This document lists my current PhD projects for which I am actively looking for PhD students to join me. You can find more information about me on **http://www.personal.leeds.ac.uk/~scshwa/**

Project 1

Name of Supervisor: He Wang
Research Project Title: Data-driven Understanding of Crowd Dynamics and Behaviour Patterns
Keywords: Computer Graphics, Computer Vision, Machine Learning
Project Description:
If you watch Game of Thrones or play Assassin's Creed, you probably know crowds (people, animals or white walkers) in movie/TV/games/virtual reality nowadays are simulated by computers. However, the importance of understanding of crowd dynamics is far beyond entertainment. It's been used for evaluating architecture design, planning for emergency evacuation, optimising transportation and logistics, predicting hazardous situations, etc.

As a PhD student, you will focus on learning individual/crowd behaviours (navigational, grouping and socio-psychological) from various forms of data (videos, trajectories, GPS locations, etc.) and build computational models that capture the crowd dynamics and simulate to predict.

The knowledge that is crucial for this project includes:
1. Computer Vision (Crowd Analysis, Video Processing)
2. Computer Graphics (Simulation, Geometry Processing, Animation, Rendering)
3. Machine Learning and data mining.

If you are not familiar with these topics yet, you will get a comprehensive knowledge and hands-on experience in each one of them; if you are somewhat familiar with them, it is a good project to help you become a world-class researcher and practitioner.

Full details can be found here: https://engineering.leeds.ac.uk/research-opportunity/201323/research-degrees/995/data-driven-understanding-of-crowd-dynamics-and-behaviour-patterns

Project 2

Name of Supervisor: He Wang
Research Project Title: Environment and Interaction Modelling for Motion Analysis and Control

Keywords: Computer Graphics, Computer Vision, Machine Learning

Project Description:

Humans have extremely strong abilities in sensing, understanding and interacting with the environment. Imagine every time you put on a sweater. It is easy for an 8 year old but extremely difficult for robots and virtual characters. By looking closely, this motion planning problem involves understanding the motor skills and structures of our body, capturing the dynamics of a highly deformable object (the sweater), planning motions and manipulation strategies and doing an on-line control.

As a PhD student, you will be looking into new problem representations (geometric, topological, etc.) to describe this kind of problems from various data. It involves to model spatial relations between objects, design task space representations for motion planning and construct control algorithms to carry out the motions.

The knowledge that is crucial for this project includes:

1. Computer Graphics (Geometry modelling, Surface reconstruction)
2. Machine Learning and data mining, robotics (ideally)

This project will be combining mainly graphics knowledge with data analysis and robotics. Aside from the graphics group, we have strong robotics and machine learning groups in school to help you to accomplish world-class research.

Full details can be found here: https://engineering.leeds.ac.uk/research-opportunity/201323/research-degrees/996/environment-and-interaction-modelling-for-motion-analysis-and-control

Other Projects

I am also open to other projects in my area (Computer Graphics, Computer Vision, Machine Learning, etc.). If you have good projects you would like to propose, please get in touch and I would love to talk to you about various possibilities.