PROFESSOR SUSAN CRAW

Here, Susan gives an overview of how data science can have a significant impact on business innovation, and how technology in the field of health can be life changing.

Susan Craw is a Professor at Robert Gordon University. Her work in Artificial Intelligence develops data mining techniques that have had important impacts on industry, e.g. assisted living in technology-enabled homes, oil & gas 'lessons learned', and pharmaceutical product design.

"My work develops innovative digital technologies for building and applying intelligent information systems for real-world problems."

Much of my research is based on Case Based Reasoning. CBR solves problems by remembering a previously solved problem (case) in its memory and reusing its solution. Newly solved problems may be retained in the memory so it learns as it solves problems.

The reliance on stored experiences means that CBR is particularly relevant in domains which are not well understood. CBR systems are a useful way to capture corporate memory of human expertise.

I've worked with many industry majors and SMEs developing case-based decision support systems.

An early application with AstraZeneca for tablet formulation reused data on "recipes" for existing drugs to design tablets for new drugs. CBR replicated the manual approach but was able to cope with changing environments and policies.

More recently CBR was applied with an SME to project planning for well engineering. Here plans were reused in order to take advantage of lessons learned from previous projects to improve efficiency and mitigate risks.

Recent projects have developed recommender systems that allow intelligent interaction and engagement with information. For online-music, a recommender uses both audio data and social tagging to suggest music that the user likes, but also to discover new music that they do not already know.

In e-learning, a recommender system must cope with learners not knowing what topics are relevant but also not using the same vocabulary as teachers. The recommender learns topics and vocabulary from textbooks and Wikipedia to help the learner search effectively.

A textile archive project with Johnstons of Elgin allowed users to browse the archive according to contents, images, 'stories', designs, and then learns to improve the browsing experience by learning from the interactions of users.

Projects with Historic Environment Scotland and the National Museum of Flight enabled visitors to engage and interact with locations by activating mobile information using NFC tags or i-beacons at the location. The visitor sites were also able to track visitors' engagement with the exhibits.

A new sensor analytics project with Albyn Housing, Carbon Dynamic and NHS is developing a fall prediction system for assisted living; this project is part of the DataFest18 'Fit for Healthy Living' session.

These projects demonstrate the variety of applications that CBR has solved, and give a taste of the range of businesses and sectors which can benefit."

For more information on Professor Craw and her work see **www.rgu.ac.uk/dmstaff/craw-susan/**

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