tracking the Sentiment on Social Media

SGI/Uni. Illinois
Global Twitter Heartbeat

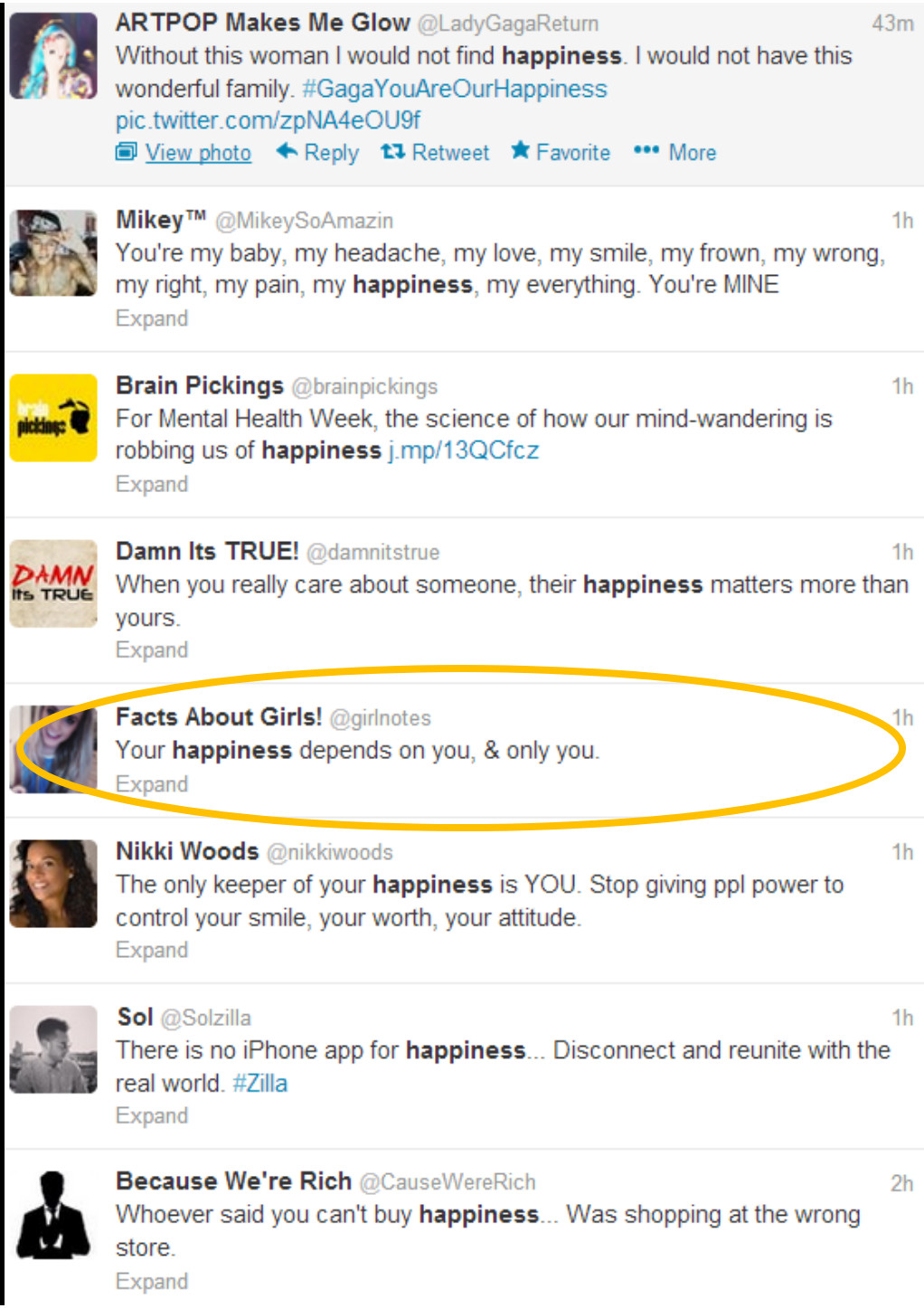


www.sgi.com/go/twitter/

presidential

Social Media Reveal Many Emotions

Search for “Happiness”



Emotions across Cultures

新浪微博 weibo.com

Search for “幸福”

Much more *visual* on the Chinese site

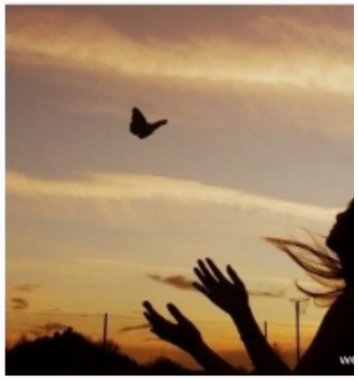
竹本人：为什么中国人民勤劳但不幸福 府，三公消费；2.央企垄断，与民争利；3 年收入；4.坑爹的企业污染环境，损害人民 的企业食品造 http://t.cn/zHUUUWS

5分钟前 来自开心网

净琳念佛-永远20岁的雨心：//@白羊座 不在于富足，而在于满足

@哲语禅思：人生的幸福，不在于富足 足不在于多加燃料，而在于减少火苗； 而在于减少欲念。人的欲望是无止境的 的，以有限的生命追求无尽的欲望，又 下贪欲，追求平实简朴的生活，是获取 法。每天参一禅，让心灵变得豁达安宁

收起 | 查看大图 | 向左转 | 向右



5月20日02:23 来自新浪微博

5分钟前 来自Android客户端

奶茶小猫V6：言言，谁要是 福！

@陈柏言V：做完我都不饿了。

今天12:43 来自新浪微博

八达岭2003：希望在当下，不在昨天。优雅地转身，才能邂逅越来越多的幸福。//@米丁米丁米

@anni1986空间：放不下过去，如同开反方向的车，会离幸福越来越远。人生如驾车，路过的，都是风景，风景再美，既已路过，就要离开，无论舍不舍得，人生都要前行。放得下，过去就是支撑未来的基石;放不下，昨天就是托累今天的包袱。人生有希望才有活头，而希望在当下，不在昨天。优雅地转身，才能邂逅越来越多的幸福。

收起 | 查看大图 | 向左转 | 向右转

52分钟前 来自华为MediaPad 转发(19) | 评论(4)

3分钟前 来自iPhone客户端 | 转发 | 收藏 | 评论

北京巴沟韩颖10：[微喊话]韩颖于2012年3月3日交到海淀法院立案庭的三个案子到现在已经449天了，多次催促立案，海淀法院武会珍庭长坚定地说：立不了案！但始终不说因什么原因立不了案。这个案子有明确的被告，有明确的诉讼请求，有基本的证据，属于你院管辖，请武庭长依法做出立案或不立案裁定。期盼立案，渴望幸福

3分钟前 来自iPhone客户端 | 转发 | 收藏 | 评论

渊海紫坪：幸福就是外面哗啦啦的下着雨，我虽然早醒却依然可以再闭上眼睛一个回笼觉。这天适合在家睡个觉，开着台灯，看本小说。科科。

3分钟前 来自Android客户端 | 转发 | 收藏 | 评论

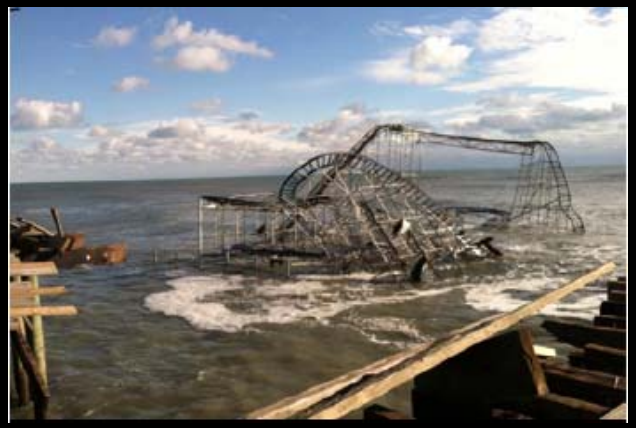
The Power of Social Multimedia

- A picture is worth one thousand words

Example Tweets

@BarackObama: Four more years.

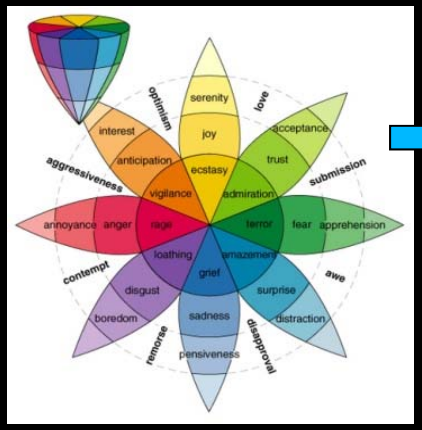
@Brynn4NY: Rollercoaster at sea.



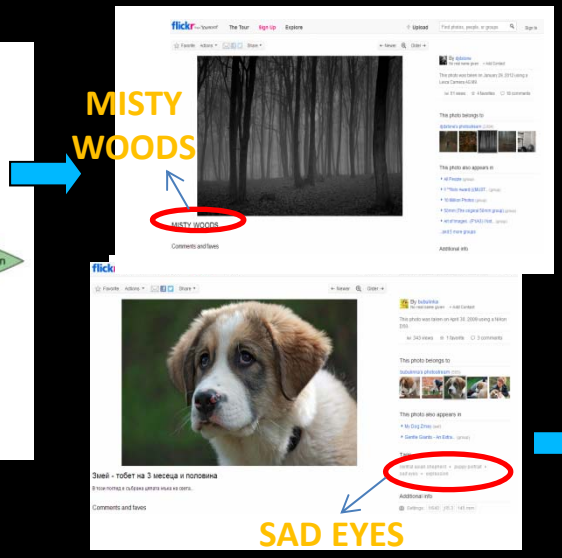
@Fang-Ru: Queen of the far far away land.

Research: Which 1000 sentimental concepts?

-- data mining to discover visual sentiments in social media



Psychology emotion wheel (24 emotions)

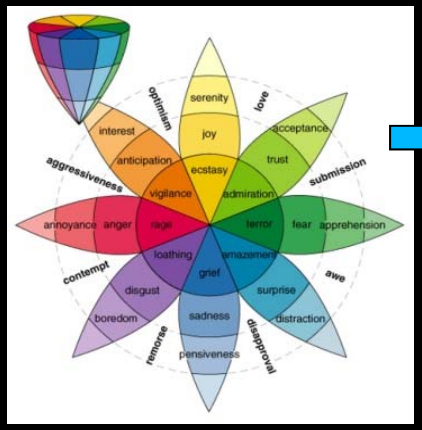


Build Sentiment Ontology

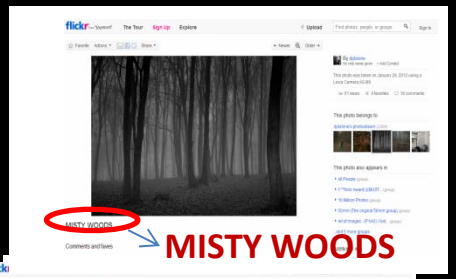
Select Adj-Noun Pairs

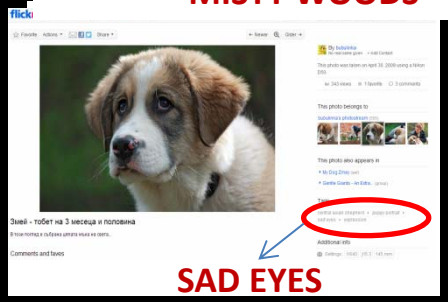
Emotions Expressed in Social Media Photos

Research:
Teach Machine to Recognize Visual Sentiments



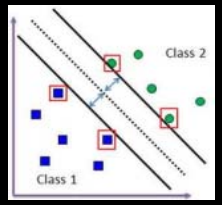
Psychology emotion wheel (24 emotions)





Select Adj-Noun Pairs

Build Sentiment Ontology



Train Classifiers

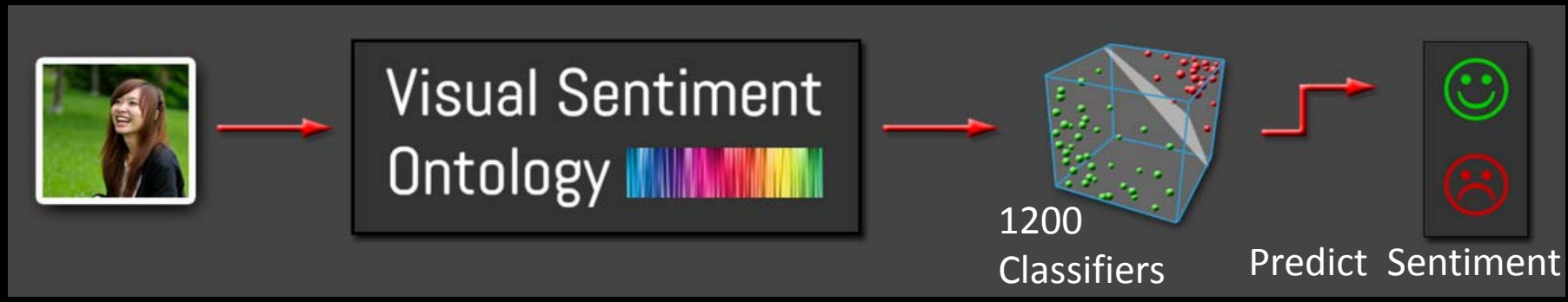
Performance Filtering

SentiBank (1200 Detectors)

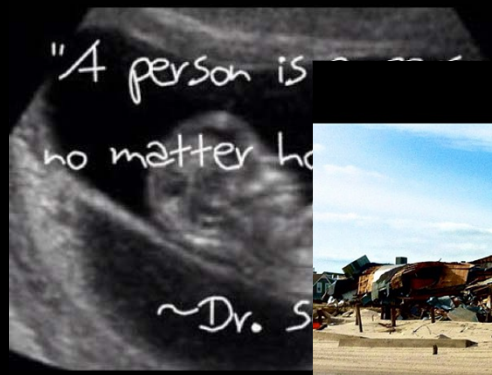
Sentiment Prediction


Machine Detected Visual Sentiments
More than 600 classifiers > 78% accuracy
Green: Correct Red: Incorrect

Columbia Visual SentiBank System



PhotoTweet Stream:



True stuff. I have ma
ladies that DO NOT g
@nickespo89

#groundzero #hurric
#newjerse
@charleslawrence

Ouch mr police man @radiodario

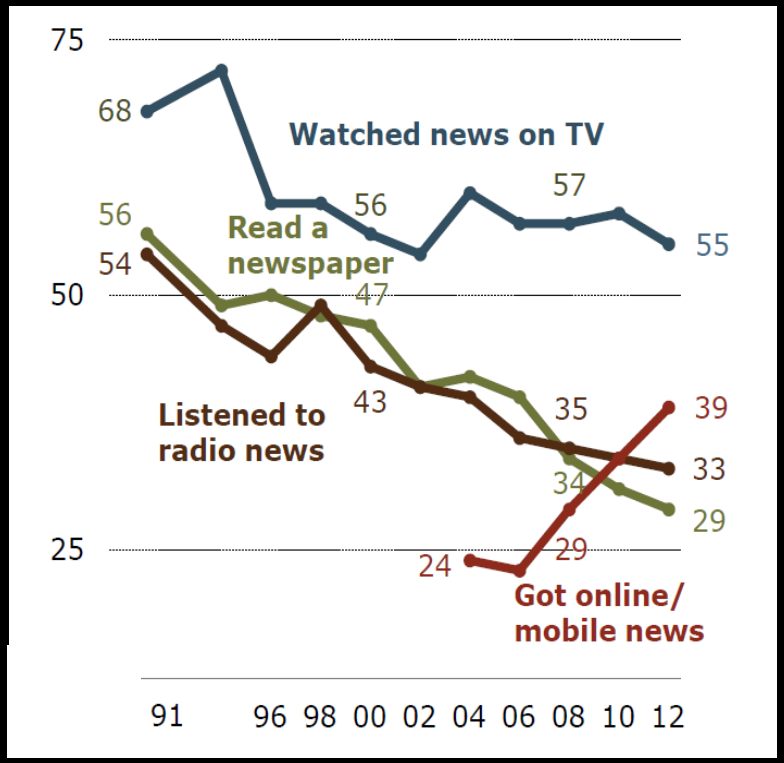
Sentiment Prediction Accuracy

Text	**0.61**
Visual	**0.65**
Text-Visual (Joint)	**0.74**

Demo

Other Impacts of Social-Mobile Media

Where did you get your news yesterday?



News consumption is moving mobile and social

- Access on any device, time, place
- Social sharing

Source: PEW RESEARCH CENTER 2012 News Consumption Survey

How will we watch news in the future?

NBA finals

tech

elections

elections

olympics

Greek riots

Personalized

Uses viewing history and personal data from social media posts

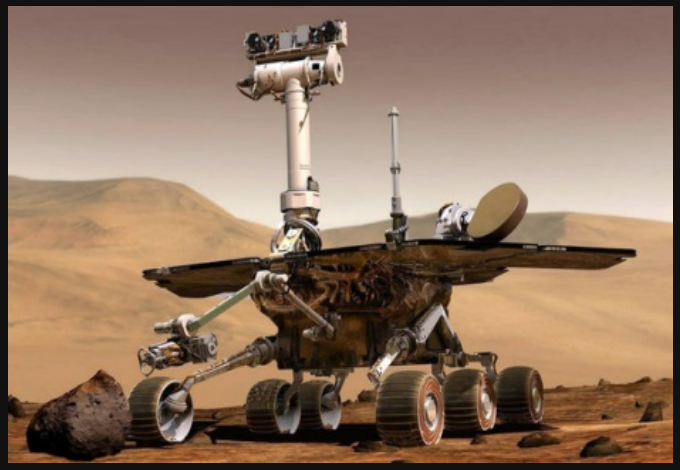
Multiple channels in one stream

Device-agnostic

Videos analyzed and processed in the cloud, then consumed anywhere

NEWS ROVER

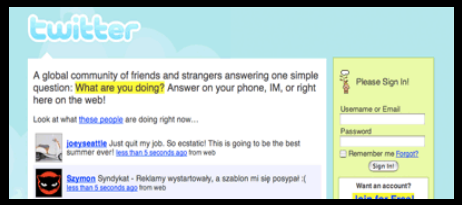
New frontier of *multi-source*, *multi-modal*, *personalized* news exploration



Supported in part by Brown Institute for Media Innovations, in collaboration with Stanford University

Research: Linked Personalized News

Social Media

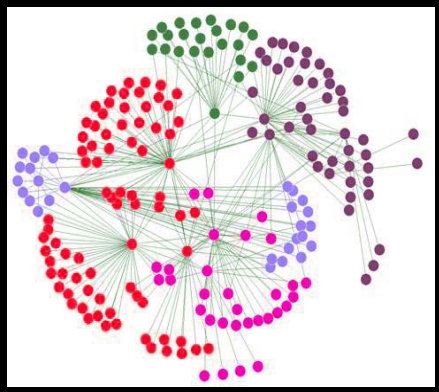


TV Viewing History

Last Monday 7:03pm - 7:49pm

Last Thursday 7:02am - 7:10am

Social Media Network

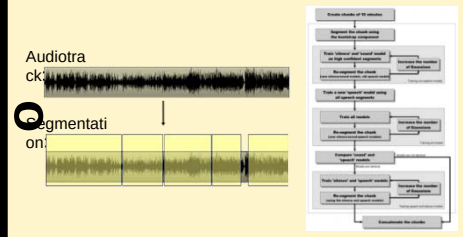


News Topics

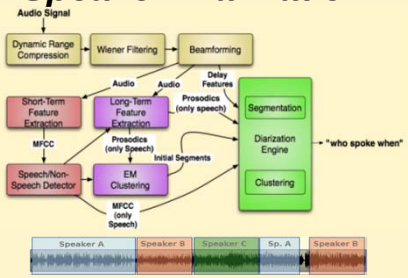
Personalized Stream

Research on Deep Information Extraction
e.g., Detect *Who & What* in News Video

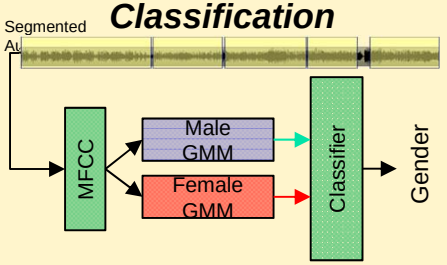
Speech Segmentation



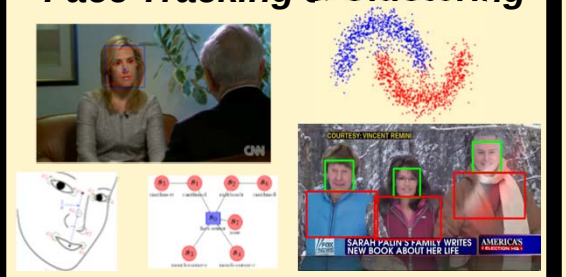
Speaker Diarization



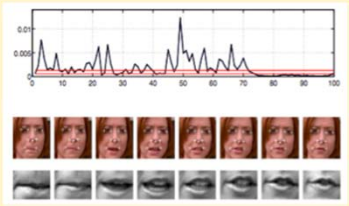
Speaker Gender Classification



Face Tracking & Clustering

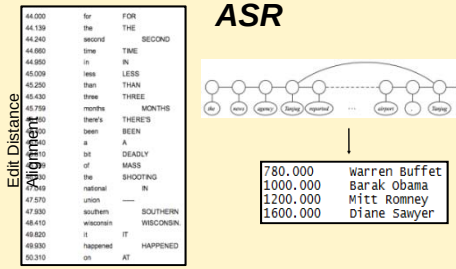


Visual Speaker Detection



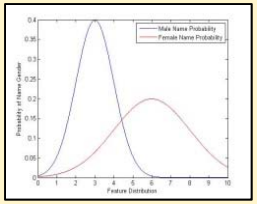
Anchor Detection

Name Extraction from Aligned CC-ASR

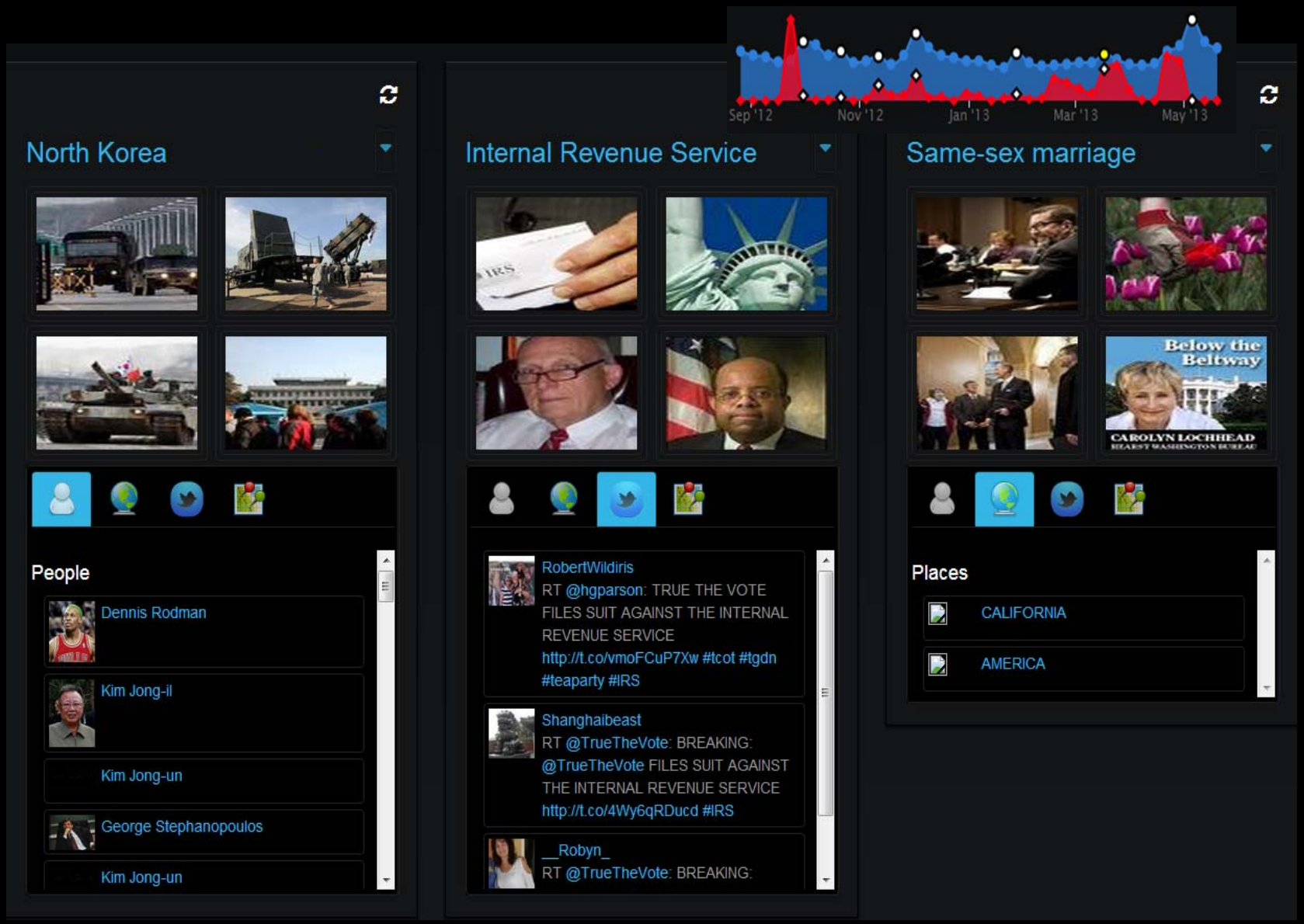


Name Extraction from OCR

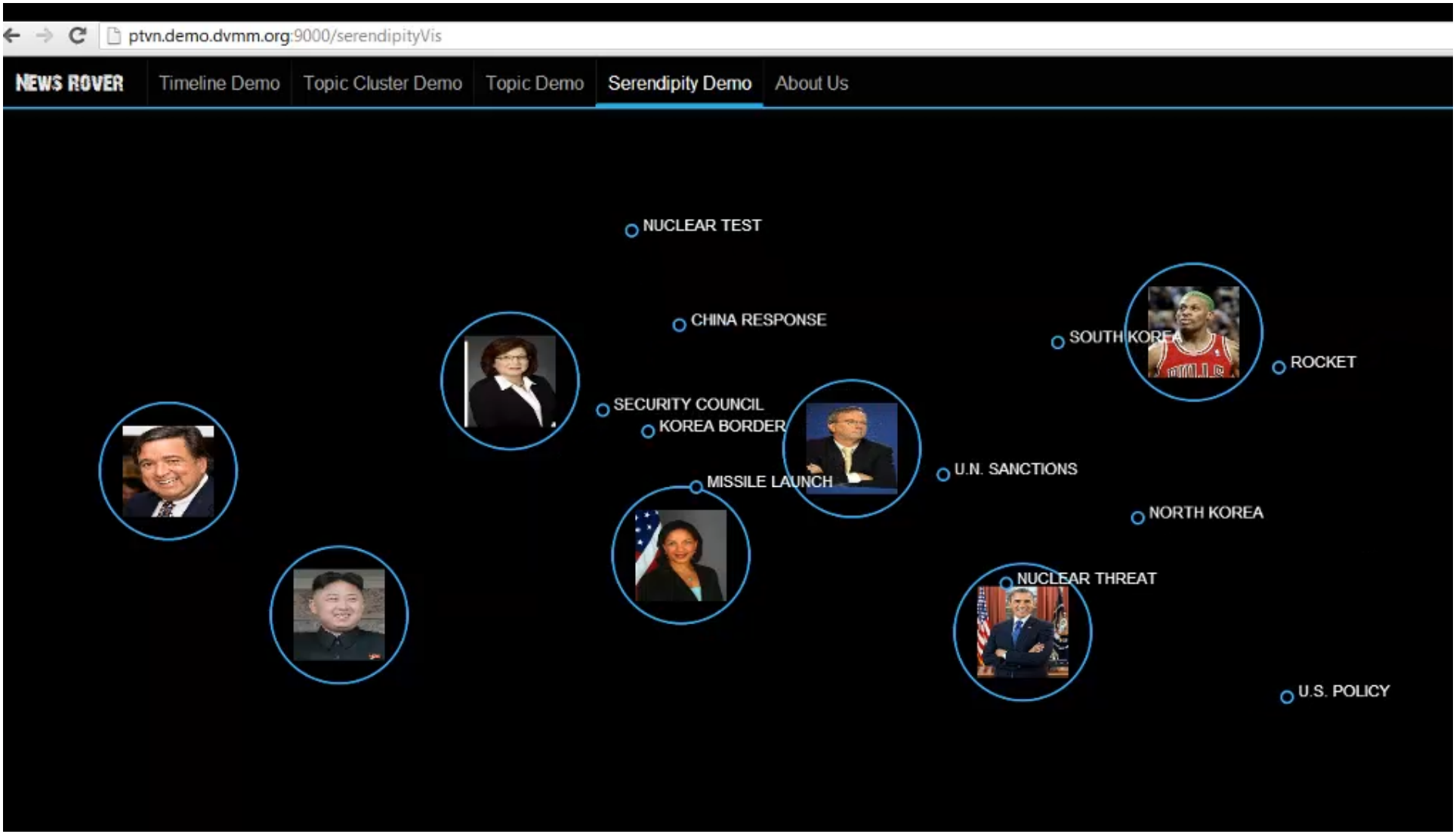
Name Gender Classification



Lean Forward User: Active Social Exploration



Lean Backward User: Show What's New Today

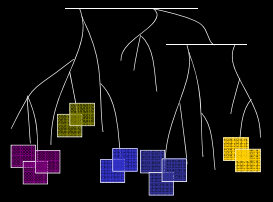


Wonders of Social Mobile Media

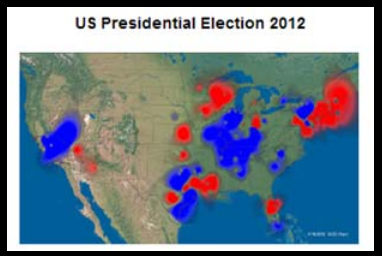
Mobil Social Multimedia

\+

Data Science
Engineering



Smart Living,
Entertainment, News,
Health, Education



NEWS ROVER

New frontier of *multi-source*, *multi-modal*, *personali*
news exploration