
CS688/WST665

Web-Scale Image Retrieval and Classification

Sung-Eui Yoon
(윤성의)

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

KAIST



About the Instructor

- Joined KAIST at 2007
- Main research focus
 - Handling of massive data for various computer graphics and geometric problems
 - Paper and video:
<http://sglab.kaist.ac.kr/papers.htm>
 - YouTube videos:
<http://www.youtube.com/user/sglabkaist>

My Recent Work

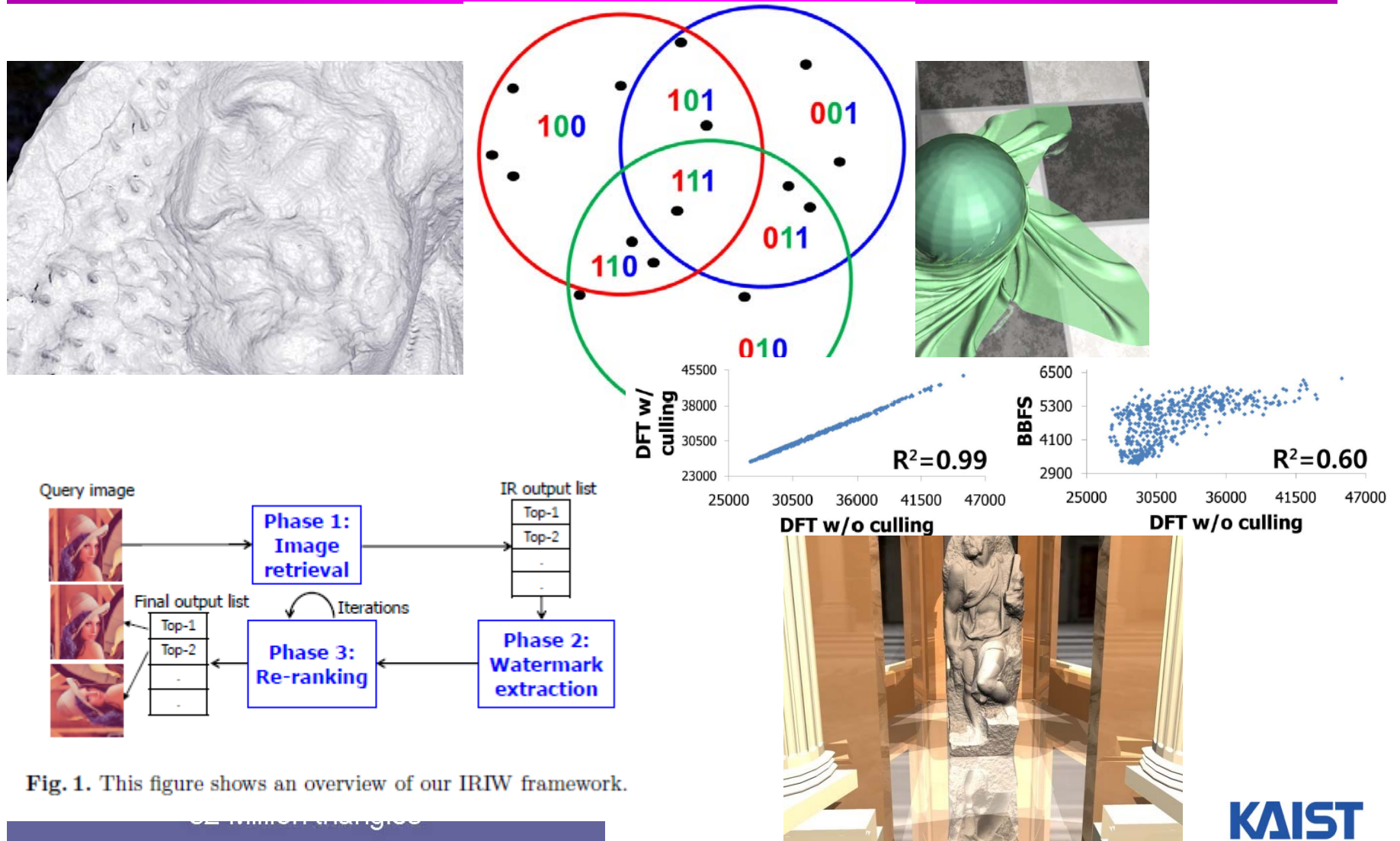


Fig. 1. This figure shows an overview of our IRIW framework.

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**
 - 4:00pm ~ 5:15pm on TTh
- **Office hours**
 - Right after the class time
 - You can make arrangements by sending emails
- **TA**
 - 이협우, leehyeopwoo@kaist.ac.kr, Room 2106

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



apple



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Advanced search

Everything

Images

Videos

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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

Larger than...

Exactly...

Any color

Full color

Black and white





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Sung-Eui Yoon (윤 성의) Assistant professor. Scalable Graphics/Geometric Algorithm Lab. Dept. of Computer Science · KAIST ...

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

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Kristian Segerstrale Playfish, 소셜게임의 미래 현재 소셜게임의 현주소와 빠르게 성장하는 소셜게임의 미래를 예리한 견식으로 소개 ...

100 × 100

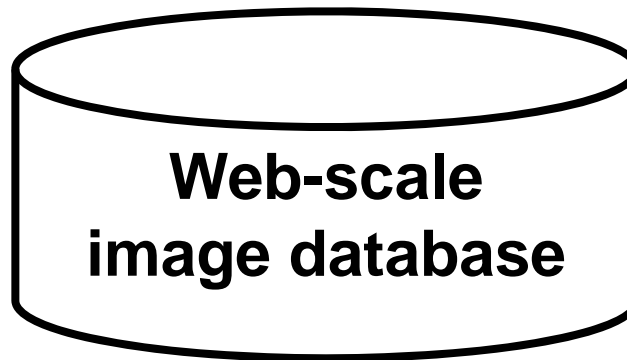
Content-Based Image Retrieval (CBIR)

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

Extract image descriptors (e.g., SIFT)



Input



Output

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>

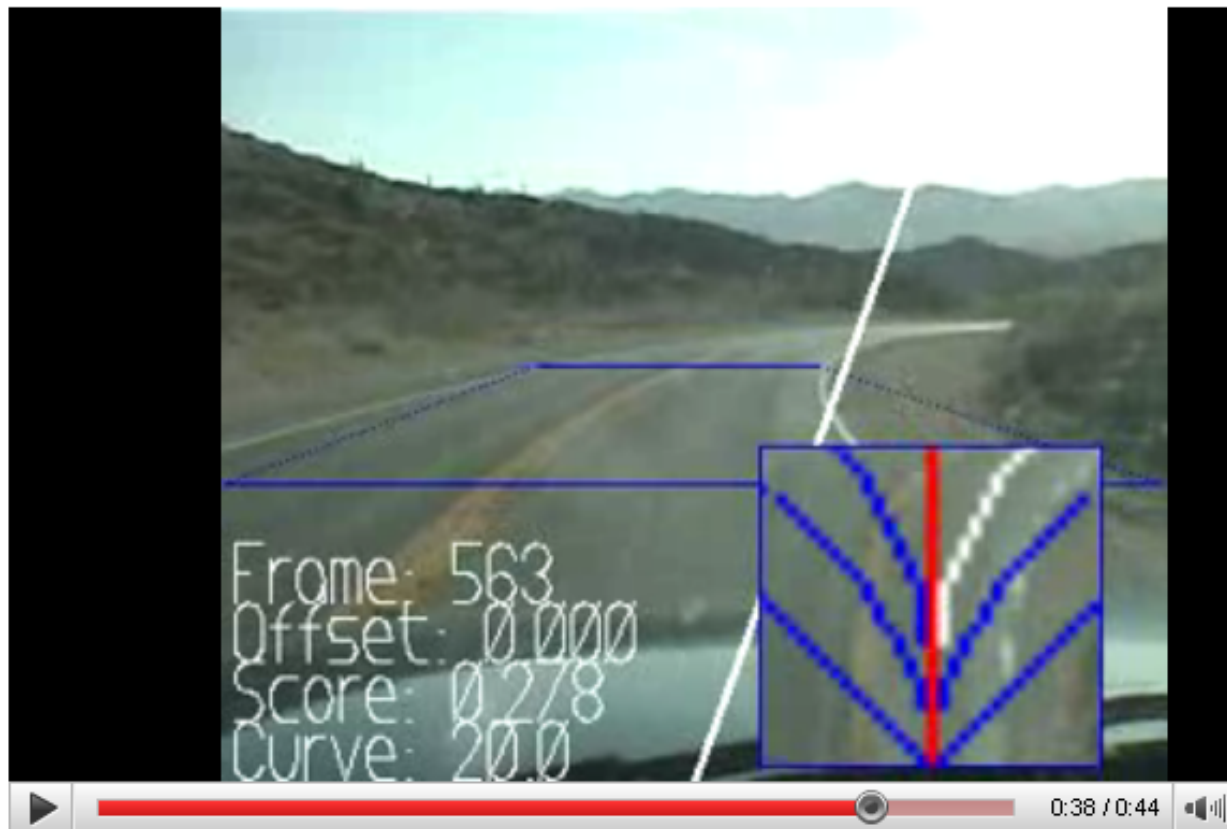
Object Detection

PASCAL challenge



Robot Motion Planning

Autonomous robot vision 1



Autonomous robot

<http://www.youtube.com/watch?v=3SQiow-X3ko>

Issues for Web-Scale Multimedia Search

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

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


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

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 Larger Exactly

Any color Full color Black

What if I meant different products of “Apple” computer?

클로퀀_2011_08_..., doc 클로퀀_2011_08_..., doc 다운로드 항목 모두 표시



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 Yoo Mi Choi. 소속: 디자인여성학회 회장 한국디자인 학회 이사 한국애니메이션학회 부회장 인포디자인학회 이사 한국 애니메이션 필름협회 이사 ...

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

Course Overview

- **Grade policy**
 - Quiz, assignment, and exams: 30%
 - Class presentations: 30%
 - Final project: 40%
 - **Class presentation and projects are the most important activities in this class**
- **Instructor and students will evaluate presentations and projects**
 - Instructor: 50% weights
 - Students: 50% weights

Presentations

- **Read papers**
 - **Given a main paper, read two or three related papers**
 - **Look at pros and cons of each method**
 - **Think about how we can efficiently more realistic and complex search and classification issues, and think about novel applications**

Final Project

- **Propose ideas to address problems identified from your presentation papers**
 - **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 allowed**
 - **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**

Programming HWs and Exams

- **Two programming assignments**
 - Implement basic image search components
- **Late policy**
 - No score for late submissions
 - Submit your work before the deadline!
- **Two exams**
 - Mid-term exam covers class materials
 - Final-term exam covers presentation materials of students

Honor Code

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

Question HWs for Every Class

- **Come up with one question in the class and submit at the end of the class**
 - 1 for typical questions (that were answered in the class)
 - 2 for questions with thoughts or that surprised me
- **Write questions at least 4 times**
 - Write a question per month
 - Multiple questions in one time will be counted as once
- **Common questions are addressed at my draft**
 - Some of questions will be discussed in the class
- **If you want to know the answer of your question, ask me or TA on person**

Homework for Every Week

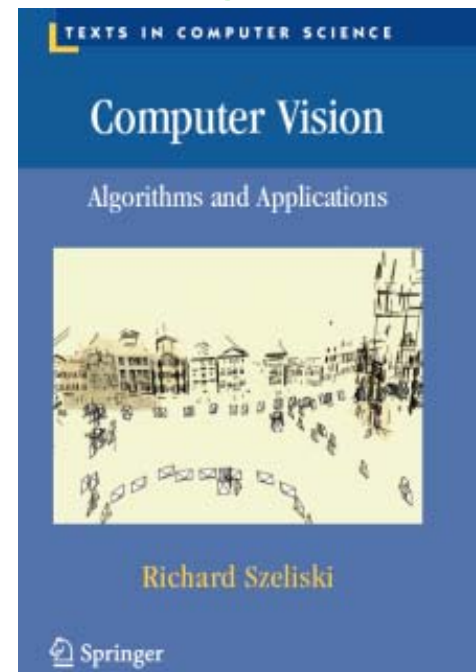
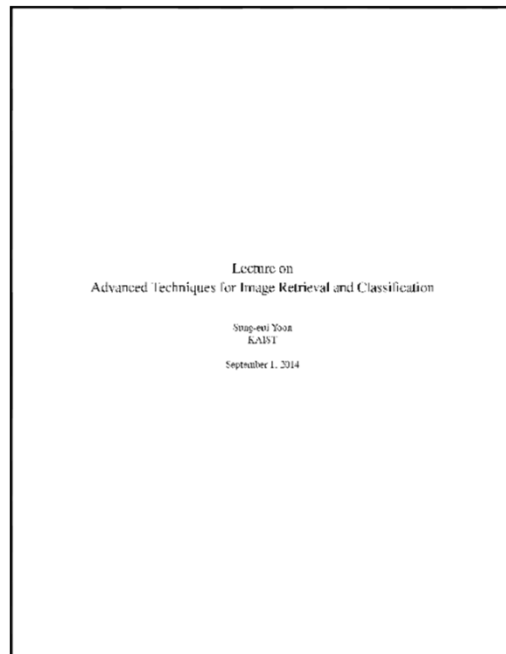
- Go over recent papers on image search
 - Those should be high quality and recent ones
 - Find two papers, and **submit your summary before every beginning of the Thur. class**
 - **Online submission is possible**
- Think about possible team members
- Too late if you think them later..

Class Attendance Rule

- Late two times → count as one absence
- Every two absences → lower your grade (e.g., A- → B+)
- To check attendance, I'll call your names
- If you are in situations where you should be late, notify earlier

Resource

- My ongoing draft on image search
 - pdf file is available at the webpage
- Reference
 - Computer vision: algorithms and applications
 - Its file is available (<http://szeliski.org/Book/>)



Other Resources

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



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

- **To non-native Korean speakers**
 - Many Korean students prefer to use Korean for deeper discussions
 - In these cases, we will use Korean, but I will summarize main points in English

My Wish for You

- Follow up lecture materials and do various class activities/HWs well
- Lead to your next publication, or
- Lead to your next start-up

Next Time

- Feature detectors

About You

- Name
- Your (non hanmail.net) email address
- What is your major?
- Previous experience on image retrieval and computer vision
- Credit/audit