Cosc366/Cosc486 Projects

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This document outlines some of the available topic areas for Cosc366 projects for the 2015–2016 summer semester and information about the availability of some potential supervisors. It will be updated as new information comes to hand. Please feel free to contact individual staff members to discuss suitable project topics. You will find more information about the research groups in the department at `http://www.cosc.canterbury.ac.nz/research`.

Tim Bell

Interactive HTML5/Javascript apps for the CS Field Guide

A $4,000 scholarship is available to work on online "interactives" for teaching computer science. The CS Field Guide (csfieldguide.org.nz) is an online textbook for teaching CS in NZ schools. It contains a number of interactive experiences to teach students concepts (some examples are given below). The goal of this project is to develop and evaluate new interactives for topics that currently don't have any. This will involve using suitable educational design principles, choosing suitable frameworks, and evaluating and refining the software.

Some examples are:

- The colour mixers and pixel interactive at `http://csfieldguide.org.nz/DataRepresentation.html#representing-images-with-bits`

- The TSP solver at `http://csfieldguide.org.nz/_static/widgets/tract-tsp-basic-v2.html`

- 3D graphics interactives at `http://csfieldguide.org.nz/ComputerGraphics.html`

Neville Churcher

I can offer projects in software engineering and software visualisation. I can also co-supervise with Dong Seong Kim a project on visualising security data.

Matthias Galster

Towards better understanding effort estimation in agile software development projects

This project aims at describing the efficiency and effectiveness of effort estimation approaches in agile software development projects. In detail, this project will a) identify the effort estimation approaches and practices currently used in agile software development projects at the organization; b) describe how these effort estimation approaches and practices are applied; and c) analyze the effectiveness of these effort estimation approaches and practices (e.g., how accurate are estimates, does accuracy of estimates increase over time, what are factors that affect the accuracy of effort

estimates). The project will observe different teams across the organization. For each team, effort estimation practices will be observed over several sprints. Furthermore, the accuracy of the estimates will be analyzed at the end of each sprint, including whether there are improvements in the estimates over time (and if so why or why not). Sources of data will include observations of teams, interviews with teams at the beginning, during and at the end of sprints, and artifact analysis.

Diversity in software development teams

Diversity can be in culture, in thinking, in discipline, in age, in gender, and in many more aspects. Diversity in teams tends to have a positive influence on innovation and team performance. This project aims at better understanding the impact of diversity on software development teams. This project will first perform an informal literature review of empirical research on diversity in software engineering and in particular software engineering teams. Then, this project will study diversity at the organization, how it changed over time and what the impact on team performance is. Team performance can be measured based on different indicators (e.g., accuracy of estimates, level of agreements and outcomes of team discussions, team progress, product satisfaction, work place satisfaction, meeting targets and many more). The study will include interviews and questionnaires with teams and individual team members, but also analyses of process documentation, internal wikis, etc. The focus of the study will most likely be on gender diversity.

Mukundan

Contact: R. Mukundan (mukundan@canterbury.ac.nz)

Texture Analysis and Segmentation (Biomedical image processing)

This project involves the study of efficient texture feature descriptors that form the basis of image segmentation, particularly in biomedical image analysis applications. High resolution digital microscopy images of biopsy samples will be used to analyse the performance of the developed methods. Prereqs: C/C++/Matlab programming.

Tissue Image Analysis of Cytological Features (Biomedical image processing)

In this project, we will consider the problem of extracting relevant cytological features (such as cell size, cell count, cell shape) from histopathological images of tissue samples. Such methods are now being increasing used in computer aided diagnosis, automatic cancer grading and disease classification. Prereqs: C/C++/Matlab programming.

Large-scale Crowd Simulation (Computer Graphics)

This project involves a detailed study of group dynamics and behaviour models that are used in large-scale crowd simulation. We will also consider some popular crowd simulation software such as Pedsim and Miarmy for comparative analysis. Prereqs: COSC363 or equivalent.

Tanja Mitrovic

One project is available on educational data mining to identify disengagement. Kourosh Neshatian will also be involved in the supervision of this project.

There could be other projects in the area of Artificial Intelligence in Education.

Kourosh Neshatian

No projects offered as sole supervisor this year.

Andreas Willig

No projects offered this year.