Knowledge Transfer Partnerships

Detecting insurance fraud

Allstate Northern Ireland Ltd

Location: Belfast

Project length: 2 years

University School: School of Electronics, Electrical Engineering & Computer Science

Academic Team: Dr Jun Hong and Prof Weiru Liu

The Company

Allstate NI is a wholly owned subsidiary of Allstate Corporation, a major US personal lines insurer, specialising in home and auto insurance. Allstate NI provides business and technology services to the parent company, including software development, business processes and quantitative analytics.

The Challenge

Reducing fraud is critically important to Allstate as research studies estimate that fraud costs the insurance industry $25 billion per year and that 10 per cent of all insurance losses are believed to be fraudulent. When applying these estimates to Allstate's business, there is a potential $800 million in savings to be made by reducing fraud. Given the magnitude of the figures, even a small reduction in fraud can have a big impact on the company's financial results.

The KTP

The aim of the Partnership was to develop an integrated anomaly detection system to identify fraudulent claims and point of sale fraud. The partnership focused on developing a structural similarity-based matching system to identity fraudulent individuals who re-enter the system with a new identity. Allstate uses graph databases for insurance data management and data analytics. These graph databases provide input data to the matching system.

The KTP Associate worked on a similarity graph algorithm which has the advantages of matching both transactional data (about claimants and policies), and structural data (connections between individuals in the system).

Queen's University Belfast

Innovate UK
Technology Strategy Board

Invest Northern Ireland

Company benefits

- Allstate have adopted the latest academic research and methods to develop advanced data mining algorithms and techniques. The KTP provided a unique opportunity to partner with a leading research institute and learn new ideas and find more opportunities to collaborate. From an analytical and technical standpoint, the KTP addressed the need to move to a completely new data model, using cutting-edge unsupervised learning along with algorithm scaling techniques.

- The knowledge and capabilities acquired through the KTP have helped instigate a much larger collaboration with Queen's aimed at implementing a production-ready version of the pattern matching algorithms researched within this KTP. This three-year collaboration will fully develop and integrate the research and algorithms into the tools used by the business to help identify fraud.

- The knowledge gained from the KTP partnership is generating growth and increasing revenue. Given that the area of research that the KTP was focused on is ground breaking, the potential company savings are going to be huge.

"The KTP provided us with a fantastic opportunity to learn from the world's best. The learning curve was extremely steep as we tried to gain all the expertise that we could during the partnership. This ultimately allowed us to raise our game in a very advanced and sophisticated area of computer science."

**Paul Shannon,
Allstate NI Ltd**

University benefits

- The University's staff have seen first-hand the application of data analytics in the insurance industry. Their experience included new research challenges, addressing application issues, analysing large-scale datasets, and collaborating with industry to solve real-world problems and produce real economic impact.

- Dr Hong and Professor Liu have increased their research expertise in graph mining and anomaly detection. Observations and requirements on data analytics applications gained from the KTP project have been incorporated into a new MSc course on data analytics and revised the module on machine learning and data mining.

- Allstate's fraudulent claim detection problem is a challenging big data problem. Firstly, the data model is graph-based rather than transactional data, hence requires advanced graph mining and analysis algorithms. Second, there are many practical application issues, such as data quality and scalability. These real-world issues provide challenges that motivate the University's theoretical research.

- Through the KTP with Allstate, Queen's has secured a large R&D grant from Invest NI. This research on insurance fraud detection underpins a potentially strong impact case study for the University. The partners have also developed a long-term partnership in other areas of mutual interest, such as Global University Programme and a potential PhD training programme.

"The KTP exceeded our expectations. We have seen many real-world challenges that we would not see in an academic environment, which helps shape our research strategies and priorities."

**Dr Jun Hong,
School of Electronics, Electrical Engineering &
Computer Science, Queen's University Belfast**

Queen's University Belfast

How to apply for a KTP

Contacts
Check the feasibility of your idea with your University Programme Manager.

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E: **l.marks@qub.ac.uk**

Or you can call Queen's University Belfast
on **028 9097 3970** or go
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Invest Northern Ireland

Or with an Invest Northern Ireland executive.

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