Honor Thesis Projects

2017-18

Computer Science
Faculty of Science
University of Ontario Institute of Technology

Students, please indicate your thesis selections at
https://goo.gl/forms/8ls70cXLS65oVMXI3
Projects (J. Bradbury)

Development of **multicore** or **many-core** testing tools (e.g., metrics plugin for Eclipse)

**Mutation testing** experiments

Applications of detecting similar code fragments ("clones") in software

Using **AI** (machine learning, genetic programming) to improve software development

**Games** for CS education

Other topics related to **software development**, **software testing**, **programming** and **source code analysis**
Project Based (K. Pu)

1. fsnotify
2. gin
3. gorilla

1. Composition
2. Realtime
3. Visualization

1. Functional programming
2. Trans-compilation
Research Based (K. Pu)

- Data sketch based algorithms for large scale open data indexing and analysis
  - Distributed minwise hashing and locality sensitive hashing
  - Extensions to hyperloglog counters
  - Hybrid data type support for fast approximate search using data sketches
- Characterization of government open data repositories
- Real-time data flow and learning
  - Close loop systems that support continuous data flow between mobile devices and the cloud
- Physics based simulation as means of user interface design
  - Extending https://thegrid.io/
Web and/or Mobile Applications (R. Fortier)

- Games, game engines, and virtual reality
- Physical simulations and visualizations
- Web and mobile application development
- Tools supporting students and teachers
  - Scheduling and planning
  - Tracking student performance
  - Organizing study groups
  - Giving online quizzes
Data Science Lab (Jarek Szlichta)
Topics

● Web Search
  ○ Anyone can play
  ○ The open society

● Data Curation
  ○ Data cleaning-needle in a haystack
  ○ Data streams
  ○ Crawling the Web

● Other topics related to Big Data
  ○ Mining social-network graphs
  ○ Query problem determinations tools
  ○ Recommendation systems
  ○ Large-Scale Machine Learning
Visual Computing Lab (Faisal Qureshi)

Making machines “see”

1. Google AI gets better at 'seeing' the world by learning what to focus on
   Techrepublic, 5 Feb 2016

2. Google And Movidius Partner To Propel Computer Vision In Next-Generation Devices
   Techcrunch, 27 Jan 2016

3. CES show report: Automobiles, computer vision, and imaging are big trends
   CES Show Report, Design & Reuse, 18 Jan 2016

4. Computer Vision Has Its Sights On Disrupting Search
   Techcrunch, 16 Jan 2016

5. Intel and Google Equip Smartphones with 3D Cameras and Computer Vision
   Anandtech, 12 Jan 2016

www.vclab.ca
Thesis projects (Faisal Qureshi)

- *Deep Learning* application in computer vision
- Scaling up computer vision using sparse processing
- Control & coordination in ad hoc networks of mobile devices
- Indexing structures for images and videos

- High-performance embedded vision on NVidia Tegra X1 processors
- Low-cost, ubiquitous vision using Raspberry PI 2
- Vision on mobile & wearable devices and Unmanned Airborne Vehicles

- Action recognition in videos
- Crowd animation through video analysis
- Personal video summarization
- Image localization and search

Theory 1 3 4
Platforms 5 2
Applications 4 3
Mark Green - Thesis Projects

- My main research interest is in computer graphics, with some interest in mobile computing, IoT/Wearables, and system programming.
- In computer graphics, I’m interested in 3D display devices and rendering algorithms - I like to build hardware.
- In mobile computing, I’m interested in mobile interaction with databases and other enterprise-like topics.
- I can always be convinced to do something in computer games.
- I like gadgets and other cool hardware things.
Mark Green - Project Idea - tshirtOS

I’m really interested in wearable technology like tshirt OS
Mark Green - Project Idea - Unix Lab

- The early versions of Unix (the OS Linux is modeled on) were quite simple and easy to understand
- MIT ported one of the earlier versions to the PC and is using it in their operating systems course
- Project: follow up on the MIT idea (their code is open source) and put together a platform for an operating systems course
- Think about the labs and assignments that would be interesting
Mark Green - More Thesis Projects

- Possible thesis projects include (but are not limited to):
  - auto stereographic displays, hardware and software
  - extensions to one of the open source rendering packages
  - Performance evaluation of rendering algorithms/software
  - for the very brave, holographic display algorithms - I have a holographic display
  - rendering platforms for graphics education
  - support packages for Vulkan
  - anything to do with AR/VR
  - mobile games, in particular multi-player
  - mobile 3D display devices
Vialab (Christopher Collins)
Visualization for Information Analysis

Linguistic Information Visualization

Visualization Technique and Interaction Design

NUIs for visualization: tables, walls, gestures

Applied visualization: software, security, humanities, healthcare, education
Vialab - Projects (Christopher Collins)

Large Text Collection Analytics
- Datasets include: history of Supreme Court, historical children’s literature, and the history of academic scholarship in Canada

App Development
- Interaction design for apps for literacy education

Eye Tracking
- Gaze awareness over screen sharing on video calls

Explainable AI
- Interface design to make AI decisions more understandable

Visualization Research
- Making automatic captions for charts based on the data
- Using sensors to study how different colour palettes in visualization design affect emotional response to data

Interaction Design for Novel Hardware
- How to interact with software using motion capture / gaze / gesture / proxemics / virtual reality (Vive/Oculus)
The End
Information (for faculty use only)

- Please use this document to add honor thesis projects that you plan to offer for 2017/18.
- Ideally each slide should contain information about one project.
- Project description must have the following information
  - Title
  - Supervisor
- It is ok to offer joint (co-supervised) projects.
- Please try to complete this information by Mar 10 at the latest