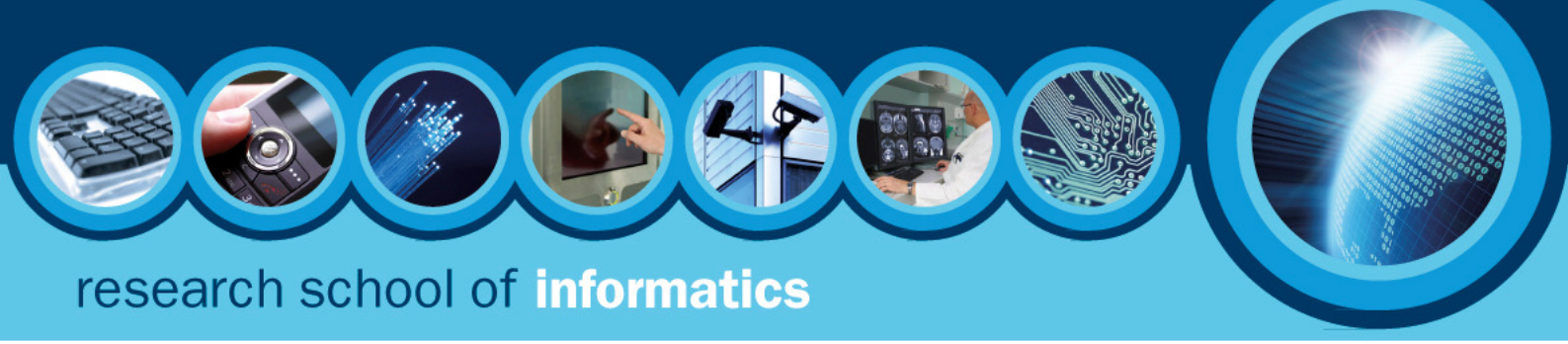

research school of **informatics**

Project Title:	Artificial Intelligence in Rail Timetabling
KTP Associate Name:	Dr Mark Withall
Supervisor Name:	Dr Chris Hinde, Dr Tom Jackson & Dr Iain Phillips
Start/End Date:	June 2008 - May 2011
Funding Source:	RWA Rail Ltd, Technology Strategy Board
Department:	Computer Science

Project Description:

Currently, the process for creating timetables for the running of trains on the UK rail network is primarily performed manually. This process can take many months. The aim of this Knowledge Transfer Partnership (KTP) project is to partly automate the train planning process. Train planning includes not only the creation of timetables, but the allocation of trains to each route on the timetable and the allocation of staff to operate those services. Previous attempts at automating rail timetabling have met with only limited success; either only being suitable for small timetables or generating a timetable that doesn't take into account the business aspirations of the train operators. By incorporating the business aspirations into the process, not only do we get a 'legal' timetable, in terms of trains not interfering with each other, but we also get a timetable that provides services that the customers actually want to use. For example, by minimising journey times and stopping at stations when there is demand. The project aims to use artificial intelligence (AI) techniques, such as genetic algorithms (GAs) (an optimisation technique based on Charles Darwin's theory of evolution), to create timetables that meet both the physical constraints of the rail network and the business aspirations of the train operating companies (TOCs). This will greatly speed up the process of creating timetables allowing greater time to test the robustness of the plan and to allocate trains and staff more efficiently. One of the greatest challenges is the lack of usable data about the rail network. There is no single unified source of rail infrastructure data and many of the required documents (such as the rules for operating trains on the rail infrastructure, which dictate, for example, how far apart trains must be on each section of track) are not in a conveniently computer-readable format. The project will include creating tools to generate and maintain this information. At the end of the project, the aim is to have a suite of tools that allow our industrial partner, RWA Rail Ltd., to perform their rail planning activities more efficiently and effectively giving benefits to both them and their customers.

Loughborough University