CS688/WST665

Web-Scale Image Retrieval and Classification

Sung-Eui Yoon
(윤성의)

Course URL:
http://sglab.kaist.ac.kr/~sungeui/IR

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About the Instructor

- Joined KAIST at 2007

- B.S., M.S. at Seoul National Univ.
- Ph.D. at Univ. of North Carolina-Chapel Hill
- Post. doc at Lawrence Livermore Nat'l Lab

- Main research focus
  - Handling of massive data for various computer graphics and geometric problems

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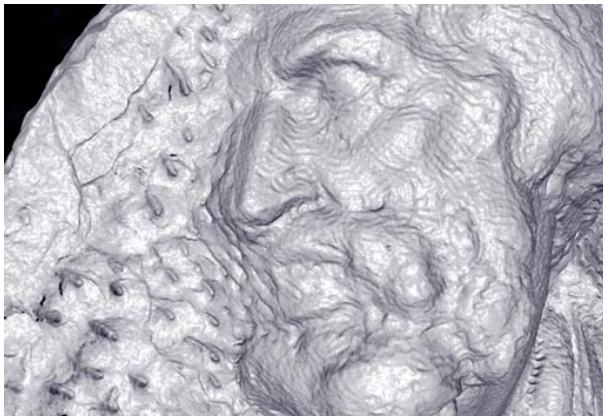
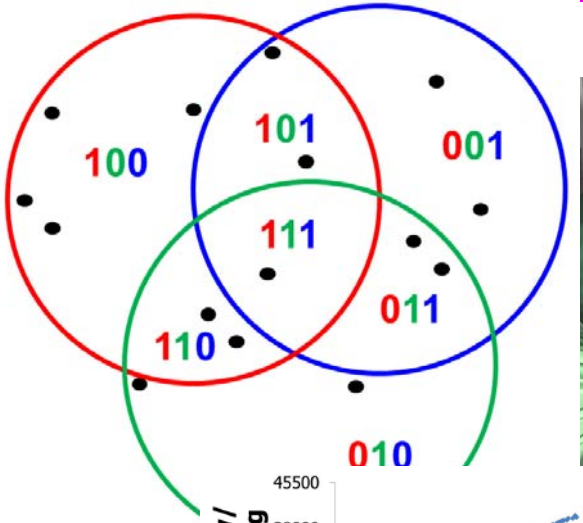
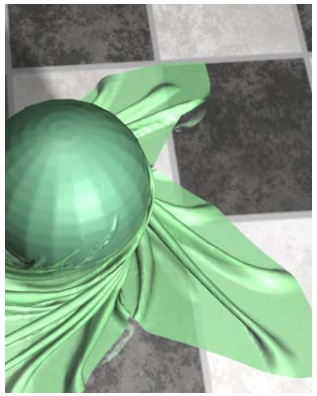
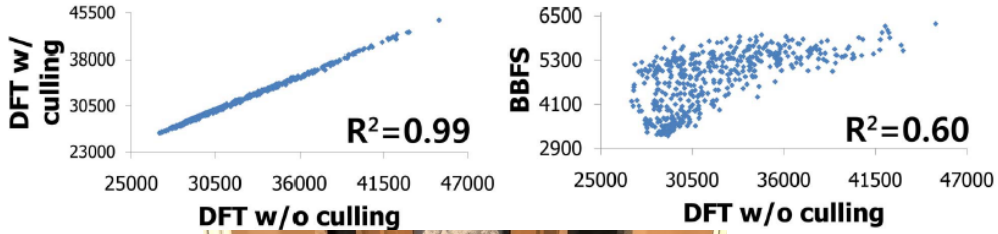
My Recent Work









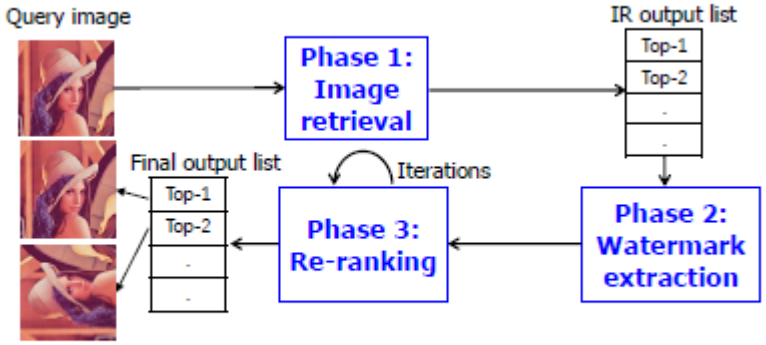


Fig. 1. This figure shows an overview of our IRIW framework.

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About the Instructor

- **Contact info**
  - **Email: sungeui@gmail.com**
  - **Office: 3432 at CS building**
  - **Homepage: http://sglab.kaist.ac.kr/~sungeui**

Class Information

- **Class time**
  - **1:00pm ~ 2:15pm on TTh**
- **Office hours**
  - **Right after the class time**
  - **You can make arrangements by sending emails**
- **TA**
  - **JongHyeob Lee (Room 3443)**

About the Course

- **We will focus on the following things:**
  - **Broad understanding on image (and video) retrieval techniques and classification**
  - **In-depth knowledge on recent methods for web-scale data**
  - **Design better technologies as your final project**

Content-Based Image Retrieval (CBIR)

- **Identify similar images given a user-specified image or other types of inputs**

Gmail - Inbox - sungeui | Google Calendar | apple - Google Search

www.google.com/search?q=apple&hl=en&biw=1024&bih=600&prmd=ivnsu&source=lnms&tbm=isch&ei=zxpNTv7bN8_OrQeB9v

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SafeSearch moderate ▾

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Sort by relevance
Sort by subject

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Medium
Icon
Larger than...
Exactly...

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이름Cha, Meeyoung (차미영) 조교수; 연구분야Social Computing, Data-Driven Social Science; 학위PhD, KAIST, 2008; 전화번호+82-42-350-2922; 이 메일meeyoungcha ...

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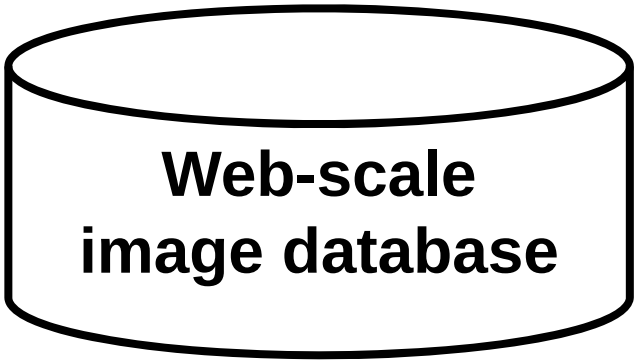
Content-Based Image Retrieval (CBIR)

- **Identify similar images given a user-specified image or other types of inputs**

Extract image descriptors (e.g., SIFT)

Input



Output

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Applications

- Search
- Image stitching
- Object/scene/location recognitions
- Robot motion planning
- Copyright detection

Panorama Stitching

(a) Matier data set (7 images)

iPhone version available

(b) Matier final stitch

[Brown, Szeliski, and Winder, 2005]

http://www.cs.ubc.ca/~mbrown/autostitch/autostitch.html

Object Detection

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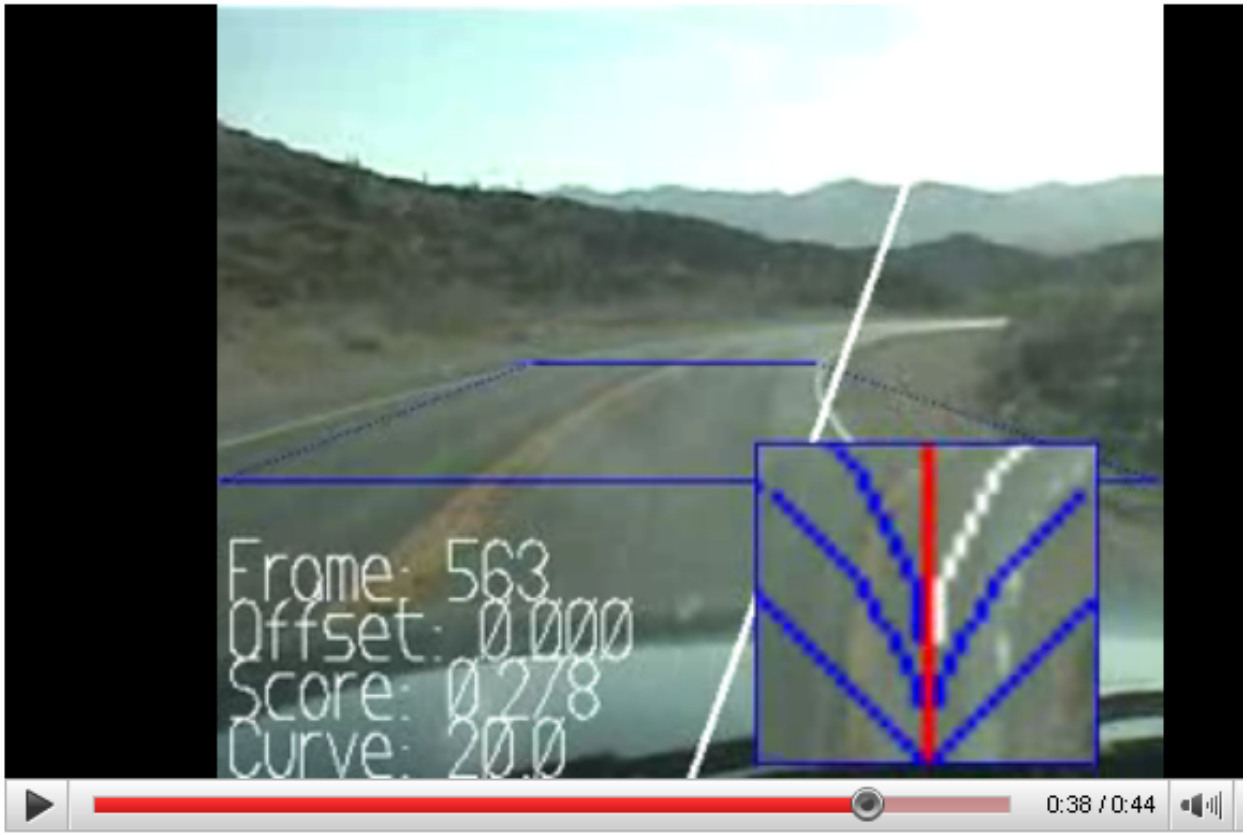
Robot Motion Planning

Autonomous robot vision 1



Autonomous robot
http://www.youtube.com/watch?v=3SQiow-X3ko

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Issues for Web-Scale Multimedia Search

- Too many multimedia data and frequent updates
- Accuracy?
- Performance?
- Novel applications?

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apple - Google Search
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Web Images Videos Maps News Shopping Gmail more
Sung-Eui Yoon
Google
apple
About 177,000,000 results (0.46 seconds)
Advanced search
SafeSearch moderate
Everything
Images
Videos
News
Shopping
More
Related searches: apple iphone 5 apple logo apple wallpaper red apple apple background apple mac
Sort by relevance
Sort by subject
Any size
Large
Medium
Icon
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Some of Topic Lists

- Feature detectors
- Descriptors
- Quantization
- Nearest neighbor search
- Bag-of-Word
- Visual vocabulary
- Object categorizations
- Generative and discriminative models
- Hashing techniques
- Text-based retrieval systems
- Large-scale retrieval indexing techniques
- Video related techniques
- Various applications

Prerequisites

- **Basic knowledge of linear algebra and data structures**
  - **No prior knowledge on computer graphics and computer vision**
- **If you are not sure, please consult the instructor at the end of the course**

Course Overview

- **Half of lectures and other half of student presentations**
  - **This is a research-oriented course**
  - **Paper list on various topics is available**

- **What you will do:**
  - **Choose papers and present them**
  - **Propose ideas that can improve the state-of-the-art techniques**
  - **Quiz and mid-term**
  - **and, have fun!**

Course Overview

- **Grade policy**
  - **Quiz, assignment, and mid-term: 30%**
  - **Class presentations: 30%**
  - **Final project: 40%**
  - **Class presentation and project are the most importance activities in this class**

- **Instructor and students will evaluate presentations and projects**
  - **Instructor: 50% weights**
  - **Students: 50% weights**

Presentations and Final Project

- **Read papers**
  - **Look at pros and cons of each method**
  - **Think about how we can efficiently handle more realistic and complex scene**
- **Propose ideas to address those problems**
  - **Show benefits of your ideas and how your ideas can improve the state-of-the-art techniques in a logical manner**
  - **Implementation of your ideas is not required, but is recommended**
- **Team project is recommended**
  - **Role of each student should be very clear**

Course Awards

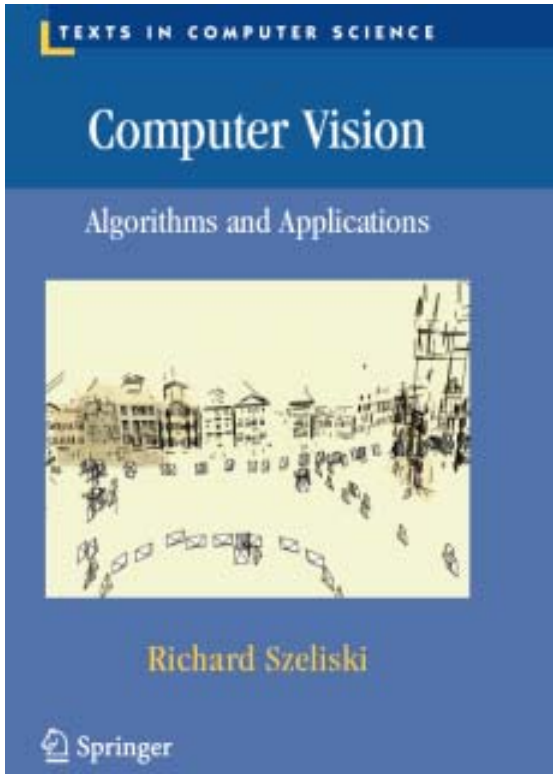
- **Best speaker and best project**
- **A small gift will be given to the best speaker**
- **A high grade will be given to members of the best project**

Honor Code

- **Collaboration encouraged, but *assignments must be your own work***
- **Cite any other's work if you use their code**

Resource

- No textbook
- Reference
  - Computer vision: algorithms and applications
    - Its file is available (http://szeliski.org/Book/)



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Other Resources

- Our paper reading list
- Technical papers
  - CVPR, ICCV, ECCV, ACM MM, SIGGRAPH, etc.
  - Computer vision resource (http://www.cvpapers.com/)
- Course homepages
- Google or Google scholar

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Schedule

- Please refer the course homepage:
  - http://sglab.kaist.ac.kr/~sungeui/IR

Official Language in Class

- **English**
  - **I'll give lectures in English**
  - **I may explain again in Korean if materials are unclear to you**
  - **You are not required to use English, but are recommended**

About You

- Name
- Your (non hanmail.net) email address

- What is your major?
- Previous experience on image retrieval and computer vision
- Credit / audit

Next Time

- **Feature detectors**

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