EE465 Introduction to Digital Image Processing

Spring 2015 Syllabus – 3 Credit Hours

Instructor

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Lecture time: Tu&Th 9:30-10:45AM

Office Hours: Tu&Th 11-12AM

Course Description

An introductory course to digital processing of image signals, with emphasis on understanding the *basic concepts* behind various image processing tasks. The *connections* of image processing with other scientific and engineering fields are highlighted throughout the course. Homework and computer assignments utilizing MATLAB image processing toolbox will be used to help students grasp the basic skills of processing images on digital computers. Students are encouraged to explore novel applications of image processing into biometrics, biomedical engineering, graphics, through the class project (mini-size senior design).

Goals

- Appreciate the strength and limitations of various mathematical tools including calculus, linear algebra and statistics
- Understand the fundamental importance of image signals and the basic concepts of various image processing algorithms
- Build up the capability of implementing various image processing algorithms on the computer by MATLAB (C will be a plus)
- Have some idea about the ubiquitous connection of image processing to other technical fields as well as our daily lives
- Train some basic R/D skills including team work and oral presentation.

Outcomes

Upon completion of this course, students should

- Be able to explain why we should care about images and get familiar with their digital representations including both compressed and uncompressed formats
- Understand the basics of various image processing tasks including compression, interpolation, enhancement, denoising, restoration, inpainting, segmentation and analysis
- Be familiar with MATLAB image processing toolbox and able to write up their own functions to solve specific engineering problems related to images.
- Get some experience of working on a mini-size senior design project with partners and learn to give a short talk about the project

Suggested Text

Rafael C. Gonzalez and Richard E. Woods, "Digital Image Processing", Third Ed., Prentice-Hall'2008

Assignments

8 computer assignments (1-2 bonus ones at the instructor's discretion), midterm exam (MATLAB-based) and final project (including oral presentation).

Assessment

Computer assignment 40%, open-book individual-based Midterm exam 30%, team-based Final project 30% (5% oral presentation)

Grading

A 90%, B 80%, C 70%, D 60%, F <60%

Computer Assignments

MATLAB will be required for all computer assignments. You have the option of either purchasing the student version from the bookstore or using the PCs in the laboratories. Please make sure you do not put your computer programs on shared hard drives.

Midterm Exam and Final Project

Midterm exam will be open-book (you have access to all non-human resources) and individual-based (more like a MATLAB programming contest).
Final project will be team-based (you can have a partner if you want) and involve oral presentation (an opportunity of learning how to sell your work).

Academic Honesty

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me before the assignment is due to discuss the matter.

Social Justice

WVU is committed to social justice. The instructor of this course concurs with WVU's commitment and expects to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. Your grade in this course will be based solely on your honesty, your innate ability, your past experience related to the course material, your level of effort, and how these affect your performance in comparison to that of other students in the class, and NOTHING else. If you are a person with a disability, and anticipate needing any type of different accommodation in order to participate in this class, please advise the instructor EARLY in the semester and make appropriate arrangements with Disability Services (293-6700).