

Syllabus 2017 Computer and Mathematical Sciences

Computer Vision

Japanese

Basic information

held this year:	yes
instructor(s)	Prof. Takayuki Okatani
room	Lecture room 1 at Mechanical Engineering
schedule	The first half year (Monday) 10:30-12:00
begins on:	04/10

Objectives and outline

This course explains various problems of computer vision with solutions to them. These are inverse-problems in which various information about an object or a scene, such as the three-dimensional shape of the object and what the object is, is to be estimated from their image(s). There are all sorts of problems, from which students will learn important problems and their applications, i.e., image processing, multi-view geometry, shape measurement based on physics-based model of light reflection, and visual recognition based on machine learning.

Class plan

1. Introduction
2. Basic image processing
3. Advanced image processing
4. Projective transformation
5. Models and calibration of cameras
6. Two-view geometry
7. Multi-view geometry
8. Statistical inference and optimization
9. Model of light reflection and shape-from-X
10. Video processing: optical flows and tracking
11. Local features and their matching
12. Visual recognition
13. Basic theory of deep learning
14. Applications of deep learning
15. Summary of this course

Evaluation

Students are evaluated on their submitted assignments and final report.

Textbook(s)

Hartley, Zisserman, Multiview Geometry in Computer Vision, 2000, Cambridge University Press, ISBN: 0521623049

Szeliski, Computer Vision: Algorithms and Applications, 2000, Springer, ISBN: 978-1-84882-934-3

Web site

Office hours

Students can email their questions

Other information

Students are required not only to submit class assignments but also to review each class using handouts. If there remain any parts they cannot understand, they should ask questions in the next class.

[Top](#)

Copyright (C) 2005-2007 Graduate School of Information Sciences, Tohoku University. All rights reserved.

