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The University of Nottingham and Webroster Ltd collaborate to achieve 'Outstanding' KTP

The University of Nottingham and workforce scheduling software provider Webroster Ltd have completed a two-year Knowledge Transfer Partnership (KTP) to improve homecare workforce utilisation, achieving the highest possible grade of 'Outstanding'.

KTP's are a nationwide programme to help innovative businesses benefit from the UK Knowledge Base by giving them access to knowledge, technology or skills at universities and other research organisations.

The two organisations embarked on the partnership in 2014 in an attempt to solve a previously unsolved challenge of truly optimising homecare workforce utilisation. A KTP was set up to give Webroster access to high calibre academia and to give the University access to real-world commercial situations upon which they can base cutting edge research.

The two-year project has recently been completed and was given the highest possible grade of 'Outstanding' by the KTP Grading Panel for meeting and exceeding its original objectives which were to improve homecare workforce utilisation by developing an adaptable software optimisation engine that solves any workforce management scenario that includes both rostering and routing.

Webroster Ltd provides online rostering and workforce management solutions to industries which have a specific need to roster staff to clients whilst also taking other variables into account, such as skill set, qualifications, travel time and the required tasks. Software Director Richard Ward said: "Prior to the KTP, Webroster sought to identify an optimiser that could be incorporated into our existing software. Even specialist providers of optimisation were not capable of providing such specialised optimisation engine

for the complex workforce scheduling and routing scenarios faced by Webroster. Following, initial consultations with the academic team, it became clear that their expertise was exactly what was needed and that a KTP was the perfect mechanism for realising our strategic vision.”

The ‘Automated Scheduling, Optimisation and Planning’ research group at the University of Nottingham were keen to get involved in the project. Dario Landa-Silva, Associate Professor in Computer Science said: “This KTP project contributed enormously to the academic team’s research activity. The focus of this project, developing an optimisation engine to automate the generation of schedules for home healthcare workforce, is one of the key research interests of the academic team and their whole research group. Tackling the integrated workforce scheduling and routing problem (i.e. homecare staff visiting patients at their home) represents a significant challenge.”

A KTP Associate, Rodrigo Pinheiro, was selected to work on the project as part of his PhD at the University of Nottingham. Although the broader issue of workforce optimisation is a key interest of his research at the University, he was tasked with researching Webroster’s specific problem and developing optimisation algorithms to solve it.

“The partnership worked really well because we were able to bring state-of-the-art academic knowledge to the company when developing the algorithms, servers and UI and to bring complex real-world scenarios to the Knowledge Base Partner (The University of Nottingham) to generate research.

“Having the three-way relationship was crucial to the success of the project; as a group, we achieved results that otherwise wouldn't be achievable. We extensively used the University access to academic journals and material on our research. Without this, we would not be able to obtain the algorithms we developed. Also, the Webroster provided us with equipment, data and opportunities to directly contact its customers and learn what their needs are so we could create better solutions.”

The results of the KTP are beyond expectation. Webroster has gained significant knowledge, understanding and appreciation of optimisation problems and has been able to produce a unique solution to the problem which will be launched later in the year.

“The research profiles of the academic team have been strengthened in several aspects.” Said Dario Landa-Silva. Eight research papers were produced as a result of the work, which have been published in leading academic journals and international conferences. Dario continued: “The papers cover a range of research outcomes facilitated by this KTP project: Problem benchmark data sets from real-world scenarios (based on customer feedback) provided by Webroster; formal optimisation models for these benchmark problems; various optimisation algorithms including mathematical programming and tailored heuristics to produce high-quality solutions and application programming interface (API) to facilitate the implementation of the optimisation engine.”

Richard Ward concluded “we can express nothing short of our expectations being exceeded by the KTP programme. Throughout the course of the project the associate and university have demonstrated true professionalism and support, always on hand to answer our questions or concerns timely and accurately; always expressed to maximise our understanding.”

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Notes to editors

- Webroster Ltd is based in Cambridgeshire and is one of the UK's leading software development firms
- Founded in 2002 from a family business Webroster Ltd is a forward-thinking, dynamic and progressive company
- Its market-leading software solutions are designed to enhance business through use of the internet and, as such, introduce new ways of working to many organisations
- <https://www.webroster.co.uk>