PhD studentship (Full-time)

Institution	Xi'an Jiaotong-Liverpool University, China
Department	Department of Civil Engineering
Supervisors	Principle supervisor: Cheng Zhang (Xi'an Jiaotong-Liverpool University) Co-supervisor: Ian Walkington (University of Liverpool, UK);
Application Deadline	Open until the position is filled
Funding Availability	Funded PhD project (world-wide students)
Project Title	Multi-agent Real-time Simulation System of Light Train Network Energy Sustainability Analysis 用于轻轨网络能源可持续性分析的多智能体实时仿真系统
Contact	Please email cheng.zhang@xjtlu.edu.cn (principle supervisor's email address) and copy doctoralstudies@xjtlu.edu.cn with a subject line of the PhD project title

Requirements:

The candidate should have a master's degree (or equivalent qualification), in *Civil Engineering, Electrical Engineering, or Computer Science*. Evidence of good spoken and written English is essential. The candidate should have an IELTS score of 6.5 or above, or an equivalent qualification, if the first language is not English. In addition, good programming skill in C++, C#, or Java, etc. will be a merit. This position is open to all qualified candidates irrespective of nationality.

Degree:

The student will be awarded a PhD degree from the University of Liverpool (UK) upon successful completion of the program.

Funding:

The PhD studentship is available for three years subject to satisfactory progress by the student. The award covers tuition fees for three years (currently equivalent to RMB 80,000 per annum) and provides a monthly stipend of 3500 RMB as a contribution to living expenses. It also provides up to RMB 16,500 to allow participation at international conferences during the period of the award. It is a condition of the award that holders of XJTLU PhD scholarships carry out 300-500 hours of teaching assistance work per year. The scholarship holder is expected to carry out the major part of his or her research at XJTLU in Suzhou, China. However, he or she is eligible for a research study visit to the University of Liverpool of up to three months, if this is required by the project.

Project Description:

The aim of this research is to optimize energy consumption by interactively simulating and analyzing the energy consumption of the individual train and the train network. The objectives are: (1) to propose a methodology of an intelligent agent system for real-time simulation of the whole light train network; (2) to develop algorithms for optimizing energy distribution based on energy consumption analysis of the network. Negotiation rules will be developed and applied to the agent group for better communication inside the network; and (3) to develop operational strategies for individual train operators based on automated machine guidance (AMG), so as to minimize the disadvantage of manual operations. An agent-based system will be proposed to interactively simulate, analyze, and optimize the energy consumption of the individual train and the light train network. Algorithms will be developed in terms of micro and macro levels to find an optimized solution for the light train transportation system. In micro level, a single-train motion simulator (STMS) will be used as the core part of each agent that represents each train operated in the network. The train position, train velocity, current energy consumption of each train is generated in real-time considering geography and driving style by the STMS simulator. While in macro level, based on traffic demand, trains running in different zones need to adjust speed and strategies to distribute energy to other trains with higher priority based on the network analysis. Negotiation will take place between agents representing individual train operators for better resource allocation. Traditional simulation models use statistical data to estimate performance. However, to make the simulation results more realistic and reflecting the changes during the task execution, a Real-time Simulation (RTS) will be proposed to improve the accuracy of performance forecasting while reducing modelling burdens on end users.

For more information about doctoral scholarship and PhD programme at Xi'an Jiaotong-Liverpool University (XJTLU): Please visit

http://www.xjtlu.edu.cn/en/admissions/phd.html

http://www.xjtlu.edu.cn/en/admissions/phd/feesscholarships.html

How to Apply:

Interested applicants are advised to email cheng.zhang@xjtlu.edu.cn (principle supervisor's email address) the following documents and copy doctoralstudies@xjtlu.edu.cn (please put the project title in the subject line).

- CV
- Two reference letters
- Personal statement outlining your interest in the position
- Proof of English language proficiency (an IELTS score of above 6.5 or equivalent is required
- Verified school transcripts in both Chinese and English (for international

students, only the English version is required)

- Verified certificates of education qualifications in both Chinese and English (for international students, only the English version is required)

Informal enquiries may be addressed to Dr. Cheng Zhang (cheng.zhang@xjtlu.edu.cn), whose personal profile is linked below, http://academic.xjtlu.edu.cn/civeng/Staff/cheng-zhang