Computer Science staff directory can be found at
http://www.nottingham.edu.my/ComputerScience/People/index.aspx

You can visit the staff webpage to find out their individual area of interests for project supervision, although it is advisable if you can arrange to meet the staff to find out in more details of projects they are interested to supervise based around their expertise.

The following is a list of projects offered by staffs. This list is by no means complete, and only indicates projects offered by them.

ZhiYuan Chen

1. Feature selection framework for the study of price volatility in agricultural commodities

Description: This project aims to examine the issue of price volatility in agricultural commodities and how machine learning techniques could help in this research area. A growing problem is that agricultural price shocks and volatility disrupt agricultural markets, economic incentives and incomes. With increased globalization and integration of financial and energy markets with agricultural commodity markets, the relationships between markets are expanding and becoming more complex. When a crisis such as a regional flooding, food safety scare or a financial crisis hits a particular market, policy-makers often do not know the extent to which it will impact on other markets and affect producer, consumer and trader decisions. This research aims at formulating a framework with a better understanding of the dynamics of agricultural commodities prices and the incidence of different explanations in their dynamics. The framework will be a practical guide for both present and future policy-makers in deciding on potential price-stabilizing interventions, and will also serve as a useful resource for researchers and students in agricultural economics.

Difficulty: Hard. Some familiarity with agricultural economics and machine learning techniques

2. Time-series analysis in trend and seasonal movement for the agricultural commodity price

Description: This project focuses on time-series analysis in trend and seasonal movement for the agricultural commodity price, and the final goal is to present a framework (or a time-series model) that is able to offer recommendations for anticipating price movements and managing their consequences. Typical functions could be agricultural commodity price short-term prediction, early warning of agricultural commodity market risk, and agricultural commodity market situation analysis.

The first potential problem of this project is in time series data analysis, which involves the prejudgment and processing of time series data, such as taking natural logarithms, differentiating the time series to eliminate random fluctuation, taking the unit root test to judge the stability of data. Second potential problem is in configuring parameters in prediction model for different agricultural commodity. For instance, apart from sequence data processing, it also needs to choose the optimal equation by comparison. Thirdly is that the ultimate results need to be translated into the knowledge with the original data format, i.e. restore the logarithmic, differential date into original date.

Difficulty: Hard. Some familiarity with agricultural economics and machine learning techniques

Siang Yew Chong

1. Microscopic Traffic Simulation
Description: This project involves microscopic traffic simulation using existing open source traffic simulation framework such as MATSIM (http://www.matsim.org/) and SUMO (http://sumo-sim.org/). Research issues of interest include the calibration of the traffic simulation based on local (Malaysian) data (e.g. driving behaviour, traffic volumes, etc.).
Difficulty: Hard (strong programming skills, e.g. JAVA for MATSIM)

2. Designing Novel Evolutionary Algorithms for Optimization Problems
Description: This project involves the design of novel evolutionary algorithms to solve optimization problems. This includes a literature survey of current state-of-the-art and standard approaches to a class of optimization problems, identifying a design motivation (e.g., novel nature-inspired approaches), subsequent implementation, and analysis that includes comparison with existing state-of-the-art.
Difficulty: Hard (strong programming skills and knowledge of performing statistical analysis)

Sooi Hock Ho

1. A digital watermark is a kind of subliminal information covertly embedded in a noise-tolerant multimedia signal such as audio or image data. It can be used to provide authentication services ranging from copyright protection to digital right management in commercial applications. Many algorithms for digital watermarking have been proposed and implemented, which can be broadly categorised into the spatial/time and frequency/transform domains techniques.

In this project, the student is expected to provide a comprehensive survey of the current development in the main domains of digital watermarking, investigate their performance and implement a selected algorithm with MATLAB or in any preferred language, e.g. Java or C++.

2. A Speaker Identification System Based on Vector Quantisation

Abstract: The goal of this system is to identify the speaker so that his/her voice can be used to restrict accesses to services like computing, phone banking, database queries, voice mail and physical facilities. Both text dependent and text independent cases are to be investigated and modeled using MATLAB and finally implemented in any preferred language, e.g. Java or C++.

Difficulty: High

Iman Liao

1. 3D Crime Scene Reconstruction.

Currently the crime scene can be captured by four fish-eye cameras to produce a spherical image in 3D. However, it is not a truly 3D scene as they are still topologically 2D images. The objective is then to reconstruct a truly 3D scene with current hardware settings.

2. Improving Transfer Function Based Volumetric Data Visualisation.

Volumetric data such as CT scanned dead bodies (with covers etc) can be viewed layer by layer by each time removing the outer layer to display the inner layer. For example, the couch may be removed to show the body only, or the skin layer be removed to show the muscle layer, etc. However, the current method being used (we suspect as the transfer function based) cannot completely remove the outer layer, i.e., the result of inner layer still contains a small portion of outer layer that are not able to be removed. The objective is then to improve the current method to produce a cleaner outer layer remover.

3. Muscle Separation Based on 3D Volumetric Data.

The current visualisation of muscles from body CT scans can only display all muscles as a big chunk but not in terms of different pieces of muscles, the latter of which, however, is much more useful for the medical experts. The objective is to provide an attempt solution to the latter goal.

4. 3D Volumetric Data Measurement.

This is to accurately calculate/measure the volume of any specific type of organ, e.g., brain, lungs, etc, from CT scans. In order to achieve this, image segmentation would be an requirement.

Tomas Maul

1. Deep neural networks for the automatic classification of Malaysian bird songs.
Difficulty: moderate

2. The integration of gradient-based learning with evolutionary mechanisms in neural diversity machines.
Difficulty: hard

3. Multiple image processing chain optimization (MIPCO) applied to a large set of image processing problems.
Difficulty: moderate