CMSC 630
Image Analysis
Syllabus

Instructor: Bartosz Krawczyk, Ph.D.

1.0 – Overview (Catalog Course Description):

Semester course; 3 lecture hours. 3 credits.

Prerequisite: CMSC 311 or EGRE 364

Basics of image structure, operations and formats. Advanced operation on images. Image segmentation and feature extraction. Learning from images and intelligent image analysis. Students will work on three project assignments, as well as deliver a seminar presentation on a selected topic from image analysis area.

2.0 – Course Structure:

Lecture hours/week – 3
Lab hours/week – 0

3.0 – Course Goals:

This graduate course provides a thorough introduction into the topic of image analysis. The students will be expected to have programming and reasoning abilities, as well as background on data structures and algorithms.

Upon successful completion of this course, the student will be able to:

1. Understand image formats and structures.
2. Understand basic and advanced operation on images that may lead to an automatic improvement of image quality.
3. Understand the role if image segmentation and region-of-interest localization.
4. Understand feature extraction and embedding into vector and tensor representations.
5. Understand machine learning algorithms for intelligent image analysis, target detection and image understanding.

4.0 – ABET Criteria Addressed:

a. An ability to apply knowledge of computing and mathematics appropriate to the program’s student outcomes and to the discipline.
b. An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
c. An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

d. An ability to function effectively on teams to accomplish a common goal.

e. An ability to use current techniques, skills, and tools necessary for computing practice.

5.0 – Major Topics Covered:

- Basics of image processing
- Advanced operations on images
- Image segmentation
- Feature extraction
- Tensor image representation
- Machine learning for image analysis

6.0 – Textbook:

None required.

Suggested:


Class Schedule:

T/R W105 11:00am-12:15 pm

7.0 – Evaluation

Grading system:

- 90% or more A
- 75% up to 89% B
- 60% up to 74% C
- 50% up to 59% D
- 0% up to 49% F

Percentage graded item:

- Project 30%
- Midterm 25%
- Final exam 30%
- Seminar 15%
General rules and instructions:

- Completing project, midterm and final exam for at least D is mandatory to pass this course.
- Project deadlines cannot be exceeded. I do not accept late work.
- Attendance is strongly encouraged.
- Extra credit (>100%) possible: up to 10% extra for projects beyond the scope.
- Students are more than welcome to ask questions during class, as long as it does not obstruct the lecture content presentation
- All slides will be posted on Blackboard after the class
- No eating during class
- Cheating during quizzes and exams, as well as plagiarism will be strongly prosecuted according to VCU Honours rules.
- Lecture slides are an aid to students, not a complete source of information required for this course
- Only e-mails written in a professional manner will be answered - proper salutation, e-mail topic description, and signature requested