Integrating the physical and digital worlds

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University of Adelaide computer scientists are investigating the relationships between people and the things around them to advance the development of the 'Internet of Things'.

Ms Lina Yao, Research Associate in the University's School of Computer Science, developed research prototypes of a 'smart home', where appliances can be turned off and on and monitored over the web.

"The Internet of Things is widely regarded as the number one technology that is going to change our world in the coming decade," says Ms Yao.

"The Internet of Things will push the Internet to the next level: not only connect documents, data and people, but also connect physical objects. So in the near future, everyday things such as the content of homes, buildings and sidewalks, and commodities can be understood, recognised, contacted and even controlled through the Internet."

Ms Yao has been using her research prototypes to establish patterns of use and to find relationships between people and the things they are using.

"With the Internet of Things, billions of objects will connect to the Internet," she says.

"One significant challenge is about how to effectively and efficiently manage this. The critical problem is that relationships between things are not obvious, they are hidden."

Her work builds on principles used in social networks and a theory that people with similar characteristics tend to get together. Taking this further, the theory suggests that the presence of relationships between people can be used to infer their similarities.

"Unlike social networks of people, where users have observable links and connections, 'things' exist in isolated settings and the connections between them are limited," Ms Yao says.

"My research focuses on this issue and aims at discovering such relationships through a novel approach, deriving correlations through usage data; looking at the user, the time and the location."

"Understanding these relationships in the Internet of Things lays the foundation for future research and advances in 'things management' and human behaviour prediction.

"Ultimately the Internet of Things will be a bit like Harry Potter's Marauders Map, but taking it a step further," she says. "Through the Internet of Things, we will not only know where everyone is but we will also know what they are doing and, perhaps, what they will do next."

Provided by University of Adelaide