ECE 7866: Computer Vision

Course Description

Computer vision systems, image models, feature extraction, shape representation and recognition, object modeling and recognition, matching, probabilistic and statistical modeling, semantic knowledge, and face perception.

Prior Course Number: 863
Transcript Abbreviation: Computer Vision
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Even Years
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 6.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: 5460 (707).
Exclusions: Not open to students with credit for 863.
Cross-Listings:

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1001
Subsidy Level: Doctoral Course

Course Goals

Teach the fundamental concepts in computer vision and to prepare the student to design simple vision systems, to read the literature, and to commence a research program in computer vision should he or she so desire
Topics include structure from motion, image segmentation, feature extraction, shape representation, object modeling and recognition, matching, and faces
Practice in computer vision concepts and system design is provided by a term project, conducted in teams and drawn from real-world applications

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to computer vision	3.0							

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Imaging geometry	6.0							
Image segmentation	6.0							
Object modeling and recognition	9.0							
Probabilistic approaches	6.0							
Face processing	6.0							
Motion analysis	3.0							

Representative Assignments

The project requires a formal, written report and an oral presentation to the class.
There usually are small homework assignments.

Grades

Aspect	Percent
Homework and/or midterms	25%
Individual projects	25%
Final project and/or final exam	50%

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
**	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
**	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
*	i	A recognition of the need for, and an ability to engage in life-long learning.
*	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Changes made:

1. Title changed from "computer vision and multisensor integration" to "computer vision."

2. Topics: Removed last weeks of multisensor integration. Added: shape and motion analysis.

Updated goals and topics to match university format 3/20/12

3. Move the course to Autumn of the same academic year.

Updated prereqa and exclusion to match university. Deleted "project" from course topic.

Prepared by: Aleix Martinez