Fighting crime through data mining

Institute for Infocomm Research works with leading credit card company to detect fraud using advanced data analytics technology. OO GIN LEE reports

A Singapore research institute is helping a credit card company weed out fraudulent online merchants.

The three-year collaboration started in October last year between the Institute for Infocomm Research (I2R) and the local office of the credit card company. The company cannot be named because of a commercial confidentiality agreement.

The institute said that tests have proved so successful that it is now working directly with the online fraud detection team of the company's global headquarters.

Data analytics scientists at the institute studied data from millions of credit card purchases involving thousands of online merchants and devised a scientific methodology to distinguish bona fide online vendors from Internet fraudsters.

The company already knew which merchants were crooks but did not tell the institute. The customers and their purchases were not identified.

Dr Shonali Krishnaswamy (left), acting head of the institute's Data Analytics Department, said the scientists nailed 85 per cent of the fraudsters.

"What really impressed the company was that we managed to detect an additional 5 per cent of fakes which were not on the company's black list," she
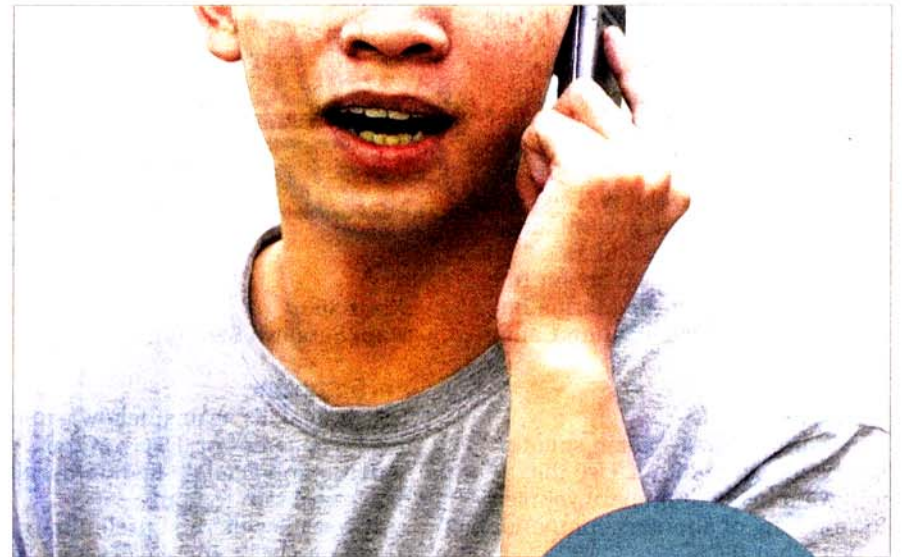
PHOTOS: ST FILE, A*STAR

Researchers at I2R are able to take raw data and apply sophisticated algorithms to uncover patterns and churn out information on consumers. For example, they are able to find out the gender of a smartphone user just by analysing data stored within the phone.

said.

The scientists were supplied only with "blind data", that is, basic information about the transactions such as the date, time, location and purchase amounts. Using this information, the data scientists came up with mathematical algorithms to detect patterns of fraud.

The digital age has generated an unprecedented volume of raw data from consumers and businesses. This can now be mined by advanced data analytics technology to uncover new patterns and knowledge hitherto hidden. It can even be used to predict future trends.

Making sense of raw data is precisely what the team's 50 data analytics experts specialise in. Thirty PhD holders focus on creating the mathematical algorithms; the rest are graduates, who develop the working prototypes from the secret formula to solve real-world problems.

"Singapore is at the forefront of the science of data mining and my team is among the biggest in the region," said Dr Krishnaswamy.

The team has won awards for its work, beating eight others in a global competition at the 16th Pacific Asia Conference in Knowledge Discovery and Data Mining in Kuala Lumpur, co-organised by Telekom Malaysia in Malaysia.

Using anonymous user profiles and usage records of 1.2 million of the telco's mobile phone subscribers, the teams were asked to identify the 5 per cent of customers most likely to churn –

industry speak for switching telcos – over the next three months. They also had to rank the attributes contributing to the switch.

Earlier this month, the institute's team also came up tops out of 95 international teams in a fraud detection competition organised by the Singapore Management University here. The Fraud Detection in Mobile Advertising competition was part of the Asian Conference of Machine Learning.

The teams were given anonymous online usage data of consumers. Their task: Ferret out advertisers who cheat by using software to generate false clicks on their own banner ads. The team not only won, but was also the only one that pinpointed more than half the fraudsters.

Few consumers realise what a treasure trove of data a smartphone is. GPS track location; accelerometers and gyroscopes sense movement; and the phone also records usage patterns and call time. The phone stores all this data, which experts can easily retrieve, said Dr Shonali.

Her team has done research that can even detect a user's gender, just by looking at such raw data.

Easy. "Women usually carry their phones in their handbags and men in their pockets. We only need to look at the movement data recorded by the accelerometers to figure out whether a user is male or female."

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