

Introduction to Media Computing

Lecture 1: Introduction

Lecturer: Zechao Li (李泽超)

Outline

- **Objectives and Expected Outcome**
- **Course Arrangements**
- **History of Media Search Engines**
- **Applications of Media on the Web**
- **Summary**

Why?

- **Multimedia is cool**
 - Media -> Multimedia
 - Everywhere
 - Requires broad knowledge in mathematics, signal processing, communications, networking, software, hardware,
 - You are paid to watch movies in your office !
- **Job opportunities**
 - Multimedia is a booming industry
 - in the metro Vancouver area
 - Tons of opportunities created by next-generation standards and emerging applications:
 - JPEG/JPEG 2000
 - MPEG-1/2/4 H.264/265/HEVC 4K UHD 3D/freeview
 - 3G/4G/5G mobile communications
 - Multimedia-enabled smartphone, tablets
 - Social media, Cloud media, Crowd media
 - Online gaming

Aims and Objectives:

- This module introduces students to the concepts, issues, design, implementation, standards and applications of multimedia technologies:
with special emphasis on media representation, standards, content analysis and search
- The module is divided into 2 parts:
 - 1) Fundamentals and Standards of Digital Media
 - 2) Text, Image and Audio Search

Fundamentals & Standards of Digital Media:

- Most important development in media processing is the standardization of audio, image and video standards, in terms of MP3, JPEG and MPEG
 - They are used everywhere, and promoted the wide spread use of audios/images/videos on the Web
 - Students must have fundamental understanding of the compression schemes, and their strengths and limitations
- This module will cover:
 - Fundamentals of digital media
 - Compression techniques
 - Audio standards
 - JPEG, MPEG (for movies) and H26x (for video conferencing)

Text, Audio and Image Search:

- Search is a fundamental tool for information access and management, be it on the Web or on local file system
- Search, esp. media search, is becoming active (both commercial and in research) because of the exponential growth of social media contents
- Issues to be discussed:
 - Representation of text, audio and image content
 - Similarity match between a query and the database items
 - Bridging of semantic and user intention-gaps in retrieval
 - Backend architecture
 - Search engine design and implementation

Examples of Media Search -1

- Google/ Bing/ Baidu Search Engines: Support text and image search etc.

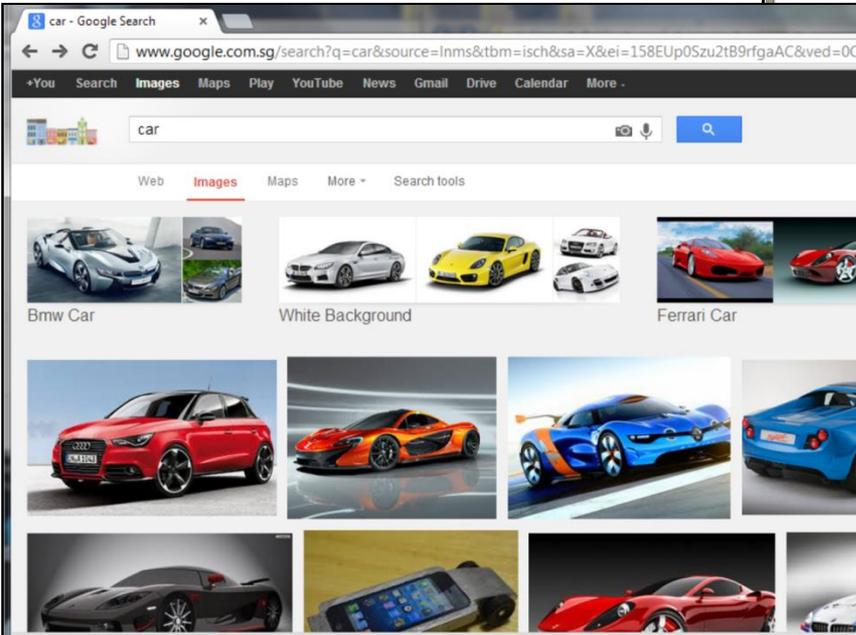
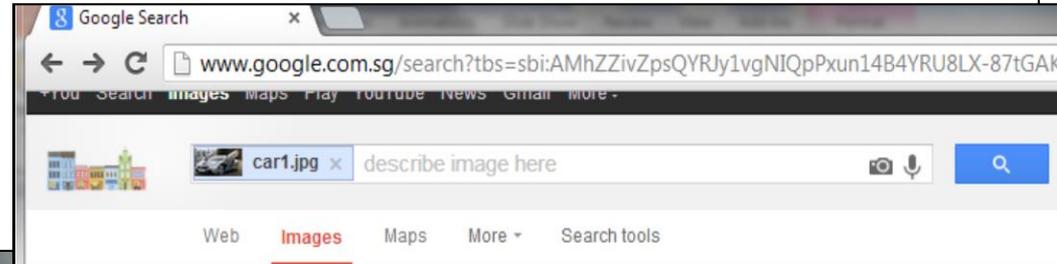
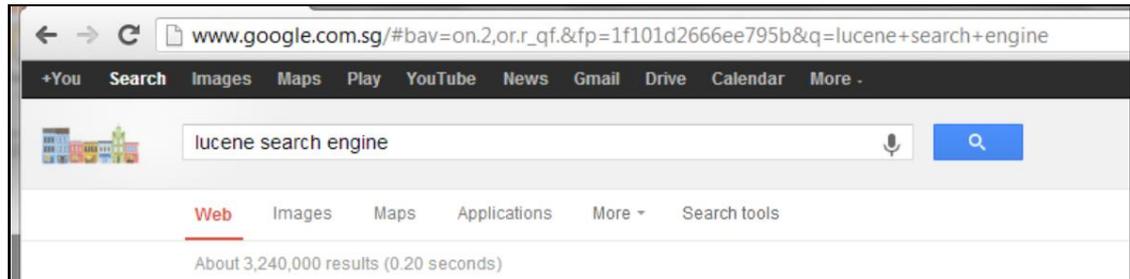


Image size:
300 × 168

Find other sizes of this image:
All sizes - Small - Medium - Large

Best guess for this image: [bmw i8 hybrid](#)

[BMW i8 - Wikipedia, the free encyclopedia](#)
en.wikipedia.org/wiki/BMW_i8

The BMW i8, first introduced as the BMW Concept Vision Efficient Dynamics, is a plug-in hybrid under development by BMW. The initial turbodiesel concept car ...

[Visually similar images - Report images](#)



Examples of Media Search -2

- Search engines developed at NUS:
 - www.nextcenter.org

The image shows a screenshot of an image search engine interface. The search term is "singapore". The results are displayed in a grid format. The interface includes a search bar, a search button, and a statistics section.

Search Bar: "singapore" [Search]

Statistics: About 1,353 results (0.0040 seconds)

Left Sidebar (Social Media Statistics):

	Crawled	Indexed
Twitter	12,919,261	2,034,782
YouTube	97,670,193	28,765,613
LinkedIn	78,957,657	5,147,032
Facebook	76,304,513	2,571,918
Google+	297,158	31,984
Instagram	779,584	0
Amazon	1,611,928	135,526
Pinterest	2,257,883	11,000
IFTTT	254,816	0
Total	271,052,993	38,697,855

Main Search Results (About 408 results (6.642 seconds)):

The main search results display a grid of images related to Singapore, including night cityscapes, landmarks, and people. The interface also includes a search bar and a search button for the main results.

Left Sidebar (Social Media Statistics):

	Crawled	Indexed
Twitter	12,919,307	2,034,782
YouTube	97,670,193	28,766,866
LinkedIn	78,957,657	5,147,032
Facebook	76,304,513	2,571,918
Google+	297,158	31,984
Instagram	779,584	0
Amazon	1,611,928	135,526
Pinterest	2,257,883	11,000
IFTTT	254,816	0
Total	271,053,039	38,699,108

Examples of Media Search -3

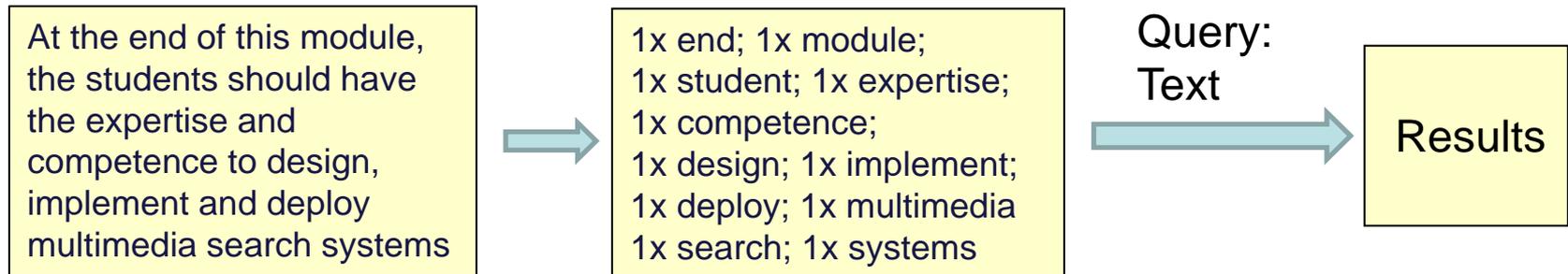
- Search engines developed at NUS:
 - www.visenze.com (An example of vertical domain visual search)

The screenshot displays a vertical domain visual search interface. On the left, a 'Similar to' section shows a reference image of a woman holding a handbag. Below this are filter categories: 'Clothing', 'Bags', and 'Shoes'. A 'Color Filter' section contains a grid of 24 color swatches and 'Clear' and 'OK' buttons. The main area shows a grid of 24 handbag products, each with a title, brand, and price. The products are:

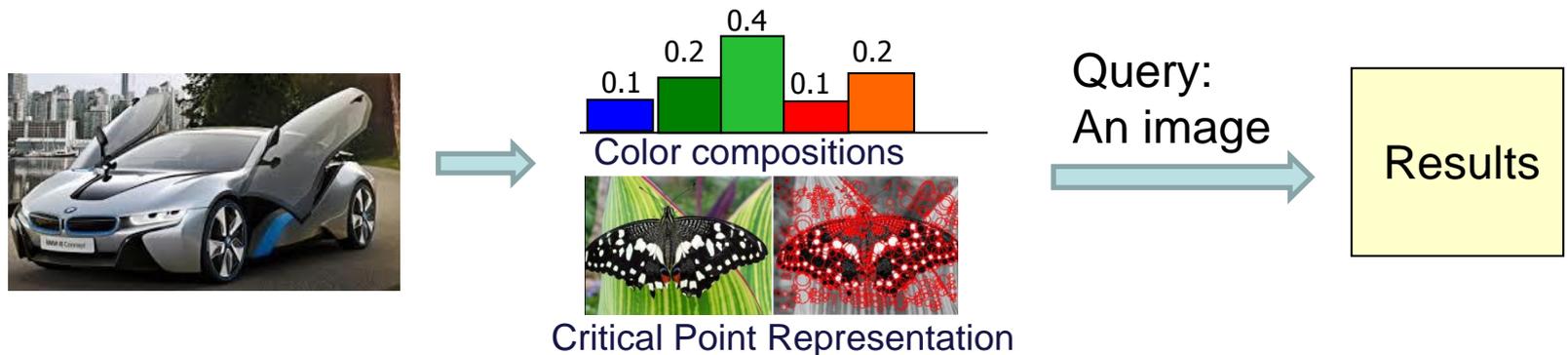
- Gucci - Sukey Original GG Large Tote, SGD \$385.50 - Saksfifthavenue
- Gucci - GG Twins Large Hobo, SGD \$385.50 - Saksfifthavenue
- Scarlett Hobo - Gucci
- Gucci - Sukey Medium Messenger Bag, SGD \$357.65 - Saksfifthavenue
- Sukey Tote - Gucci
- Heart Bit C - Gu
- Tory Burch Large Straw Square Tote | SHOPBOP, \$225.00 - Shopbop
- New Ladies Web Large Hobo With Engraved Gucci Script - Gucci
- Bella Hobo - Gucci
- Sukey Tote - Gucci
- GG Twins Large Hobo With Interlocking G Ornaments. - Gucci
- Gucci - Sukey, SGD \$246.25 - S
- Sukey Tote - Gucci
- Gucci - Sukey Original GG Medium Hobo, SGD \$322.84 - Saksfifthavenue
- Gucci - Dressage Medium Tote, SGD \$657.03 - Saksfifthavenue
- Scarlett Studded Interlocking G Tote - Gucci
- Marc By Marc Jacobs - Coated Canvas Inter Static Nova, SGD \$26.35 - Saksfifthavenue
- Sukey - Gu

What are the Technologies Behind these Search Engines?

- Text representation and matching



- Image representation and matching



- Extract object-level representation (for vertical domain)
- Indexing for efficient matching and retrieval

Teaching Outcome:

At the end of this module, the students should have the expertise and competence to design, implement and deploy multimedia search systems, with a good understanding of the architecture of modern search engines

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Course Schedule (1)

Lecture/Tutorial Topics
L1: Introduction to MM Systems
L2: Brief Intro to Text Retrieval (+RF)
L3: Image Content Analysis (Feature Extraction & Similarity Measures)
L4: Concept-based Image Retrieval
L5: Indexing and Search Architecture
L6: Basic Concepts in Digital Multimedia
L7: Intro to Audio Processing
L8: Image Transformation and Filters

Course Schedule (2)

Lecture/Tutorial Topics
L8: Image Transformation and Filters
L9: Compression Algorithms [7,8]
L10: Introduction to JPEG [4,9]
L11: Color Model and Color JPEG
L12: MPEG Model [10,11]
L13: : H261 [10,12] & Future Trends

References:

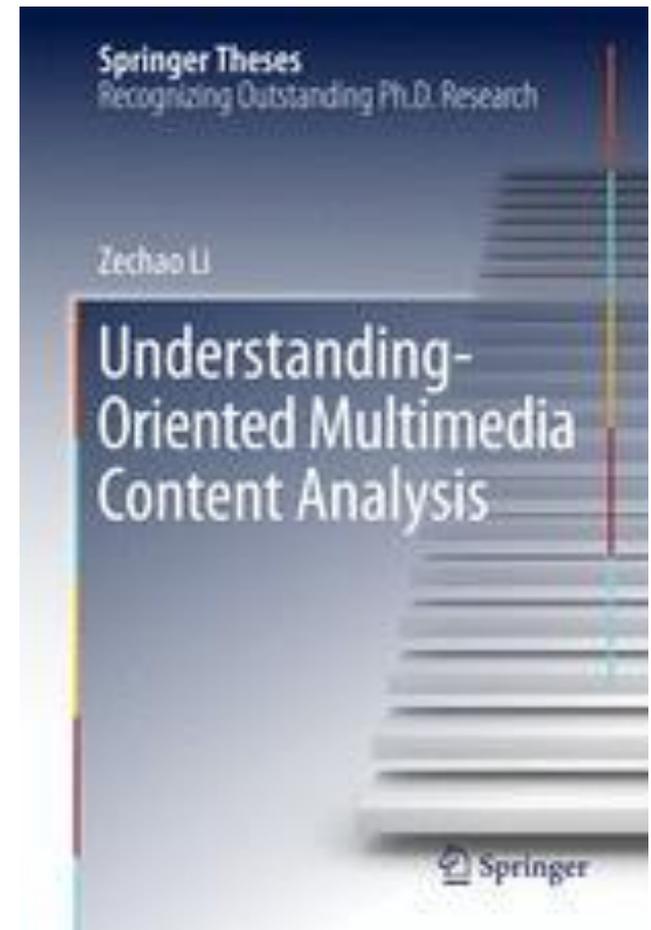
- **MainText** (on media standards):
 - Z.N. Li and M.S. Drew (2004). Fundamentals of Multimedia. Prentice Hall
- **Reference Text:**
 - Jennifer Burg. The Science of Digital Media. Pearson Prentice-Hall, 2009
 - Alberta Del Bimbo. Visual Information Retrieval. Morgan Kaufmann Publishers, 1999
 - Yuhang Zhang. Content-based Image Retrieval. LAP Lambert Acad Publisher, 2010.
 - Price R., Chua Tat-Seng, Al-Hawamdeh S. (1992). Applying Relevance Feedback to a Photo Archival System. Journal of Information Science, 18: 203-215.
 - Brin S & Page L (1998). The anatomy of a large-scale hypertextual web search engine. 19 pages

References:

- **MainText:**

- Zechao Li. **Understanding-Oriented Multimedia Content Analysis**. Springer 2017

- <https://link.springer.com/content/pdf/10.1007%2F978-981-10-3689-7.pdf>



About Myself

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 - Professor

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 - Education
 - 2004-2008, University of Science and Technology of China
 - 2008-2013, Institute of Automation, Chinese Academy of Sciences
 - 2013-Date, Nanjing University of Science and Technology

 - 智能媒体分析实验室 <http://imag.njust.edu.cn/>

**Any Questions Before We
Proceed??**

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- **History of Media Search Engines**
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The web is really large

- 100 B pages
- Lots of dynamically generated content
- New pages get added all the time
- The size of the blogosphere doubles every 6 months
 - Technorati has 50M+ blogs
- Yahoo deals with 12TB of data per day (according to Ron Brachman)
- The biggest addition of info is the social network sites
 - Every day, Facebook users share 2.3 billion pieces of content and upload 250 million photos
 - Twitter users post 190 million tweets
 - Many tweets have images (1/3 in Weibo)

Examples of search engines

- Conventional (library catalog).
Search by keyword, title, author, etc.
- Text-based (Lexis-Nexis, Google, Yahoo!, Bing, Baidu).
Search by keywords. Limited search using queries in natural language.
- Multimedia (QBIC, WebSeek, SaFe, Major Search Engines)
Search by visual appearance (shapes, colors,...).
- Question answering systems (Ask, NSIR, Answerbus)
Search in (restricted) natural language
- Clustering (Lesystems (Vivísimo, Clusty)
- Many research systems

- Social media search: Twitter/Weibo search interfaces..
Problem in indexing live postings – not all live posts are indexed

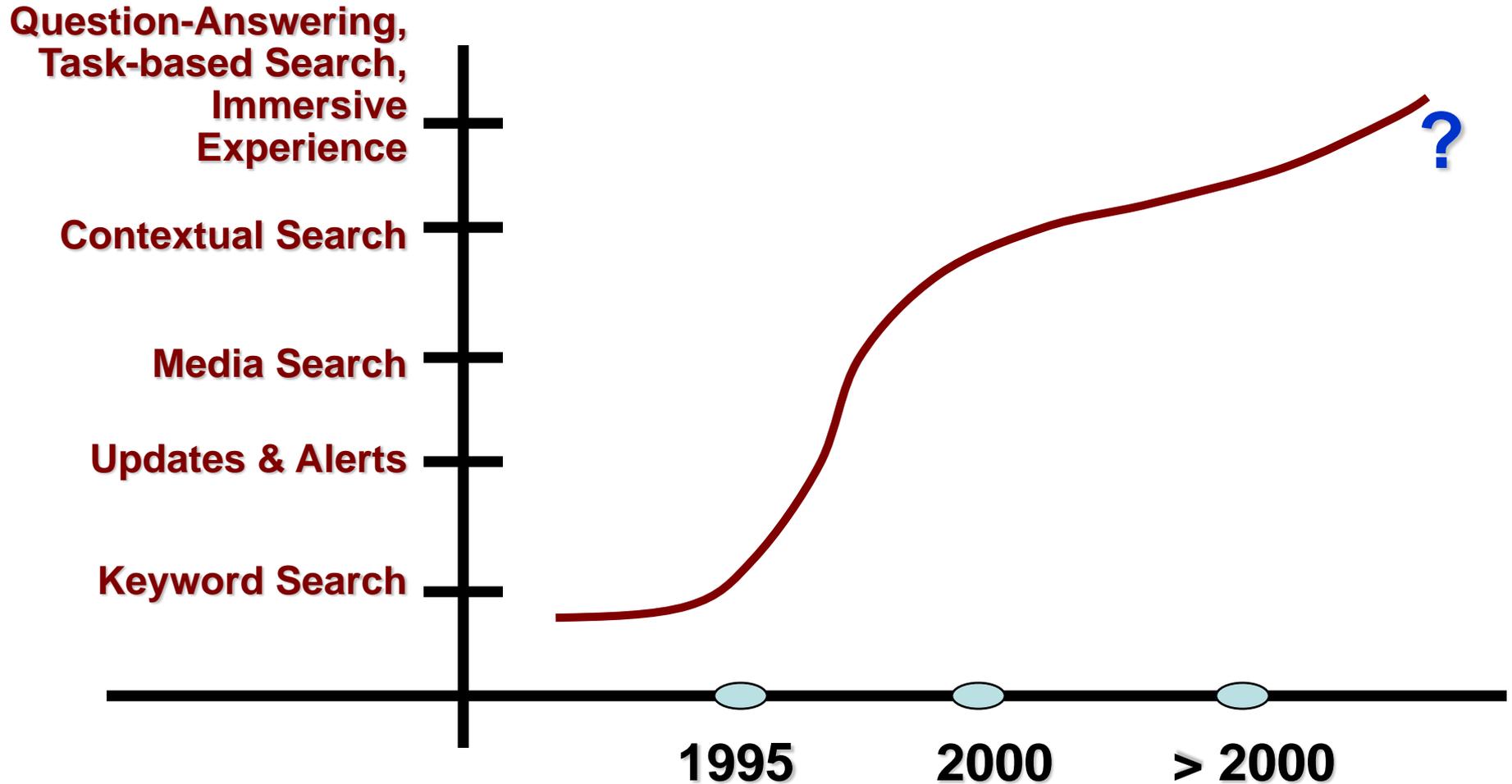
What does it take to build a search engine?

- Decide what to index
- Decide what features to index
- Gather data
- Index it (efficiently)
- Keep the index up to date
- Provide user-friendly query facilities

What else?

- Understand the structure of the web for efficient crawling
- Understand user information needs
- Preprocess text and other unstructured data
- Cluster data
- Classify data
- Evaluate performance

Development of Web Search



- Current Web is text-based and document-oriented
- Future is going to be multimedia and information oriented

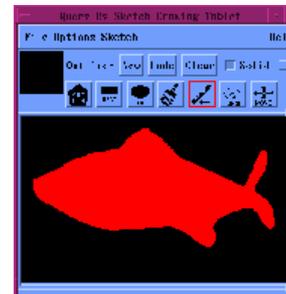
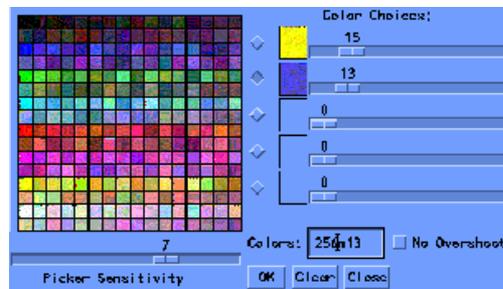
Text-Based Media Search



- Most commercial image search systems allow user to issue query as a list of keywords - **Query by keywords**
 - Search is performed on basis of textual tags annotated by users, which tend to be incomplete and ambiguous
 - Moreover, most users cannot express the search intention clearly

Early Media Search Systems

- Use of media contents in search evolved in early 90s
- QBIC of IBM is an early example (Flickner et al '95)
 - First complete commercial CBIR System that supports Query by Image Content
 - Uses color, texture, shape features
 - Support search by colors, shapes, sketch and text - primitive



CBIR in Main Stream Search Engines -1

- More recently, content-based media search has been integrated into main stream search engines
 - Uses a combination text and content-based media search functions
 - Media contents used include: color, texture and visual keywords based on local features such as SIFT
 - Media analysis is secondary to text in retrieval

Google Image Search -1

- Google has integrated Content-based Media Search

The screenshot displays a Google search interface for the term "fountain". The search bar shows the word "fountain" and a search button. Below the search bar, the results are categorized into "Web" and "Images". The "Images" section is active, showing a grid of 24 different fountain images. The images include various styles of fountains, such as modern sculptures, traditional tiered fountains, and large public fountains. The search results also show related searches: "garden fountain", "natural fountain", "wall fountain", "home fountains", and "fountain duchamp". The search results indicate "About 323,000,000 results (0.20 seconds)". The interface includes navigation links for "You", "Search", "Images", "Maps", "Play", "YouTube", "News", "Gmail", "Documents", "Calendar", and "More". The search filters on the left include "Any time" (Past 24 hours, Past week, Custom range...), "All results" (By subject), and "Any size" (Large). The search results also show a "SafeSearch moderate" filter and a "Sign in" button.

Google Image Search -2

- Google has integrated Content-based Media Search

The screenshot shows a Google search for 'fountain' on the Singaporean domain (www.google.com.sg). The search results page displays a grid of various fountain images. A prominent feature is a large, detailed image of a fountain shaped like a human face, with water flowing from its mouth. This image is accompanied by a caption: 'fountain03.jpg', 'toxel.com', '450 x 320 - This amazing fountain forms an entrance to the Swarovski headquarters in ...', and a link to 'Similar More sizes'. The page also shows related searches like 'garden fountain', 'natural fountain', 'wall fountain', 'home fountains', and 'fountain duchamp'. On the left, there are navigation options for 'Web', 'Images', 'Maps', 'Videos', 'News', 'Blogs', and 'More', along with filters for 'Any time' (Past 24 hours, Past week, Custom range...) and 'All results By subject'. At the bottom, there is a download bar showing 'OK/S' and a small 'e' icon.

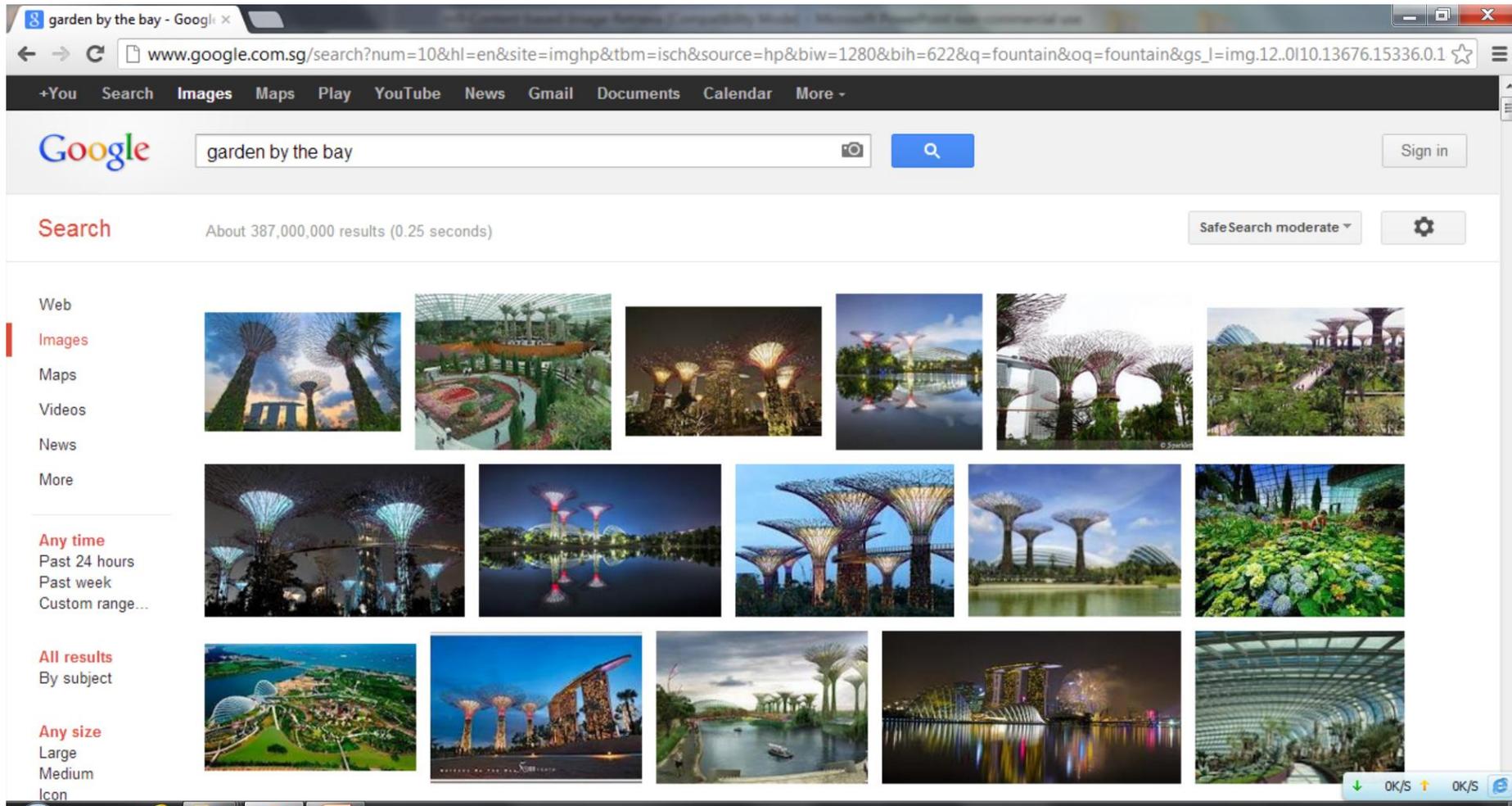
Google Image Search -3

- Google has integrated Content-based Media Search

The screenshot shows a Google search for 'fountain' on the Singaporean domain (www.google.com.sg). The search results page features a 'Visually similar' section with a grid of 21 images. The primary image is a large, green, topiary-style fountain shaped like a human face with water flowing from its mouth. Other images in the grid include various styles of fountains, such as tiered stone fountains, circular basins with multiple jets, and more traditional garden fountains. The interface includes the Google logo, a search bar with the text 'fountain', and navigation links for Web, Images, Maps, Videos, News, Blogs, and More. The search results indicate 'About 9,210,000 results (0.72 seconds)'. The bottom right corner shows a download speed of 3.1K/S and an upload speed of 0.2K/S.

Google Image Search -4

- Google has integrated Content-based Media Search



The screenshot shows a Google search interface for 'garden by the bay'. The search bar contains the text 'garden by the bay' and a search button. Below the search bar, the results are displayed in a grid format. The first row shows six images: a Supertree at night, a conservatory, a Supertree at night, a Supertree at night, a Supertree at night, and a conservatory. The second row shows five images: a Supertree at night, a Supertree at night, a Supertree at night, a Supertree at night, and a conservatory. The third row shows six images: a conservatory, a Supertree at night, a Supertree at night, a Supertree at night, a Supertree at night, and a conservatory. The left sidebar contains navigation options: Web, Images, Maps, Videos, News, More, Any time (Past 24 hours, Past week, Custom range...), All results (By subject), and Any size (Large, Medium, Icon). The bottom right corner shows a download icon and the text 'OK/S'.

Google Image Search -5

- Google has integrated Content-based Media Search

The screenshot shows a Google search for "garden by the bay" on the Singaporean domain (www.google.com.sg). The search results page features a "Visually similar" section, which is a key feature of Google's Content-based Media Search. This section displays a grid of images that are visually similar to the search query, showing various views of the Supertrees at night. The interface includes a search bar, navigation tabs (Web, Images, Maps, Videos, News, More), and a sidebar with filters for time and image similarity. The URL in the address bar is www.google.com.sg/search?num=10&hl=en&site=imghp&tbm=isch&source=hp&biw=1280&bih=622&q=fountain&oq=fountain&gs_l=img.12..0l10.13676.15336.0.1. The status bar at the bottom shows a download speed of 0.1K/S and a network speed of 0K/S.

Google Image Search -6

- In fact, Google appears to be even more intelligent!!
- Approach:
 - Looks for near-duplicates
 - Use their text features to describe input image
 - Works because they have large number of samples
- Bing & Baidu have also introduced content-based search with improved quality

The screenshot shows a Google search interface with the query 'melkus rs 1600'. The search results are displayed on the right side of the page. The top result is a white sports car, identified as a Melkus RS 1600. Below the image, there is a 'Best guess for this image' section with a link to 'Melkus RS 1600 full acceleration - YouTube'. The video thumbnail shows a white sports car on a track. Below the video, there is a link to 'Melkus - Wikipedia, the free encyclopedia'. The Wikipedia snippet describes the Melkus RS 1600 as a 1959 Formula Junior car. Below the Wikipedia snippet, there is a 'Visually similar images' section with a grid of eight small images of various sports cars. At the bottom, there is a 'Pages that include matching images' section with two links to Flickr photos of Melkus RS 1600 cars.

Baidu Image Search -1

Web search engine - Wiki x Search Engine History.com x 汽车_百度图片搜索 x

image.baidu.com/i?tn=baiduimage&inn=r&ct=201326592&cl=2&lm=-1&st=-1&fm=result&fr=&sf=

This page is in Chinese (Simplified Han) Would you like to translate it? Translate Nope Never translate Chinese (Simplified Han) Option

汽车 百度一下



The image grid contains 15 individual photos of vehicles:

- 1. A silver sedan driving on a road.
- 2. A blue and yellow bus.
- 3. A white Audi convertible.
- 4. A blue open-wheel race car with 'Superformance' and '38' branding.
- 5. A silver sedan on a road.
- 6. A silver Audi sedan.
- 7. A white hatchback car.
- 8. A silver Toyota SUV.
- 9. A red sports car.
- 10. A white bus.
- 11. A tan bus.
- 12. A silver car at a show.
- 13. A white car with red and black graphics.
- 14. A yellow and blue car.
- 15. A dark blue sedan.

Baidu Image Search -2

Upload image Query

Google Search 百度识图-上传图片 查询图 x

stu.baidu.com/i?ct=2&tn=shituresultpc&pn=0&rn=10&querysign=348395906,2049605253

This page is in Chinese (Simplified Han) Would you like to translate it? Translate Nope Ne

Baidu 图片 新闻 网页 贴吧 知道 音乐 图片 视频 地图 百科

全部 相似图片

 找到该图片不同尺寸200张
原图尺寸:350x189
筛选该图片的其他尺寸:
[全部尺寸](#) [大尺寸](#) [中尺寸](#) [小尺寸](#) [精确尺寸](#) »

识图猜测: [rav4](#)

[rav4 百度百科](#)

RAV4是丰田公司微型多功能越野车家族中的基本型车,其名称来自“Recreational Active Vehicle drive.”的缩写,意为“四轮驱动的休闲运动车”。RAV4于1994年在日本问世,销量为丰田公司月销往美国。RAV4单元式的车身结构在多功能越野车中独树一帜。

[基本介绍](#) - [汽车配置](#) - [性能特点](#) - [车型口碑](#)
<http://baike.baidu.com/view/652882.html?from=shitu>

外观相似图片



外观相似图片



该图片更多相关信息

-  **rav4 2.4豪华升级版售24.68万-25.68万**
550x297 (责任编辑:李晶)
<http://auto.ce.cn>
-  **丰田rav4 购车最高尊享11000元现金优惠**
800x600 丰田rav4 购车最高尊享11000元现金优惠
<http://news.cheshi.com>
-  **维修保养方面,丰田 rav4 整车质保为2年或5万公里,每隔4000公里做一**
550x296 对于一款合资品牌suv车型来说,rav4的保养费用和竞争对手相比属于中等水平。
<http://www.xwcsj.com>
-  **国产大众cc上市 为华南战略提供产品支撑**
500x269 (南方都市报)
<http://www.citygf.com>
-  **背后意义更大:为大众华南战略提供产品支撑**

Equivalent Results from Google Image Search

Google Search

www.google.com.sg/search?tbs=sbi:AMhZZitdeSnG4dFqrq_1YGGIU6nQGMUa

This page is in Chinese (Simplified Han) Would you like to translate it? Translate

+You Search Images Maps Play YouTube News Gmail More -

Google car2.jpg x 丰田 rav4

Web Images Maps More Search tools

About 476 results (0.57 seconds)



Image size: 350 x 189
No other sizes of this image found.

Best guess for this image: [丰田 rav4](#)

[丰田RAV4 - 二手车交易市场 - 51汽车](#)
2car.51auto.com/s2rav4/

A description for this result is not available because of this site's robots.txt - learn more.

[丰田rav4新款 Soowang Network Pte Ltd](#)
www.soowangsearch.com/s.aspx?wd=丰田rav4新款

The contents provided herein http://www.soowangnews.com is an automated generated result based on your input of keyword and search perimeters.

[Visually similar images - Report images](#)



Visually similar images - Report images



Pages that include matching images

[天津一汽丰田汽车有限公司](#)

 www.tftm.com.cn/english/cpgc/rav4/peibei.htm
720 x 159 - Outstanding obstacle performance of RAV4 comes from advanced 4WD system. Electric-control coupling device can judge information concerning driving speed ...

[太原一汽丰田RAV4|太原一汽丰田RAV4经销商|太原一汽丰田RAV44S ...](#)

 www.0351auto.com > [整车销售](#) > [Translate this page](#)
283 x 192 - 本站为您提供一汽丰田RAV4|太原一汽丰田RAV4|太原一汽丰田RAV4汽车|太原一汽丰田RAV4车型|太原一汽丰田RAV4经销商|太原一汽丰田RAV44S店|太原一汽 ...

[RAV4 丰田RAV4_RAV4的图片_搜狐汽车 - 车型 - 搜狐](#)

 db.auto.sohu.com/model-1639_pic.shtml > [Translate this page](#)
170 x 92 - 丰田RAV4的图片_搜狐汽车为你提供丰田RAV4相关的丰田RAV4报价、丰田RAV4参数、丰田RAV4图片、丰田RAV4配置、丰田RAV4资讯、丰田RAV4油耗、丰田RAV4 ...

[丰田RAV4 - 深圳汽车团购- 本地宝](#)

 qiche.sz.bendibao.com/tuan/98.htm > [Translate this page](#)

CBIR in Main Stream Search Engines -2

- More recently, content-based media search has been integrated into main stream search engines
 - Uses a combination text and content-based media search functions
 - Media contents used include: color, texture and visual keywords based on local features such as SIFT
 - Media analysis is secondary to text in retrieval
- **Why after almost 20 years since QBIC?**
 - Local visual features is sufficiently robust
 - Large amount of social annotations available
 - Advances in indexing strategy and storage permit large visual index to be searched efficiently

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Towards Object-based Search in a Vertical Domain: ViSenze -1

- Start-up from NUS (www.visenze.com)
- Specialized in visual fashion search (snap-search-browse)

The screenshot shows the ViSenze website interface for a visual search. The browser address bar displays `find.visenze.com/shop/uploadsearch`. The navigation bar includes links for HOME, SHOP, STREET LOOKS, and CELEBRITY. The main header features the ViSenze logo with the tagline "INTELLIGENT VISUAL RECOGNITION" and a search bar. Below the header, there are category filters for BAGS, SHOES, and CLOTHING. The main content area is titled "Upload Similar Looks" and displays a grid of product recommendations. The first row shows a reference image of a woman holding a plaid bag, followed by seven product cards. Each card includes an image of the product, the brand name, the product name, and the price. The second row shows four more product cards. A sidebar on the left lists various bag categories with their respective counts.

Product Name	Price
BURBERRY LONDON checked tote	\$694.35
BURBERRY LONDON Check Tote Bag	\$718.02
Dolce&Gabbana Dolce&Gabbana 'Miss Escape' Tot	\$1495.00
milanoo.com Green Casual Printed Pillow-Snaps	\$20.99
milanoo.com Colorful Tie Dye PU Woman's Sho	\$22.39
milanoo.com Fabulous Patchwork Genuine Leath	\$33.26
Baggu Baggu Women's The Canvas Back	\$34.00

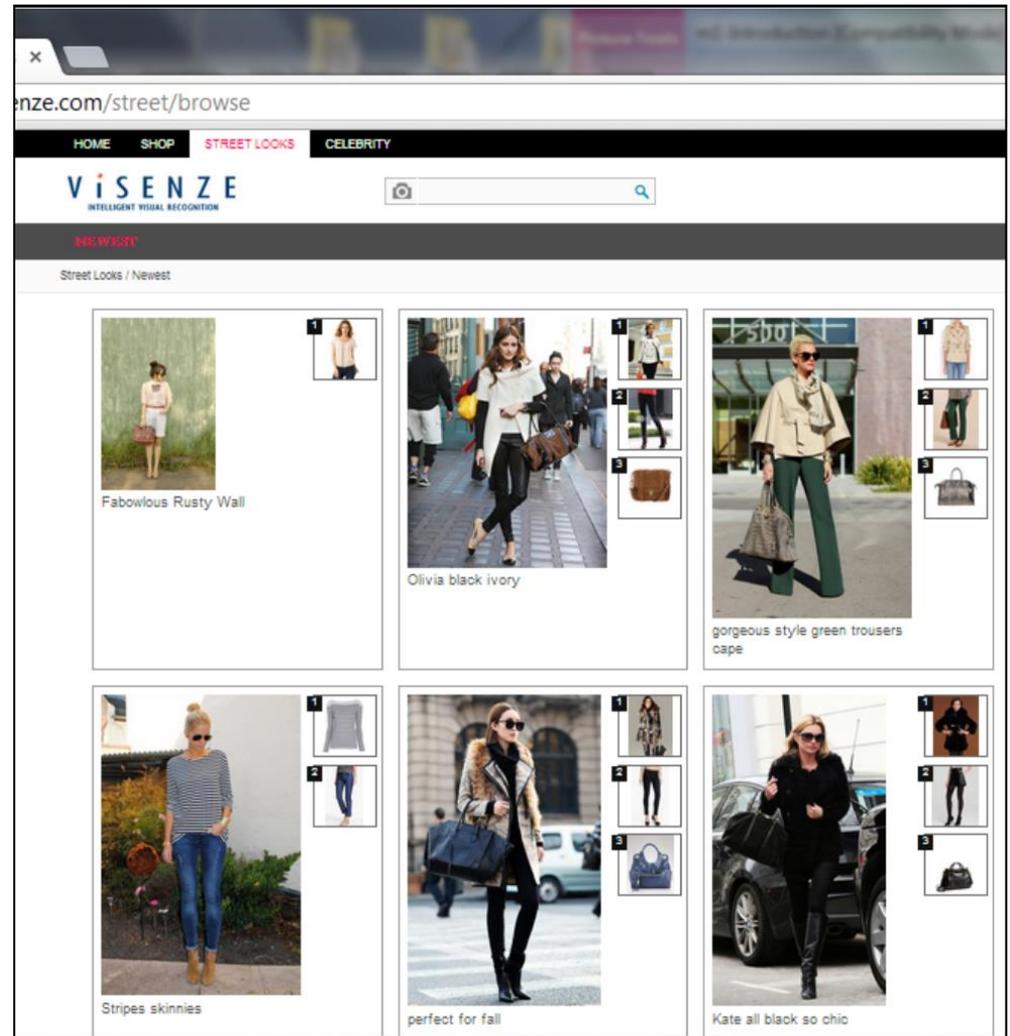
Categories in sidebar:

- Bags (127)
- Clutch Bags (96)
- Cosmetic Bag (4)
- Hobo Bags (23)
- Laptop Bags (3)
- Satchel Bags (4)
- Shoulder Bags (115)
- Tote Bags (335)

URL at the bottom: `find.visenze.com/shop/productdetail?pid=karmaloop.com-320281&node=bag&category=`

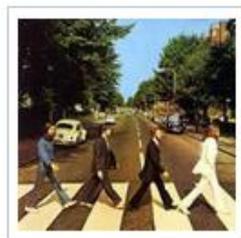
Towards Object-based Search in a Vertical Domain: ViSenze -2

- Extraction of fashion contents and matching to products from street photos
- Piloting with big e-commerce and affiliate marketing sites



Reverse Search Engine

- Google, Baidu & ViSenze are examples of reverse search
- TinEye: A Reverse Image Search Engine
 - It finds out where an image came from, how it is being used
 - Based on copy and near duplicate detection technology
 - Purely content-based search on database of over 3 billion images

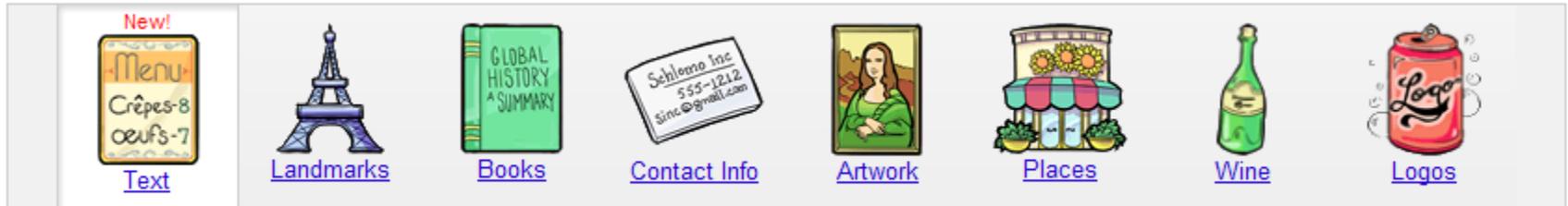




Google Goggles

Use pictures to search the web.

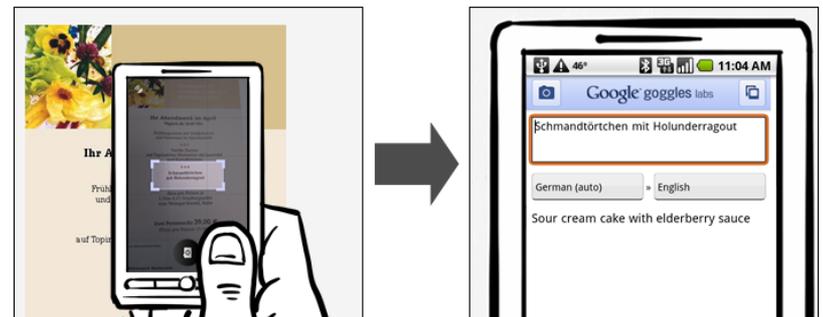
- List of objects searchable via Goggle
 - Snap pictures and get answers



- More details of this Landmarks



- Give me the English translation of this menu?



- Key technologies: OCR, logo detection, image matching...



Many other similar systems in the market !!

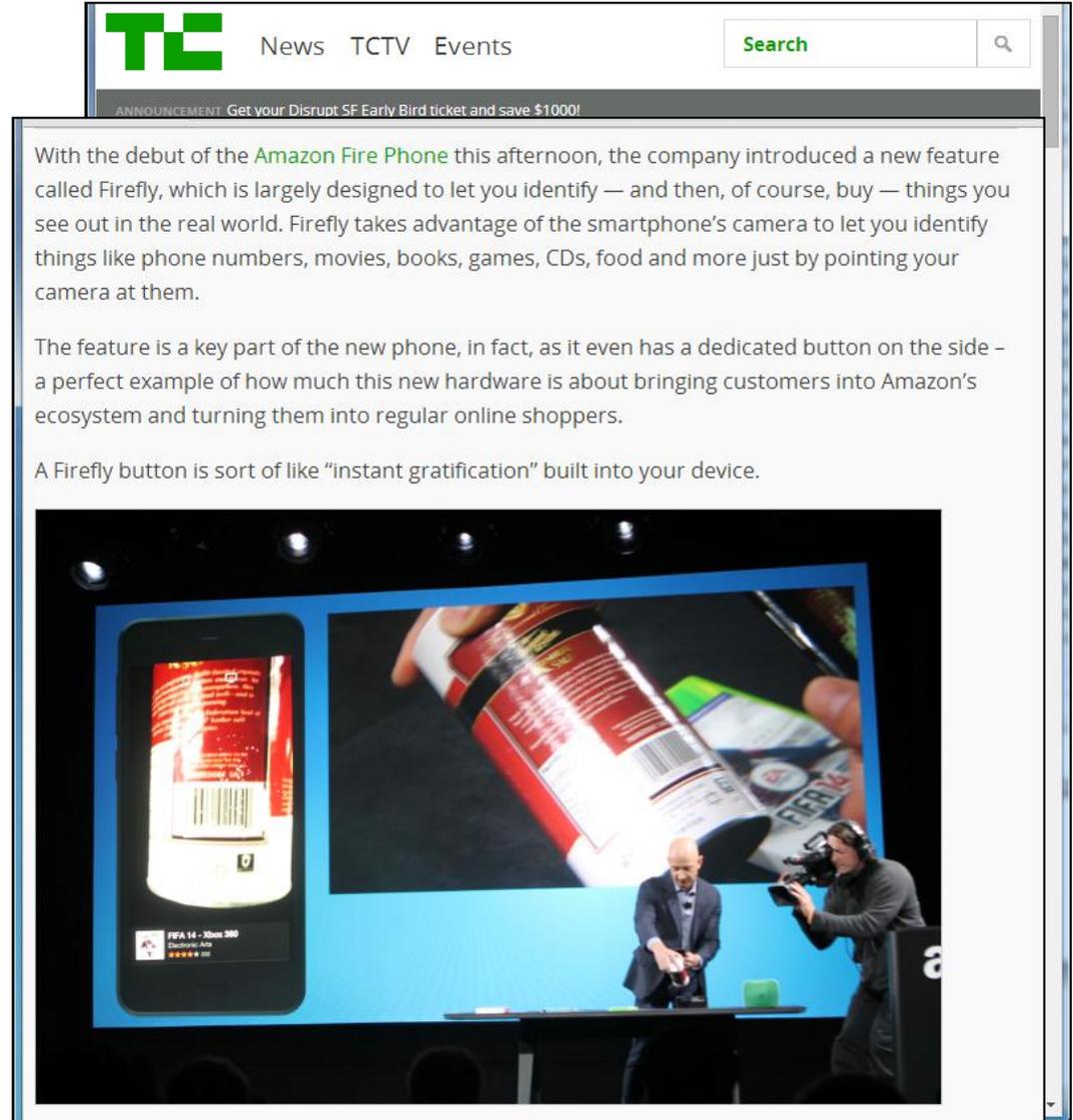
- LTU
- IQ Engines
- etc



- Match object in database on millions of objects in Amazon's EC2 Cloud Computing Services

Amazon Firefly

- Specializes in logo recognition
- Perform recognition & matching in real-time
 - Match to logo, covers etc in Amazon database
 - Did very well in limited domain
 - Try download a mobile version to try



The image is a screenshot of a news article from a website. At the top, there is a navigation bar with the letters 'TE' in green, followed by 'News TCTV Events' and a search box with the word 'Search' and a magnifying glass icon. Below the navigation bar is a dark banner with white text that reads 'ANNOUNCEMENT Get your Disrupt SF Early Bird ticket and save \$1000!'. The main body of the article contains two paragraphs of text. The first paragraph describes the Amazon Fire Phone and the Firefly feature. The second paragraph explains that the feature is a key part of the new phone. Below the text is a photograph of a man in a suit holding a camera, standing in front of a large screen. The screen displays a close-up of a hand holding a red and white container, with a smaller inset showing the same container on a smartphone screen. The smartphone screen also displays the text 'FIFA 14 - Xbox 360 Electronic Arts' and a star rating.

News TCTV Events

ANNOUNCEMENT Get your Disrupt SF Early Bird ticket and save \$1000!

With the debut of the [Amazon Fire Phone](#) this afternoon, the company introduced a new feature called Firefly, which is largely designed to let you identify — and then, of course, buy — things you see out in the real world. Firefly takes advantage of the smartphone’s camera to let you identify things like phone numbers, movies, books, games, CDs, food and more just by pointing your camera at them.

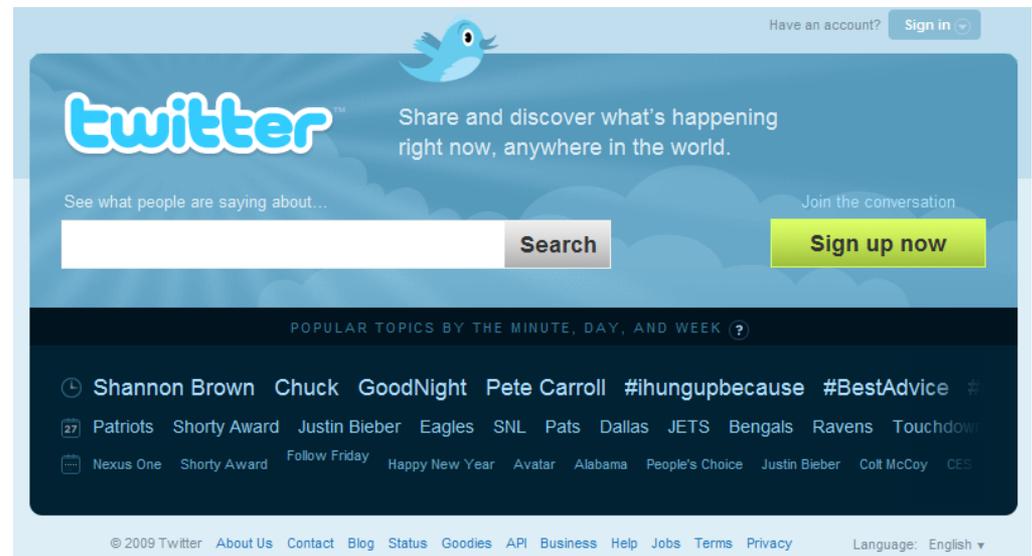
The feature is a key part of the new phone, in fact, as it even has a dedicated button on the side — a perfect example of how much this new hardware is about bringing customers into Amazon’s ecosystem and turning them into regular online shoppers.

A Firefly button is sort of like “instant gratification” built into your device.



Social Network Sites

- How do you see the big picture involving FaceBook and Twitter?

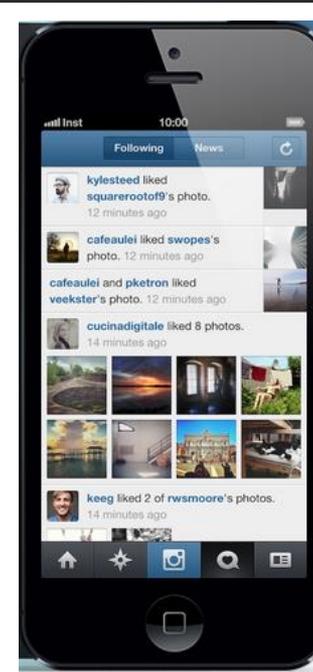


- Facebook has been the most popular site, overtaking Google 3 years ago in terms of user traffic
- They are also the largest photo sharing sites, with more than 250 million uploads each month

Photo Sharing: on Instagram



- Fun app: give users capability to transform picture to professional looking ones
- Simple technology, innovative implementation & good timing
- Bought by Facebook for US\$1 Billion



Trends

- Leveraging on huge amount of images on social media
 - Example, 1/3 of Weibo have images, and 60% of these images do not have text annotation
- Fun and Utility social app based on photos
 - Such as Instagram, Path
- Increasingly requires content-based matching capability
- Real-time, social and Location!!!
- Business Models:
 - B2C or Consumer in the past
 - More recently towards enterprise (B2B model)

Recap: Aims and Objectives

- This module introduces students to the concepts, issues, design, implementation, standards and applications of multimedia technologies:
with special emphasis on media representation, standards, content analysis and search
- The module is divided into 2 parts:
 - 1) Fundamentals and Standards of Digital Media
 - 2) Text, Image and Audio Search

Next Lesson

- **Introduction to Concepts**