Words and Pictures

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Words and Pictures

- Numerous large collections of objects containing both
  - often, relations are informative
    - e.g. news stories reuse pictures

Chinese President Jiang Zemin (news - web sites) and President Bush (news - web sites) wrap up a press conference following their private meeting at Bush's ranch in Crawford, Texas, Friday, Oct. 25, 2002. The two leaders agreed to seek a peaceful resolution to the crisis that was triggered when North Korea (news - web sites) announced it's developing nuclear weapons. (AP Photo/J. Scott Applewhite)

Yahoo News

Story 1 *Beijing and Washington have consolidated their "constructive, cooperative relationship" based on a new partnership of fighting global terrorism and nuclear proliferation. In his summit with President Jiang Zemin in the Bush family ranch in Crawford, Texas, President George W. Bush characterized the two countries as "allies in the fight against global terror." This was despite Beijing's non-committal stance on Washington's draft UN resolution on Iraq.*

theme: US-China Diplomacy

BBC-1

Story 2 *A key protégé of President Jiang Zemin has emerged as the frontrunner to become Executive Vice-Premier, one of the most powerful posts in China. Former Communist party secretary of Shanghai Huang Ju is also tipped to be inducted into the seven-man Politburo Standing Committee, the country's supreme ruling council. The incumbent Executive Vice-Premier, Li Lanqing, 70, who is also a PSC member, is due to retire at the 16th party congress next month.*

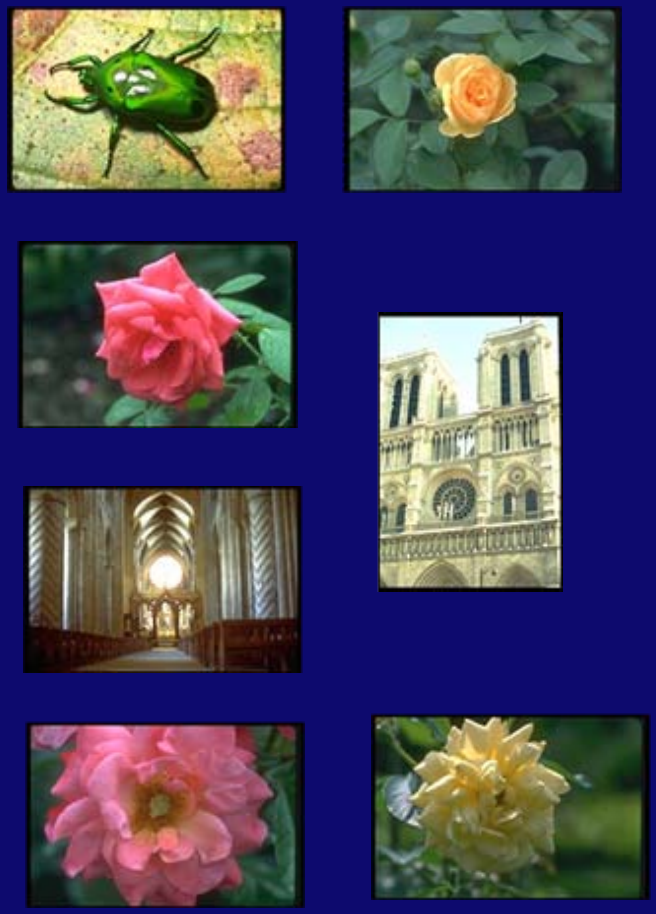
theme: Chinese Politics

BBC-2

Annotation results in complementary words and pictures

Query on

“Rose”



Example from Berkeley Blobworld system

Annotation results in complementary words and pictures

Query on

Example from Berkeley
Blobworld system

Annotation results in complementary words and pictures

Query on

“Rose”

and

Example from Berkeley Blobworld system

Clustering words and pictures

- Lay out and browse the clusters
- Build a joint probability model linking words and pictures
- Use Hoffman’s hierarchical aspect model

[Hofmann 98; Hofmann & Puzicha 98]

Input

"This is a picture of the sun setting over the sea with waves in the foreground"

Image processing*

Each blob is a large vector of features

- Region size
- Position
- Colour
- Oriented energy (12 filters)
- Simple shape features

Language processing

sun sky waves sea

* Thanks to Blobworld team [Carson, Belongie, Greenspan, Malik], N-cuts team [Shi, Tal, Malik]

FAMSF Data

Web number: 4359202410830012

rec number: 2

Title: Le Matin

Primary class: Print

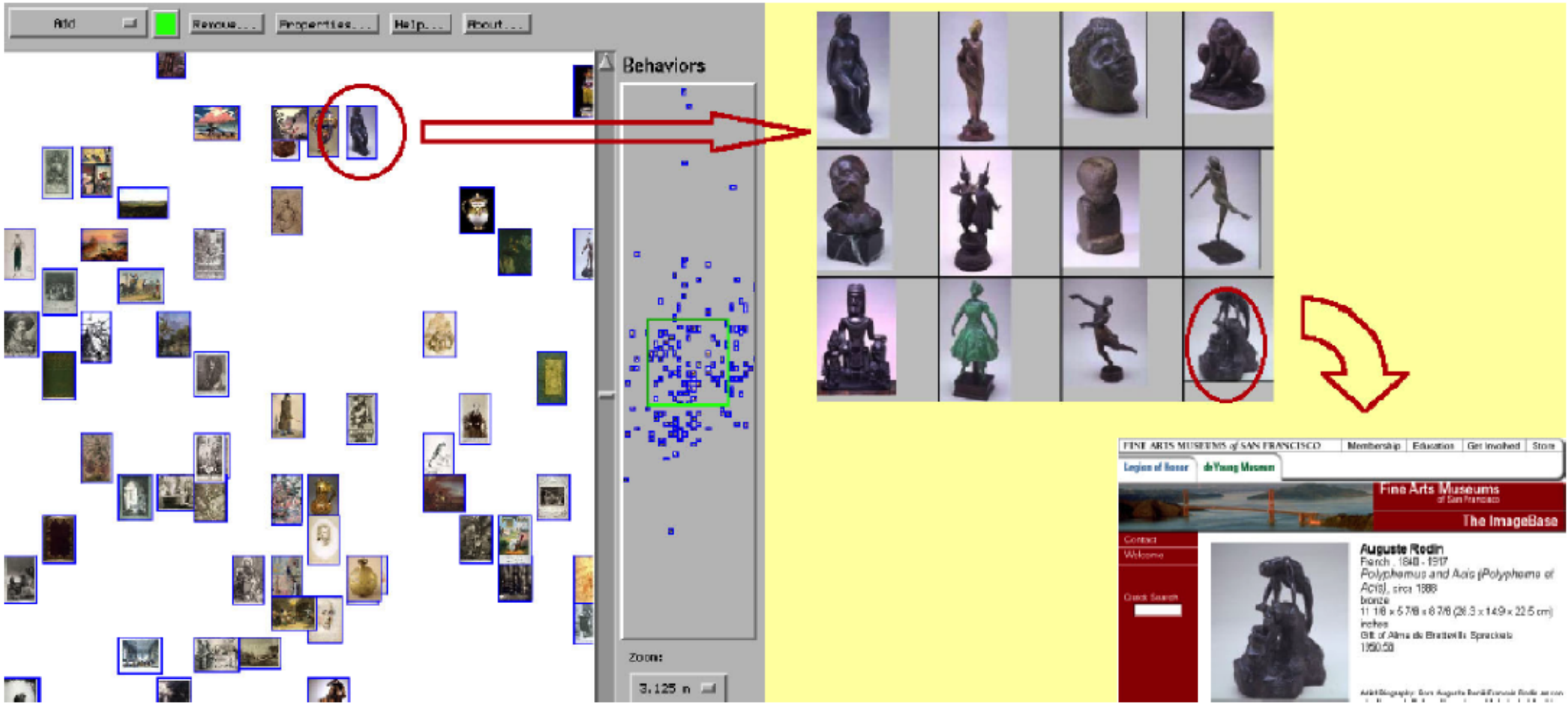
Artist: Tissot

Description:
serving woman stands in a dressing room, in front of vanity with chair, mirror and mantle, holding a tray with tea and toast

Display date: 1886

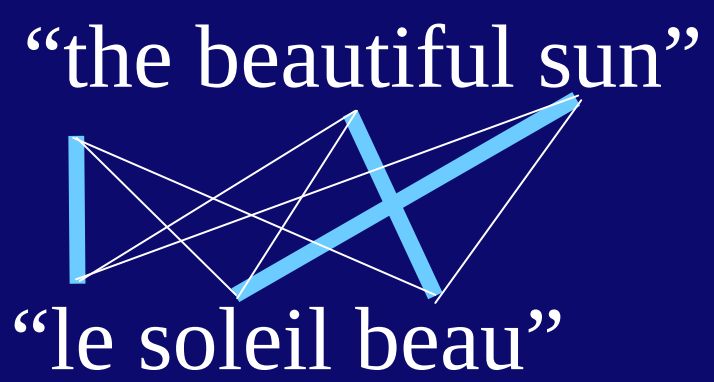
Country: France

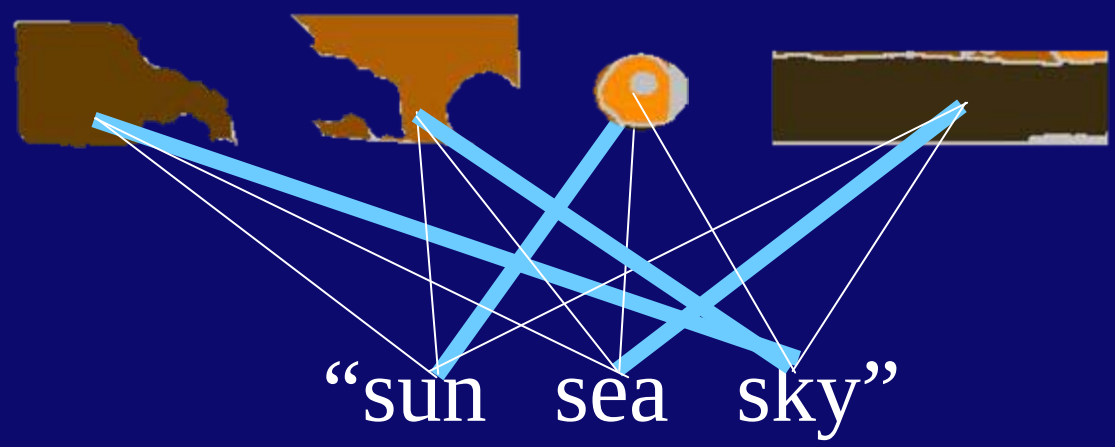
83,000 images online, we clustered 8000


Add
Revoue...
Properties...
Help...
About...
Behaviors
Zoom:
3.125 n
FINE ARTS MUSEUMS of SAN FRANCISCO
Membership
Education
Get Involved
Store
Legion of Honor
deYoung Museum
Fine Arts Museums
of San Francisco
The ImageBase
Contact
Welcome
Quick Search
Auguste Rodin
French, 1840 - 1917
Polyphemus and Acis (Polyphème et Acis), circa 1888
bronze
11 1/8 x 5 7/8 x 6 7/8 (28.3 x 14.9 x 22.5 cm)
inches
Gift of Alma de Bretteville Spreckels
1950.58

Lexicon building

- In its simplest form, missing variable problem
- Pile in with EM
  - given correspondences, conditional probability table is easy (count)
  - given cpt, expected correspondences could be easy
- Caveats
  - might take a lot of data; symmetries, biases in data create issues



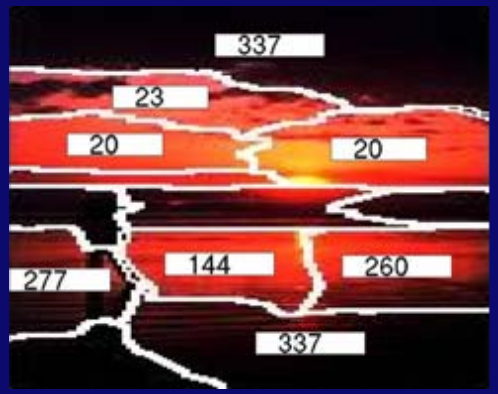


Brown, Della Pietra, Della Pietra & Mercer 93; Melamed 01

city mountain sky sun

jet plane sky

cat forest grass tiger



beach people sun water

jet plane sky

cat grass tiger water

“Lexicon” of “meaning”

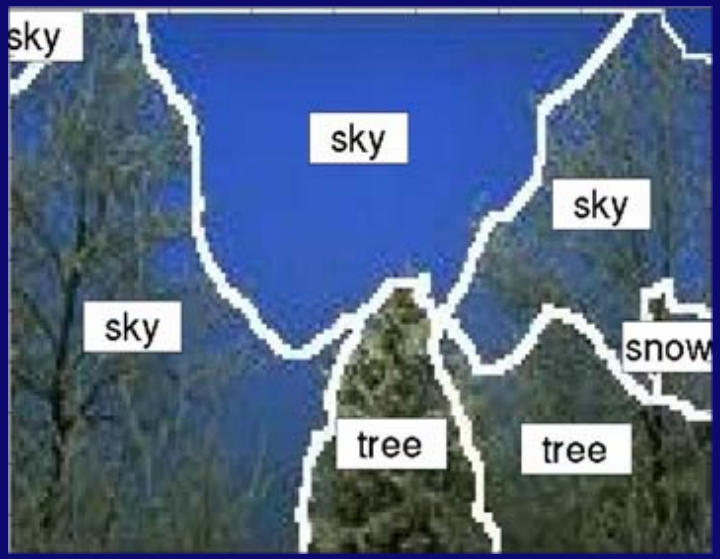
sun

sky

cat

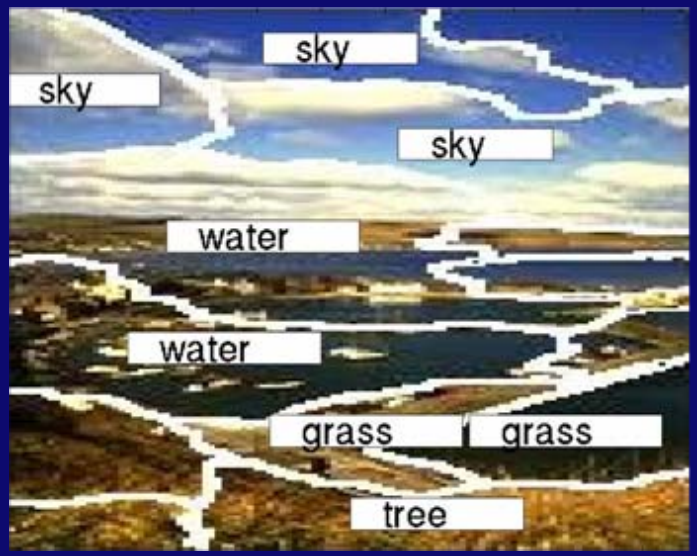
horse

This could be either a conditional probability table or a joint probability table; each has significant attractions for different applications


sky
sky
sky
sky
snow
tree
tree

sky
sky
water
buildings
sky
tree
buildings
buildings

rocks
sky
water
beach
tree
people
street
cars


sky
sky
sky
water
water
grass
grass
tree

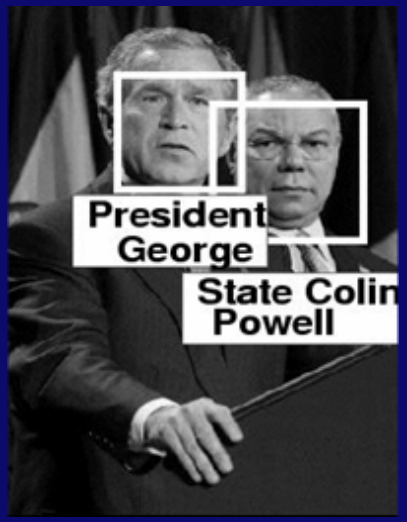
Harvesting knowledge with pictures

- Pictures:
  - link stories in ways that words cannot
  - associate with stories in ways that reveal important changes in the story
  - reveal information that words cannot
- Understanding image information to:
  - Identify participants
  - Reason about what people are doing
  - Find and label important objects
  - Learn about new objects
- Topic developed by UIUC researcher (Forsyth); now a major topic in computer vision

President George W. Bush makes a statement in the Rose Garden while Secretary of Defense Donald Rumsfeld looks on, July 23, 2003. Rumsfeld said the United States would release graphic photographs of the dead sons of Saddam Hussein to prove they were killed by American troops. Photo by Larry Downing/Reuters

Linking Names and Faces

- Link faces in images with names in captions using EM, face detector, face representation.



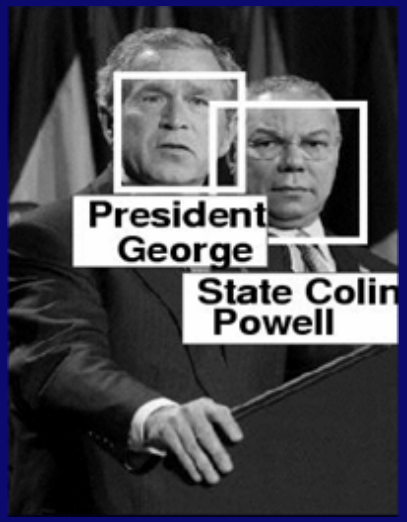
US President George W. Bush (L) makes remarks while Secretary of State Colin Powell (R) listens before signing the US Leadership Against HIV /AIDS , Tuberculosis and Malaria Act of 2003 at the Department of State in Washington, DC. The five-year plan is designed to help prevent and treat AIDS, especially in more than a dozen African and Caribbean nations(AFP/Luke Frazza)

German supermodel Claudia Schiffer gave birth to a baby boy by Caesarian section January 30, 2003, her spokeswoman said. The baby is the first child for both Schiffer, 32, and her husband, British film producer Matthew Vaughn, who was at her side for the birth. Schiffer is seen on the German television show 'Bet It...?!' ('Wetten Dass...?!') in Braunschweig, on January 26, 2002. (Alexandra Winkler/Reuters)

British director Sam Mendes and his partner actress Kate Winslet arrive at the London premiere of 'The Road to Perdition', September 18, 2002. The films stars Tom Hanks as a Chicago hit man who has a separate family life and co-stars Paul Newman and Jude Law. REUTERS/Dan Chung

Privacy from face detection

- Because we can detect, name faces, we can redact datasets



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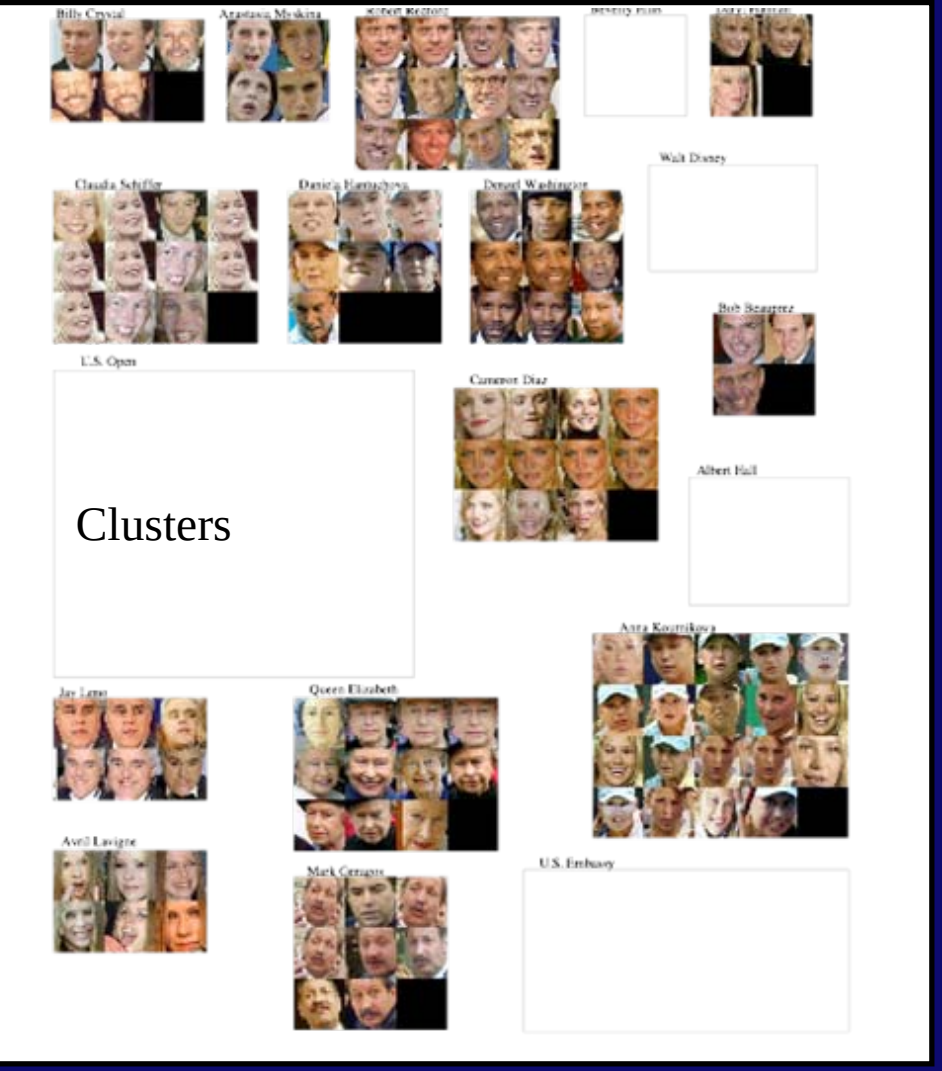
Language contributes

Sahar Aziz, left, a law student at the University of Texas, hands the business card identifying Department of the Army special agent Jason D. Treesh to one of her attorneys, Bill Allison, right, during a news conference on Friday, Feb. 13, 2004, in Austin, Texas. In the background is Jim Harrington, director of the Texas Civil Rights Project. (AP Photo Harry Cabluck)

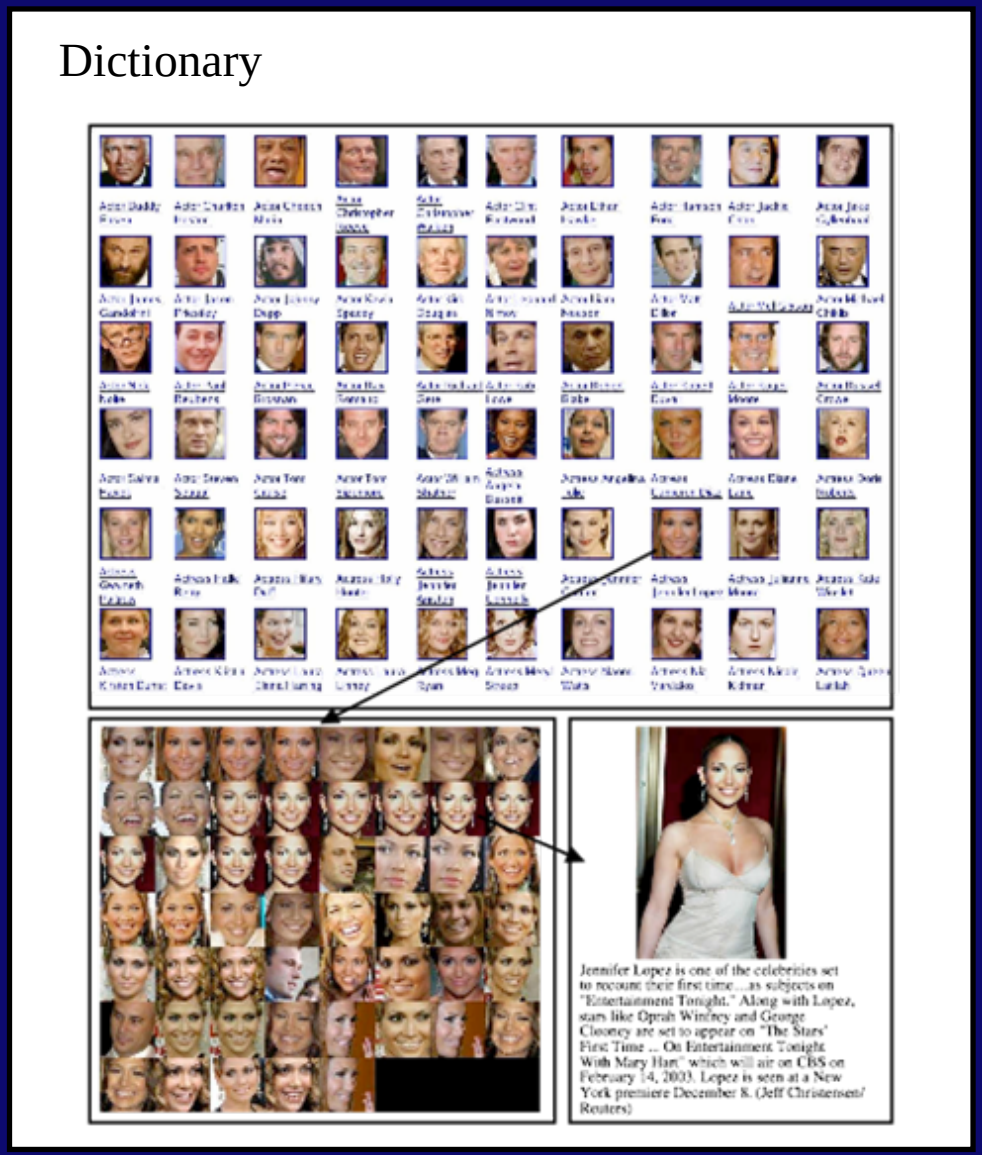
Language improves naming,

Model	EM	MM
Appearance Model, No Lang Model	56%	67%
Appearance Model + Lang Model	72%	77%



Link faces to names by: finding faces; computing representation of face; EM procedure estimates which names are depicted, assigns faces to depicted names.

Result: huge dictionary of faces "in the news", linking names to face examples and stories



Unstructured objects

- Methods above link structured text and known relevant images.

- What if
  - we haven’t got captions (so don’t know that text refers to image)
  - range of topics is broader
- We can still obtain information
  - topics near images in physical layout tend to be diagnostic
- Demonstration
  - We obtain huge collections of examples of images of animals by searching for web pages that have relevant text, and have images that are similar to examples.

Berg+Forsyth, 06

Berg+Forsyth, 06

Summary

- Text and images within pages are often complementary
- Many such objects have quite rigid and exploitable structure
  - face dictionary
  - faces in the wild
- Relations are revealing even in unstructured objects
- Possible applications
  - what does publication reveal?
  - identify otherwise difficult links between stories
  - build computer vision datasets