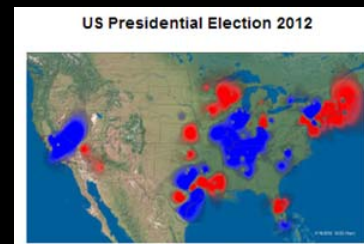


Wonder of Mobile Social Multimedia



NEWS ROVER

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

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

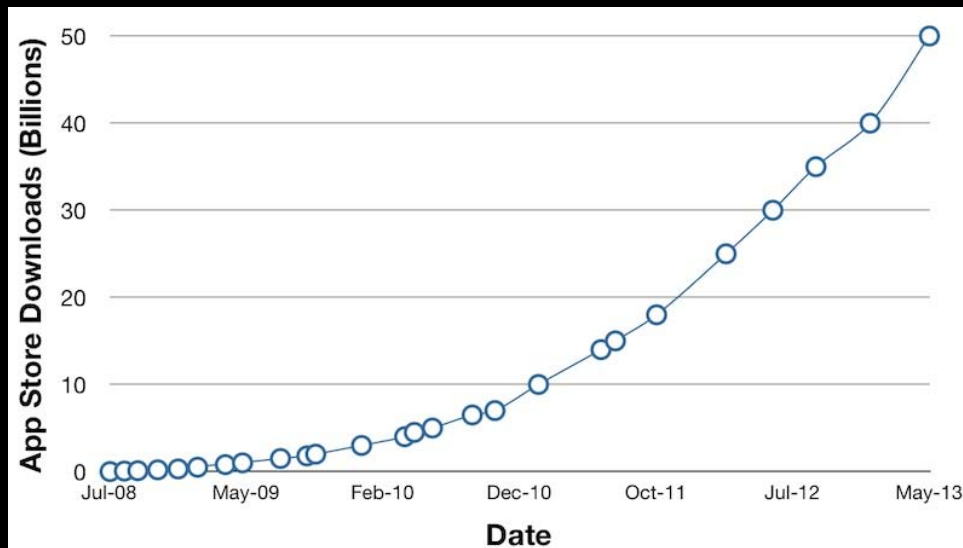
From Photo Shoebox to Social Multimedia



- 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



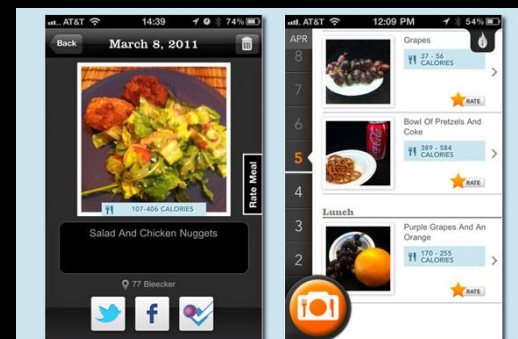
Shazam App, Prof. Ellis

- Find objects you see



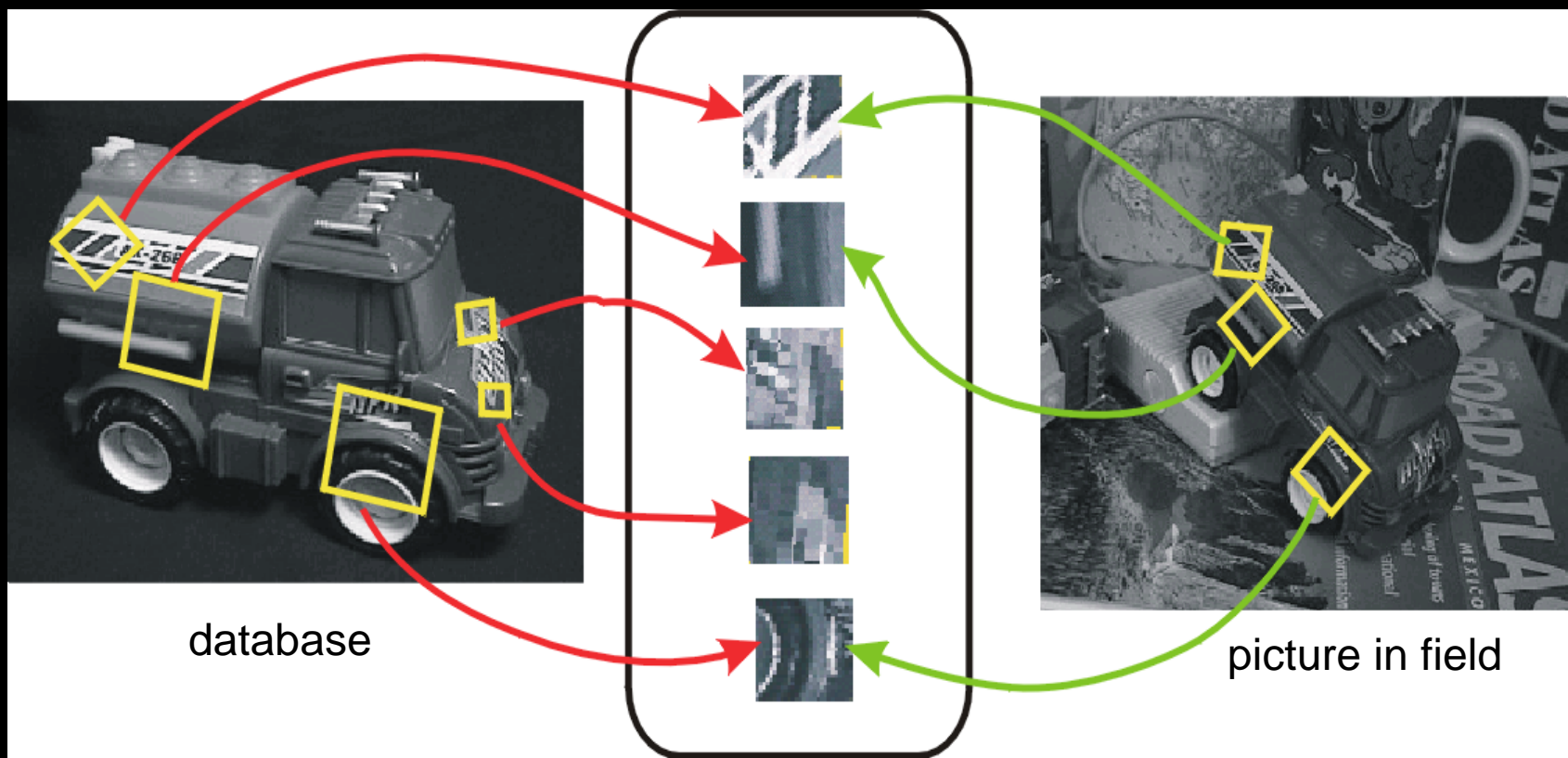
LeafSnap
Prof. Belhumeur

- Watch diet for you



Tell me what foods are in this picture

How Does Automatic Recognition Work?



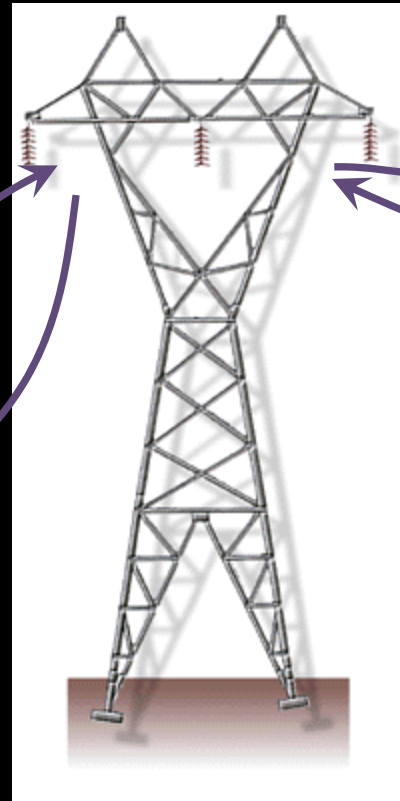
- Find “Important” Feature Points in Pictures, Compute Similarity, and Match Layout

Deploy this over Mobile Networks



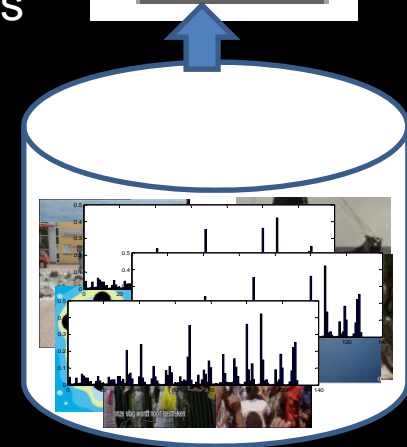
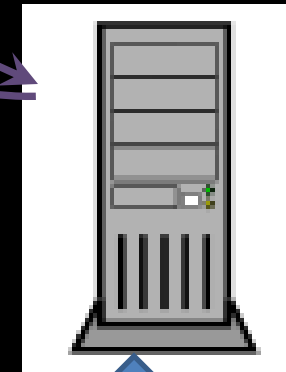
1. Take a picture

2. Send image features

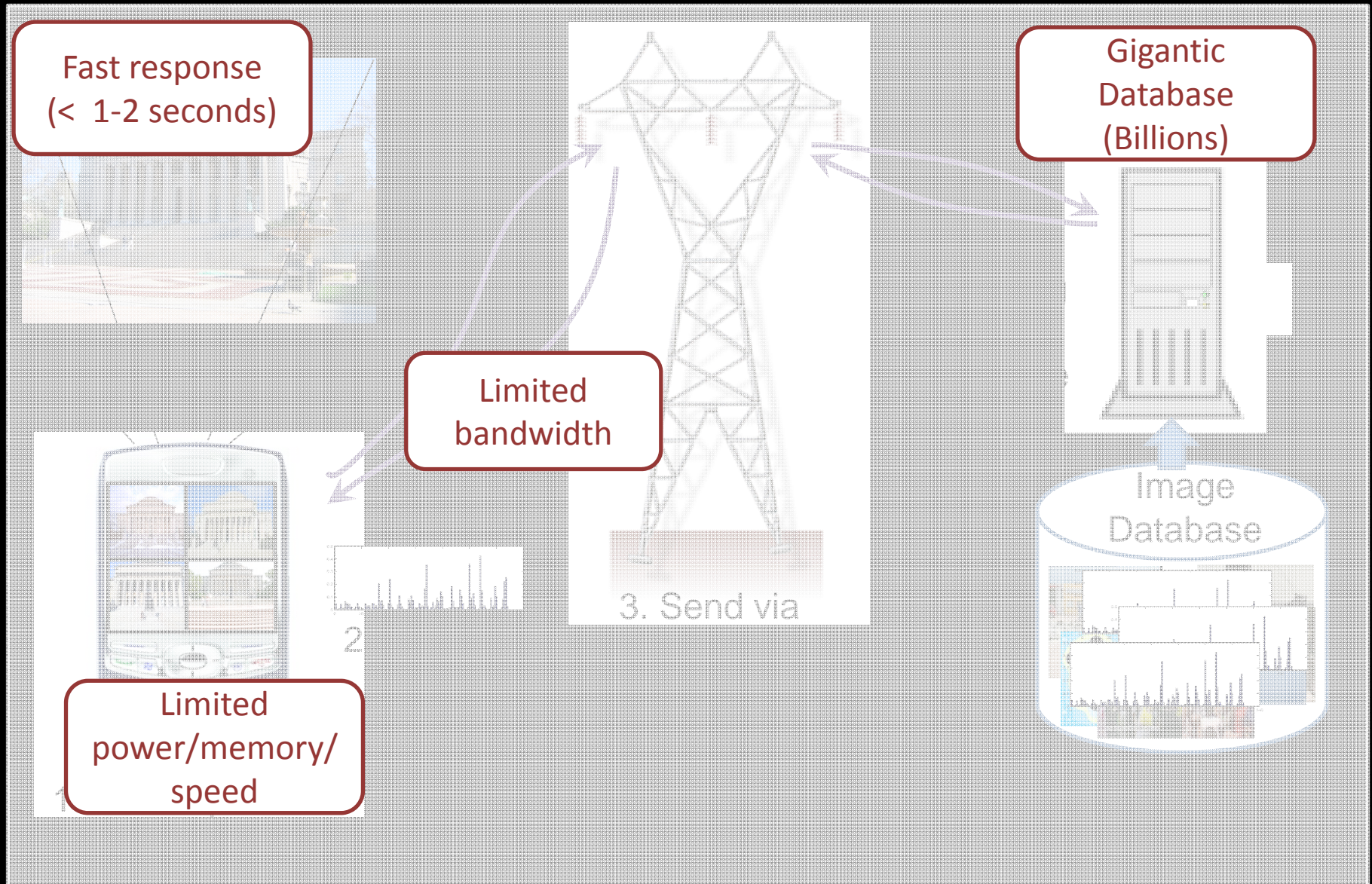


3. Send via mobile networks
5. Send results back

4. Visual matching with database images

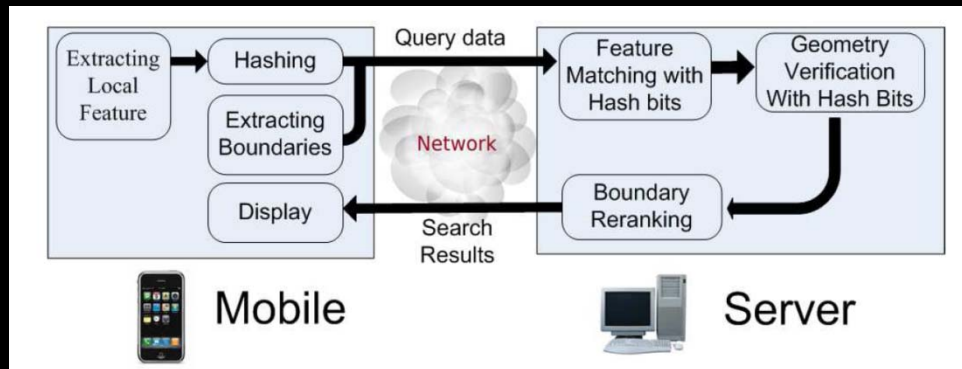


Technical Challenges



Columbia Mobile Product Search System: using Advanced Hash Coding

Columbia DVMM Lab, 2011

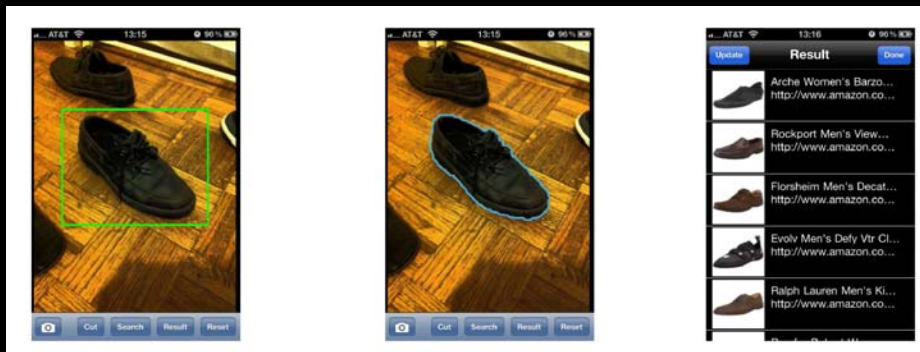


Database:

- 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,

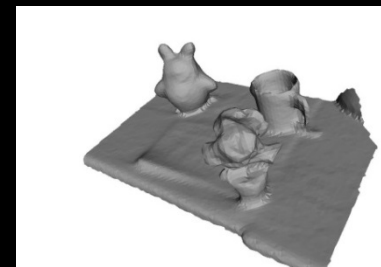
Multi-Player Augmented Reality

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

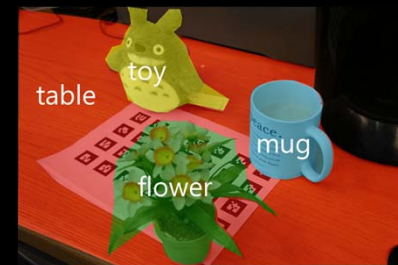


+

=

?

Semantic Labels



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



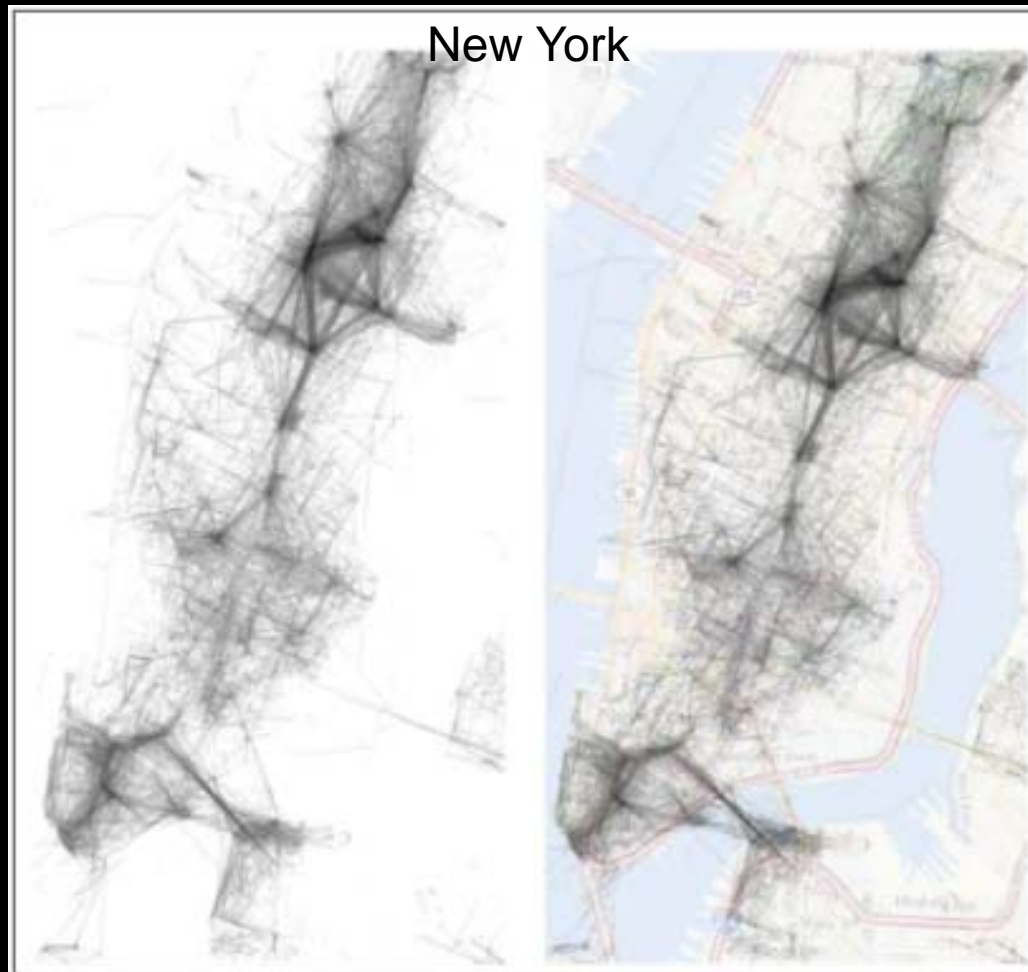
Mobile

Multimedia

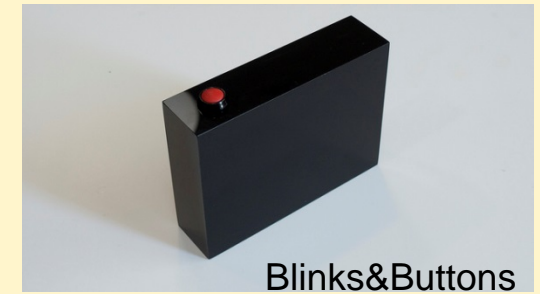
Social

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

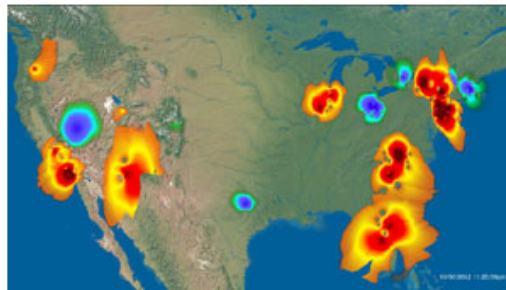


Tracking the Sentiment on Social Media

SGI/Uni. Illinois
Global Twitter Heartbeat

Heat Maps of Sentiment on Twitter

Hurricane Sandy

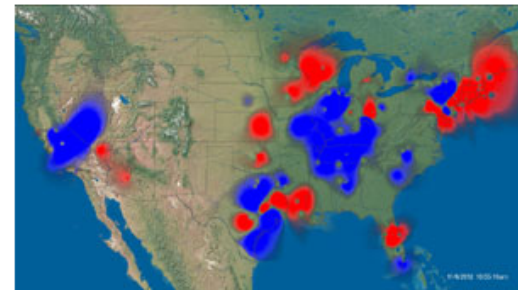


[view larger](#)

RED represents more **Negative** sentiment.
BLUE represents more **Positive** sentiment.

[Download](#) full resolution image (ZIP)

US Presidential Election 2012

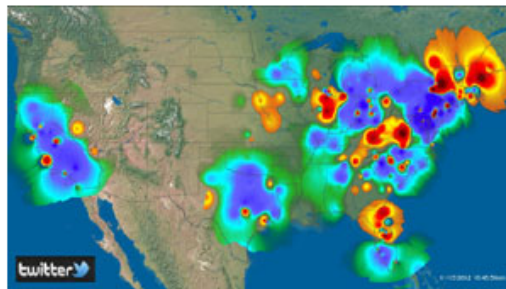


[view larger](#)

RED represents tweets about **Romney**.
BLUE represents tweets about **Obama**.

[Download](#) full resolution image (ZIP)

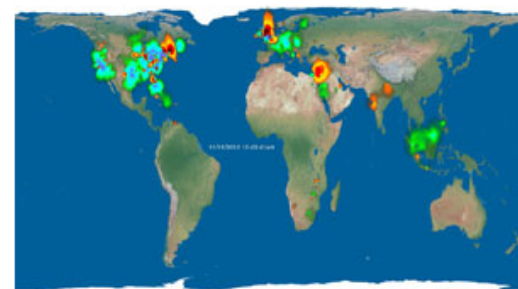
US Sentiment from Live Twitter Feed



[view larger](#)

RED represents more **Negative** sentiment.
BLUE represents more **Positive** sentiment.

Global Sentiment from Live Twitter Feed







[view larger](#)

RED represents more **Negative** sentiment.
BLUE represents more **Positive** sentiment.

Social Media Reveal Many Emotions



Search for “Happiness”


-  **ARTPOP Makes Me Glow** @LadyGagaReturn 43m
Without this woman I would not find **happiness**. I would not have this wonderful family. #GagaYouAreOurHappiness
pic.twitter.com/zpNA4eOU9f
[View photo](#) [Reply](#) [Retweet](#) [Favorite](#) [More](#)
-  **Mikey™** @MikeySoAmazin 1h
You're my baby, my headache, my love, my smile, my frown, my wrong, my right, my pain, my **happiness**, my everything. You're MINE
[Expand](#)
-  **Brain Pickings** @brainpickings 1h
For Mental Health Week, the science of how our mind-wandering is robbing us of **happiness** j.mp/13QCfcz
[Expand](#)
-  **Damn Its TRUE!** @damnitstrue 1h
When you really care about someone, their **happiness** matters more than yours.
[Expand](#)
-  **Facts About Girls!** @girlnotes 1h
Your **happiness** depends on you, & only you.
[Expand](#)
-  **Nikki Woods** @nikkiwoods 1h
The only keeper of your **happiness** is YOU. Stop giving ppl power to control your smile, your worth, your attitude.
[Expand](#)
-  **Sol** @Solzilla 1h
There is no iPhone app for **happiness**... Disconnect and reunite with the real world. #Zilla
[Expand](#)
-  **Because We're Rich** @CauseWereRich 2h
Whoever said you can't buy **happiness**... Was shopping at the wrong store.
[Expand](#)

Emotions across Cultures




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>

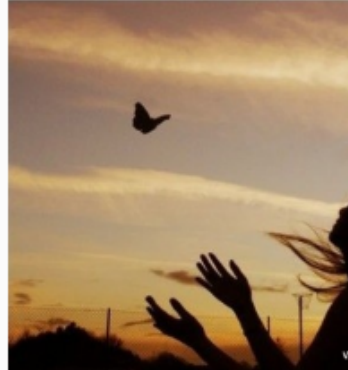


5分钟前 来自开心网

 **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 | 向右转



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**：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，昨天就是拖累今天的包袱。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

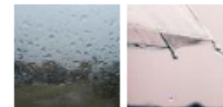
 **北京巴韩颖10**：[微喊话]韩颖于2012年3月3日交到海淀法院立案庭的
三个案子到现在已经449天了，多次催促立案，海淀法院武会珍庭长坚定
地说：立不了案！但始终不说因什么原因立不了案。这个案子有明确的
被告，有明确的诉讼请求，有基本的证据，属于你院管辖，请武庭长依
法做出立案或不立案裁定。期盼立案，渴望幸福



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
上眼睡一个回笼觉。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.

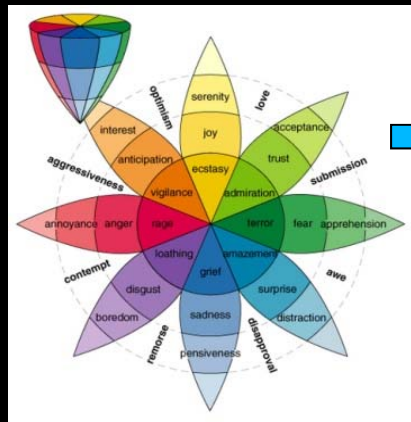


@Fang-Ru: Queen of the far far away land.

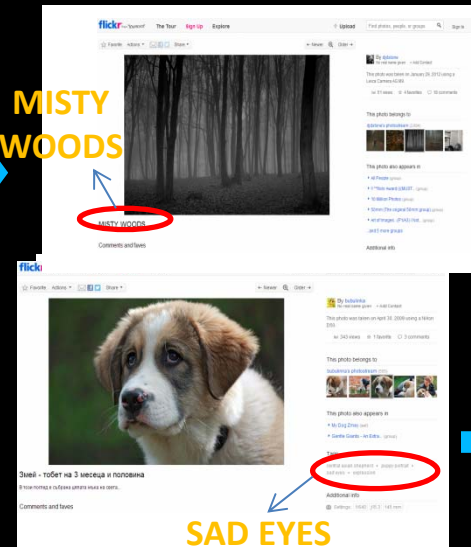


Research: Which 1000 sentimental concepts?

-- data mining to discover visual sentiments in social media



Psychology emotion wheel (24 emotions)

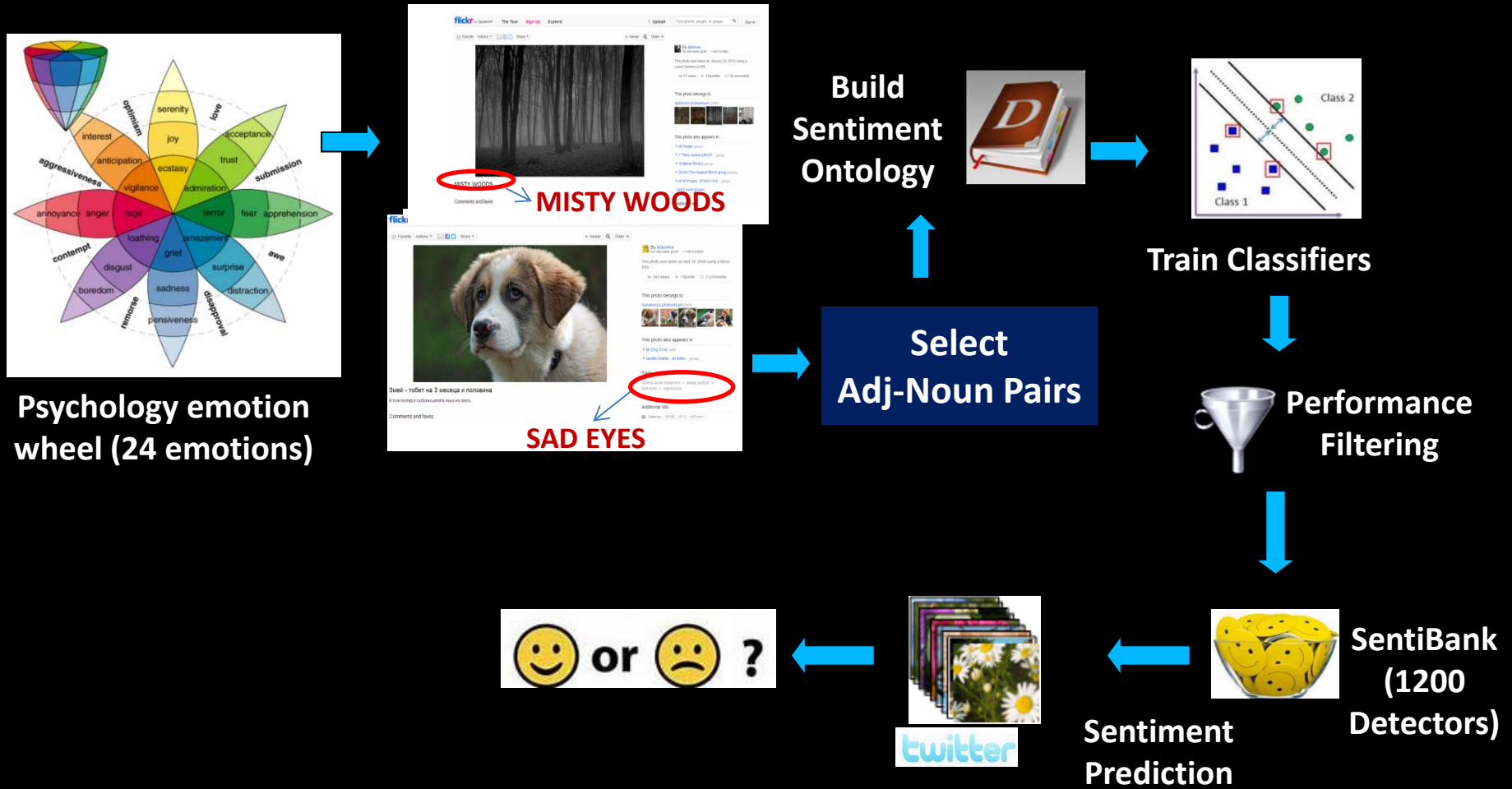


Build Sentiment Ontology



Select Adj-Noun Pairs

Research: Teach Machine to Recognize Visual Sentiments



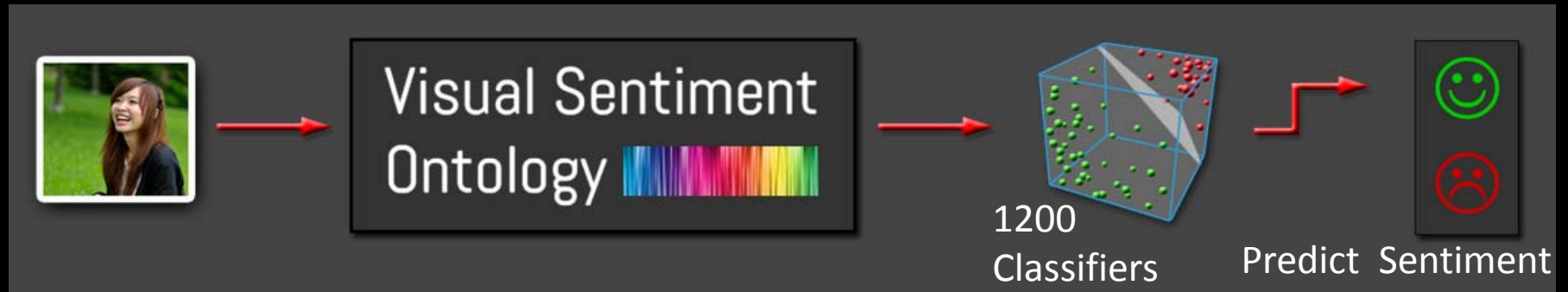
Beautiful flower
Happy face



Machine Detected Visual Sentiments
More than 600 classifiers > 78% accuracy

Green: correct Red: incorrect

Columbia Visual SentiBank System



PhotoTweet Stream:

"A person is...
no matter how...
~Dr. S...

#groundzero #hurric
#newjersey
@charleslawrence

Ouch mr police man
@radiodario

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

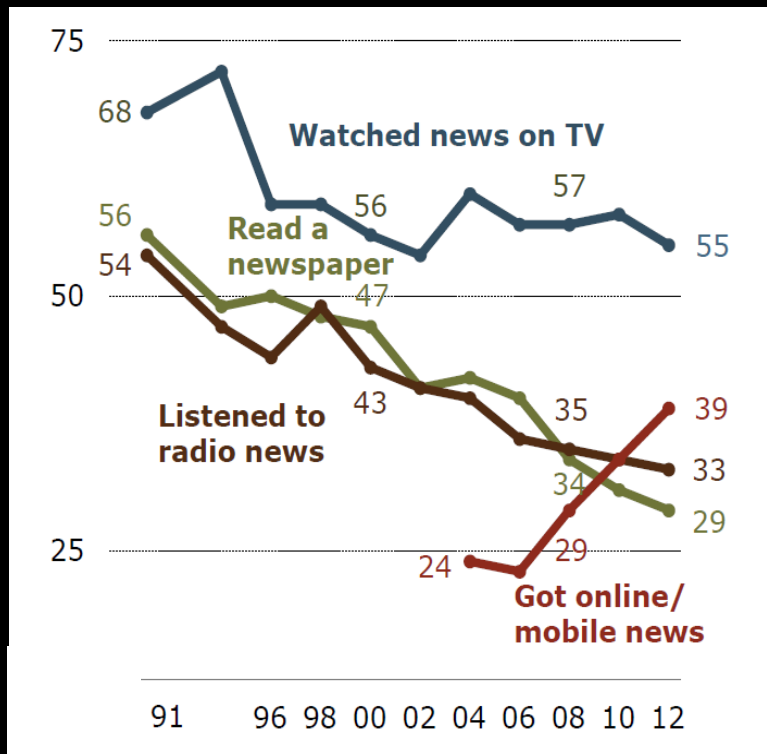
Sentiment Prediction Accuracy

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

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



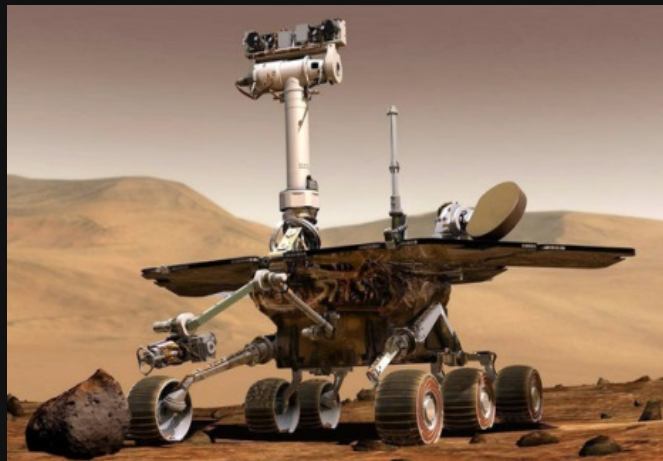
Device-agnostic



Videos analyzed and processed in the cloud, then consumed anywhere

NEWS ROVER

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



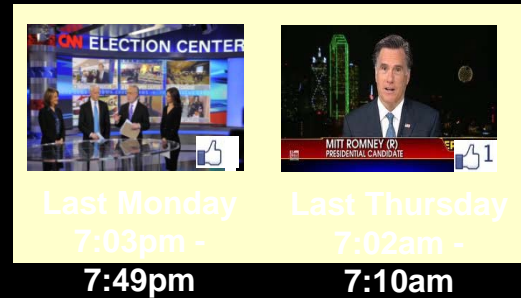
Supported in part by Brown Institute for Media Innovations, in collaboration with Stanford University

Research: Linked Personalized News

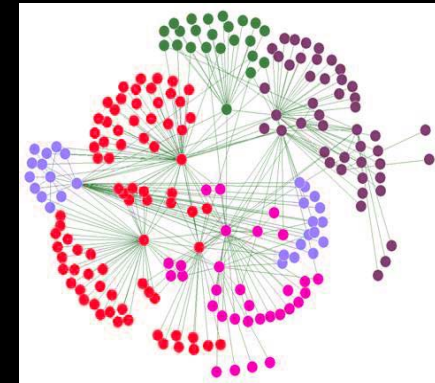
Social Media



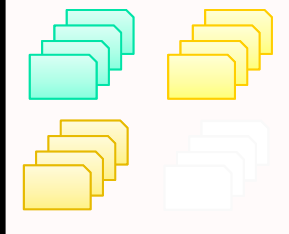
TV Viewing History



Social Media Network



News Topics



Personalized Stream



Research on Deep Information Extraction

e.g., Detect *Who & What* in News Video

Speech Segmentation

Audio signal is processed through various steps including dynamic range compression, Wiener filtering, beamforming, and segmentation. The process involves extracting short-term and long-term features, using MFCC and prosodic information, and applying an EM clustering algorithm to identify initial segments. The final output is a segmented audio signal with diarization labels.

Speaker Diarization

The process starts with an audio signal, which is processed through dynamic range compression, Wiener filtering, and beamforming. It then branches into short-term and long-term feature extraction, and MFCC extraction. These features are used for prosodic analysis and an EM clustering algorithm to identify initial segments. The diarization engine then clusters these segments to identify speakers, resulting in a diarized audio signal with labels like Speaker A, Speaker B, Speaker C, Sp. A, and Speaker B.

Speaker Gender Classification

Segmented audio is processed by MFCC. The resulting features are fed into two separate Gaussian Mixture Models (GMM) for Male and Female. The outputs of these GMMs are then combined and passed through a Classifier to determine the final Gender.

Face Tracking & Clustering

The process involves tracking faces in a video frame and clustering them based on facial features. The resulting clusters are used for speaker identification and diarization.

Visual Speaker Detection

The graph shows the detection of visual speakers over time, with peaks corresponding to the presence of a speaker. Below the graph, a series of face images are shown, illustrating the visual speaker detection process.

Anchor Detection

The process involves detecting news anchors in a video frame. The resulting anchors are used for speaker identification and diarization.

Name Extraction from Aligned CC-ASR

The process involves extracting names from aligned CC-ASR. The resulting names are used for speaker identification and diarization. The diagram shows the edit distance and alignment between the original text and the extracted names.

44.000	for	FOR
44.150	the	THE
44.240	second	SECOND
44.660	time	TIME
44.800	in	IN
45.000	less	LESS
45.250	than	THAN
45.430	three	THREE
45.770	months	MONTHS
46.000	there's	THERE'S
46.100	been	BEEN
46.200	a	A
46.300	bit	BIT
46.400	of	OF
46.500	the	THE
46.600	shooting	SHOOTING
46.700	national	NATIONAL
46.800	in	IN
47.000	southern	SOUTHERN
48.410	wisconsin	WISCONSIN
48.800	it	IT
49.000	happened	HAPPENED
50.310	on	AT

780.000 Warren Buffet
1000.000 Barak Obama
1200.000 Mitt Romney
1600.000 Diane Sawyer

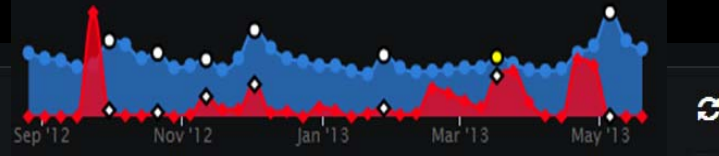
Name Extraction from OCR

The process involves extracting names from OCR in a news video frame. The resulting names are used for speaker identification and diarization.

Name Gender Classification

The graph shows the probability of a name being male or female based on the feature distribution. The resulting probabilities are used for speaker identification and diarization.

Lean Forward User: Active Social Exploration



North Korea




People


-  Dennis Rodman
-  Kim Jong-il
- Kim Jong-un
-  George Stephanopoulos
- Kim Jong-un

Internal Revenue Service



 RobertWildiris
RT @hgparson: TRUE THE VOTE FILES SUIT AGAINST THE INTERNAL REVENUE SERVICE
<http://t.co/vmoFCuP7Xw> #tcot #tgdn #teaparty #IRS



 Shanghaibeast
RT @TrueTheVote: BREAKING: @TrueTheVote FILES SUIT AGAINST THE INTERNAL REVENUE SERVICE
<http://t.co/4Wy6qRDucd> #IRS

 _Robyn_
RT @TrueTheVote: BREAKING:

Same-sex marriage



Places

-  CALIFORNIA
-  AMERICA

Lean Backward User: Show What's New Today

← → ↻ ptnv.demo.dvmm.org:9000/serendipityVis

NEWS ROVER | Timeline Demo | Topic Cluster Demo | Topic Demo | **Serendipity Demo** | About Us

Diagram illustrating a network of news topics and related images:

- NUCLEAR TEST
- CHINA RESPONSE
- SOUTH KOREA
- ROCKET
- SECURITY COUNCIL KOREA BORDER
- MISSILE LAUNCH
- U.N. SANCTIONS
- NORTH KOREA
- NUCLEAR THREAT
- U.S. POLICY

Images shown in the diagram include:

- A man in a suit (left).
- A woman in a dark jacket (top left).
- A man in a dark suit (center).
- A woman in a dark jacket (bottom center).
- A man in a red jersey (right).
- A man in a dark suit (bottom right).
- A man in a dark suit (bottom right, overlapping 'NUCLEAR THREAT').
- A man in a dark suit (bottom right, overlapping 'U.S. POLICY').

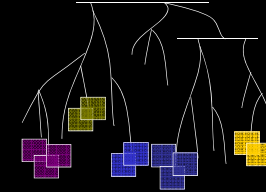
Wonders of Social Mobile Media

Mobil Social Multimedia

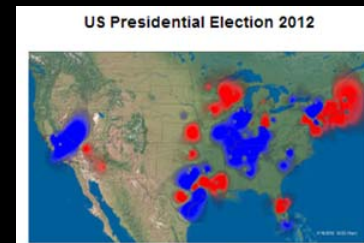
Data Science
Engineering



+



Smart Living,
Entertainment, News,
Health, Education



NEWS ROVER
New frontier of *multi-source, multi-modal, personal*
news exploration