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Thinking *inside* the box

Local software companies explore artificial intelligence

The researcher

Guenther Ruhe talks hybrid intelligence

Originally from Germany, Dr. Guenther Ruhe leads the Laboratory for Software Engineering Decision Support (SEDS) at the U of C.

He became interested in AI in the 80's when the idea was at a conceptual level. As technology advanced, he realized AI would have a huge role to play in software engineering, a discipline that involves millions upon millions of complex lines of code.

"The more you use additional techniques, referring to classification, to machine learning, to predicting, to planning –the more you do of that, the more you move into AI," Ruhe explained.

An author of several books and more than 200 peer-reviewed research papers, Ruhe's interests include product release planning, decision support systems, and pretty much anything involving an extensive amount of data.

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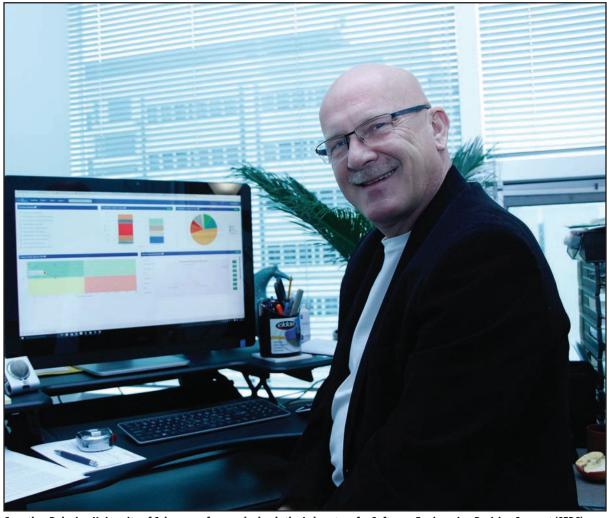>
> *–Guenther Ruhe*

Guenther Ruhe is a University of Calgary professor who leads the Laboratory for Software Engineering Decision Support (SEDS). Decision support systems often involve machine learning elements, but they work best when paired with human explanation.

PHOTO: PAUL MCALEER

In addition to his extensive portfolio, Ruhe is focused on bridging the gap between academic research and practical results that can solve societal issues.

"In research, there's often the perception that the more papers you write the better, and the more you get referenced the better," he said. "This is nice, but having an impact on society is another aspect."

During the aftermath of the Fort McMurray wildfires, Ruhe and his team compiled data from Twitter to see if current apps were meeting the needs of actual victims.

"We analyzed more than 70,000 tweets and found out what were the actual needs of people and designed apps which intended to better serve their needs," he said. "The most surprising thing was that in all the apps existing for wildfire emergencies worldwide, the top ten needs are not contained in any of these apps."

These features included fire alarm notifications, food and water requests, safety guidelines, emergency text messages, locations of gas stations, medical centres and emergency zone maps.

The research utilized methods of machine learning through classification and textual analysis.

When it comes to product releases and decision support systems, Ruhe collects data in a few main areas such as timing, functionality, quality and features.

"You can map this into comprehensive and complex search algorithms," he said. "And then running optimization to make offers what, from a user perspective, might be the best release for the product."

Even with complex algorithms crunching the numbers, the human component is still a key part of extrapolating useful results.

"I would not make a sharp boundary between machine and human intelligence," Ruhe said. "They're not competing with each other, but they are complimenting each other. The real trick is to find hybrid intelligence, understanding that humans can do things better than the machine."

Ruhe added decision support systems are a great example of hybrid intelligence.

"The idea is not to replace a human by any means, but to add to the competence of the human expert to make decisions in situations where things are not clearly defined," he said.

Machine learning: An application of AI to work outside of the parameters of its code for the purpose of learning independently. There are multiple types of machine learning used to analyze large amounts of data.