

CIS*6320 Image Processing Algorithms and Applications

Course Outline, Winter 2018

Website: www.socs.uoguelph.ca/~matsakis/CIS6320 Instructor: Pascal Matsakis, pmatsaki@uoguelph.ca, MCKN 900D Lectures: Mon, Wed, 1:00pm-2:20pm, MCKN 317 Office Hours: By appointment only

Description

This course has been designed so as to be beneficial to all graduate students in computer science or related field, regardless of their specific thesis research.

The applications of digital image processing are continuously expanding through all areas of science and industry, e.g., medicine, defence, security, astronomy and geology. This course provides an introduction to basic concepts and methodologies. Typical topics include image representation, image enhancement, filtering in the spatial and frequency domains, segmentation, visual descriptors, and object recognition.

Not only will the students gain an insight into the principles of digital image processing, but they will also improve their oral presentation and technical writing skills; they will learn more on how to design effective slides and write a good literature review; they will gain critical skills; they will understand better research publishing and the process of peer review.

Finally, they will get more comfortable with mathematics and the mathematical language; they will develop analytical and problem solving skills; they will develop their ability to think and write with rigor and precision, to formalize ideas and formulate a problem in a way which allows for computation and decision.

<u>Textbooks</u>

The textbooks below are recommended for those with special interest in image processing, but none is required for the course.

- S. Birchfield, Image Processing and Analysis, First Edition, Thomson-Engineering, 2017
- R. C. Gonzalez, R. E. Woods, Digital Image Processing, Fourth Edition, Pearson, 2017
- J. C. Russ, F. B. Neal, The Image Processing Handbook, Seventh Edition, CRC Press, 2015
- M. Petrou, C. Petrou, *Image Processing: The Fundamentals*, Second Edition, Wiley, 2010

Grading Components

Quizzes (25%) — *Jan 15, Jan 22, Jan 29, Feb 14, Feb 28, Mar 7, Apr 4* You will be asked to take 7 quizzes that cover the course material.

Talk (20%) – Feb 5-7

The title of your talk will be "Applications of digital image processing to <application area>." I will do my best to accommodate your preference regarding the application area (e.g., medicine, defence, security, astronomy, geology), but I will make the final decision.

Reviews (15%) – Feb 6-8, Apr 20

You will be asked to review some talks and project papers.

Project paper (20%) – Apr 11

Your project must involve the implementation of image processing techniques. I will do my best to accommodate your preference regarding the topic (e.g., thresholding, edge detection, texture description), but I will make the final decision. You will have to present your work in the form of a conference style paper and submit your programs along with proper documentation.

Paper Presentation (20%) – Apr 18

You will be asked to give an oral presentation of your project paper.

E-Mail Communication

All students are required to check their <uoguelph.ca> email account regularly. They must use their <uoguelph.ca> account (not any other account) to contact the instructor. They should start the subject of each message with the number 6320.

Academic Integrity

The University of Guelph is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards, and must abide by the applicable policies (see https://www.uoguelph.ca/graduatestudies/current/academics/academic_integrity and https://academicintegrity.uoguelph.ca/). There is no group work in this course.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be audioor video-recorded without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact Student Accessibility Services as soon as possible (519-824-4120 x 56208, csd@uoguelph.ca, www.csd.uoguelph.ca/accessibility/).