



Introduction to Computer Vision for Digital Art

Winter 2015

Time: Friday 2:30-5:20PM

Location: Raitt Hall 105

DXARTS 528 for Winter 2015 focuses on computer vision for digital art. What new creative possibilities arise given the availability of affordable, ubiquitous tools for visual sensing? How are the traditional roles of viewer, artist, and artwork altered when the artwork can look back? What are the poetic, aesthetic, and ethical concerns introduced by the spread of machine vision techniques?

Each class session will consist of a live demo, an in-depth discussion of theory and implementation, and the presentation and analysis of relevant artworks. Weekly topics include the fundamentals of image processing, camera system construction, feature extraction, tracking, visual recognition tasks (face, object, text), gesture and activity recognition, 3d stereo imaging, and some preliminary machine learning. Course examples will be developed in Python or C++ using the OpenCV and OpenFrameworks libraries.

Student participation will be evaluated on the basis of weekly art/programming exercises and midterm and final projects. Work will be graded on the synthesis of technical material and artistic concept.

PROSPECTIVE STUDENTS, PLEASE COMPLETE OUR SURVEY: <http://goo.gl/forms/kW48LGdFc9> (<http://goo.gl/forms/kW48LGdFc9>)

Instructors

Yi Ding

Post-Doctoral Researcher (Computer Vision and Machine Learning)

Center for Digital Arts and Experimental Media

xddingyi@uw.edu (<mailto:xddingyi@uw.edu>)

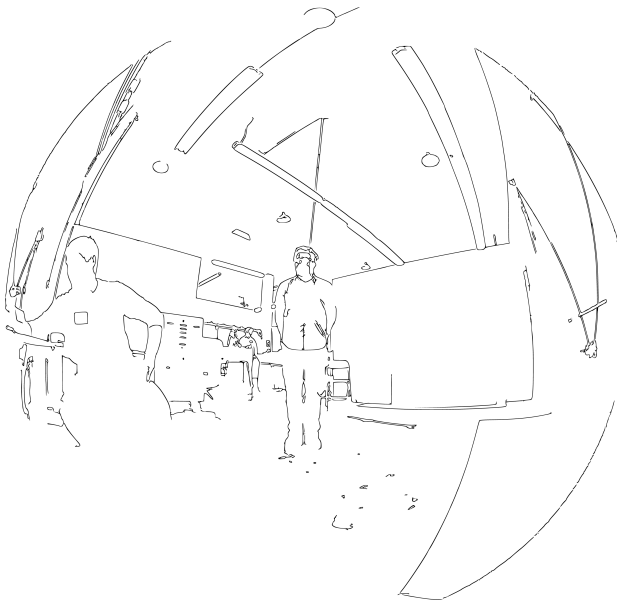
Robert Twomey

PhD Candidate

Center for Digital Arts and Experimental Media

rtwomey@uw.edu (<mailto:rtwomey@uw.edu>)

roberttwomey.com (<http://roberttwomey.com>)



Class Format

- 0.5-1hr - discussion of readings / homework / assignments
- 1hr - Robert
- 1.5hr - Yi
- 0.5hr - q & a

Student Responsibilities and Requirements

- **Attend** all lectures, workshops, labs and critiques.
- The class has only twenty lecture sessions, and each one will have a lot of information packed into it. Therefore it is important that you don't miss any sessions, and **attend** regularly. If you have to miss class due to emergency, illness or due to an established religious holiday, then you must notify the instructor directly and in advance. You will be expected to make up any missed sessions.
- Students are expected to come to class on time, ready to start promptly. Please bring any required materials, homeworks and notetaking equipment.
- Complete weekly **research**, assignments and/or **reading** homeworks, typically small experiments related to the current week's topics.
- **Participate** in class discussions
- Complete two projects and critiques: late work will not be accepted
- Creative **experimentation** is required and expected: attempt the impossible; use your imagination to stretch the boundaries of any and all assignments.

Policies

- No smoking, eating or drinking in the laboratory, classroom or building.
- Back up your data. No excuses for losing papers, web documents, images, etc. Keep at least three copies of everything: one on your hard drive, one on a CD, and one somewhere else just in case.
- You are responsible to clean the mechatronics lab according to the cleaning duty rota schedule and rules.
- If you need any specific electronic components, you have to check out them with your TA.
- If you have a disability that you think may impact your participation in this class, please contact **Disabled Student Services**. Every effort will be made to accommodate your needs.

Please be considerate of all DXARTS equipment that you check out. DXARTS equipment that is damaged while in your possession incurs the following deductible fees:

In the U.S. and Canada: \$250 for all equipment, and \$750 for laptops

Foreign locations: \$1000 for any lost, stolen or damaged equipment.

For more details on this visit <http://www.washington.edu/admin/rmequip/rates.html> (<http://www.washington.edu/admin/rmequip/rates.html>)

Homework

Homework is due by 11:59pm Thursday each week, the night before class.

Upload the whole project folder in one zip file to the course website.

This includes:

- source code
- Code::Blocks project file
- video, images, or other data files (in *bin/data* folder)
- this needs to be compilable

Midterm and Final Projects

We will critique both the midterms and final projects in class. For credit you will need to submit documentation of your project. This includes video, audio, still images depending on what you have made. We will talk about documentation on a case by case basis as we get close to the midterm and final.

Grading

- 20% Midterm
- 40% Final
- 40% Homeworks (weekly, approx 6-7 over the term)

Work will be assessed based on the quality of the concept, the application of technical knowledge, and the success of the final realization.

Above all we are striving for a productive synthesis of concept and technique (not just tech, not just an idea).

Door Codes

Date	Details	
Fri Jan 9, 2015	Week 1 - Intro, Coding (https://canvas.uw.edu/courses/961223/assignments/2729041)	due by 2:30pm
Thu Jan 15, 2015	Homework 1 - Setup Environment, First Project (https://canvas.uw.edu/courses/961223/assignments/2729417)	due by 11:59pm
Fri Jan 16, 2015	Week 2 - Fundamentals of Image Processing (https://canvas.uw.edu/courses/961223/assignments/2732439)	due by 11:59pm
Thu Jan 22, 2015	Homework 2 - Image Processing (https://canvas.uw.edu/courses/961223/assignments/2733381)	due by 11:59pm
Fri Jan 23, 2015	Week 3 - Background Segmentation and Blob Detection (https://canvas.uw.edu/courses/961223/assignments/2732443)	due by 11:59pm
Thu Jan 29, 2015	Homework 3 - Figure/Ground (https://canvas.uw.edu/courses/961223/assignments/2733344)	due by 11:59pm
Fri Jan 30, 2015	Week 4 - Object Detection (https://canvas.uw.edu/courses/961223/assignments/2732446)	due by 11:59pm
Thu Feb 5, 2015	Homework 4 - Face (https://canvas.uw.edu/courses/961223/assignments/2729428)	due by 11:59pm
Fri Feb 6, 2015	Week 5 - Motion and Object Tracking (https://canvas.uw.edu/courses/961223/assignments/2732448)	due by 11:59pm
Thu Feb 12, 2015	Homework 5 - Machine Observers (https://canvas.uw.edu/courses/961223/assignments/2729426)	due by 11:59pm
Fri Feb 13, 2015	Mid-term Project (https://canvas.uw.edu/courses/961223/assignments/2732540)	due by 11:59pm
	Week 6 - Midterm Critique / Stereo 3D (https://canvas.uw.edu/courses/961223/assignments/2732452)	due by 11:59pm
Fri Feb 20, 2015	Week 7 - Recognition (https://canvas.uw.edu/courses/961223/assignments/2732466)	due by 11:59pm
Fri Feb 27, 2015	Week 8 - Building Practical Realtime Vision Systems (https://canvas.uw.edu/courses/961223/assignments/2732456)	due by 11:59pm
Fri Mar 6, 2015	Week 9 - Practical Realtime part 2 (https://canvas.uw.edu/courses/961223/assignments/2732526)	due by 11:59pm
Fri Mar 13, 2015	Week 10 - Review, Special Topics (https://canvas.uw.edu/courses/961223/assignments/2732469)	due by 11:59pm
Fri Mar 20, 2015	Final Project (https://canvas.uw.edu/courses/961223/assignments/2732545)	due by 11:59pm