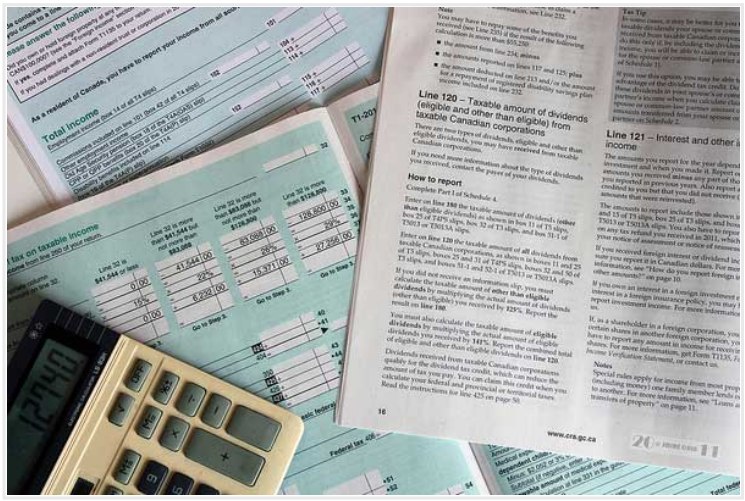
Law and computer science collaborate to change the future of legal research

App supported by IBM Watson can help answer complex tax questions

Nina Haikara



(photo by Swire via Flickr)

As an expert in taxation law and judicial decision-making, Faculty of Law Professor **Benjamin Alarie** is ready to change how legal research is done.

And you can get a glimpse of his vision of the future at the Ontario Centres of Excellence' (OCE) Discovery 2015 which runs from April 27 to 28.

"What's promising about cognitive computing is that there are no limitations," says Alarie. "Cognitive computing can perform a role as a crosscheck against lawyers' intuition or understanding of the law, to make sure they haven't missed something."

Alarie is part of the team behind Blue J Legal, which will be giving live demos at the OCE event. It's the latest groundbreaking development to come from the University of Toronto's collaboration with International Business Machines Corporation's (IBM) Watson.

In September, the department of computer science was invited to take part in a unique academic and entrepreneurial undertaking with IBM's Watson. (Read more about the decision to bring Watson to U of T.) Of the 10 top-ranked institutions asked to develop applications for Watson as part of a cognitive computing contest, U of T was the only Canadian university. (Read more about the U of T department of computer science's top-10 worldwide ranking.)

The IBM service provided a powerful processing engine for the apps developed by U of T students and researchers to create artificial intelligence-based apps shaped around legal data.

Alarie was invited by the department of computer science to take part in judging all five legal apps created at U of T, including the final entry to the IBM Watson University Challenge, Ross, a paralegal researching powerhouse. (Read more about the U of T team that took second place in the IBM Watson University Challenge.)

The campus contest sparked Alarie's idea for a new collaboration between computer science and the Faculty of Law.

"None of the teams was presenting a tax law advisor – not surprising that a tax law professor would think a tax law advisor would be a good thing to do," said Alarie.

"I started talking to **Steve Engels** and **Paul Gries** in the computer science department and **Edward Iacobucci**, dean at the Faculty of Law, that maybe we should start thinking about doing something in the tax law area with Watson. That's how the Blue J Legal project came about."

The power of cognitive computing

Cognitive computing goes beyond any typical keyword search. The primary question lawyers and accountants in taxation need to ask, is whether someone is an employee or an independent contractor. Answering this first question, accurately, has further implications to the case as is it applies to taxation, pension, liability, benefits and more.

Curated by its subject experts, Watson has the ability to read the entirety of the information it's supplied:

legislation, academic publications and administrative documents such as Canada Revenue Agency bulletins.

Just as law students learn, so must Watson. As it begins to understand the basics, it can be challenged to go deeper and understand further complexity such as the role of strong and weak precedents, court hierarchies and the variety of motivations that judges might have in rulings that bend and shape the law to benefit society and public policy.

Watson can't predict where the law will go – yet. But with its ability to read and make connections, it can quickly review a submitted fact pattern – not unlike the case information law that students are given in a final exam – and gives each of its answers a confidence rating.

"Watson is a good student, but we are still teaching it," said Professor **Anthony Niblett** during a demonstration of Blue J Legal's present capabilities.

The future of legal research

"Because of human bandwidth limitations and that fact that we each learn the law on a certain path, with exposure to certain cases, or professors, or different takes on the law, one of the big advantages of a system like Watson, is that it can read everything and give a dispassionate view," explains Alarie.

"Even an expert will have a certain entry path to that understanding and will naturally make more salient to his or her mind one element or elements. The very best experts will probably achieve an unbiased, dispassionate view and a hierarchical understanding – but that is very difficult to achieve as time is so limited."

Top of mind was whether legal researchers and lawyers would still be needed, to which Alarie says a resounding "yes".

"Instead of each individual lawyer having to develop that hierarchical, deeply expert understanding of the field, if you train Watson once, then it is available for everyone to draw on," said Alarie, who also sees future uses for people who have simple legal questions and cannot afford the professional support.

"It will make lawyers better. It will make professionals better."

Opportunities for subject matter experts to collaborate with software developers

The department of computer science (DCS) recently announced its new Innovation Lab (DCSIL) located within the Gerstein Science Information Centre, part of U of T's vast network of entrepreneurship accelerators and incubators. (Read more about U of T's Banting & Best Centre for Innovation & Entrepreneurship.)

The DCS Innovation Lab – which will also be represented at OCE by directors **Helen Kontozopoulos** and **Mario Grech** – will introduce students to the structure and dynamics of the software industry and will include students from across the University, who wish to collaborate on software-based innovations.The lab offers its first 12-week Arts & Science Entrepreneurship Program this summer.

"What's thrilling is that this project points to other potential collaborations across the University, across divisions, where these sorts of things could really take off," said Alarie.

Blue J Legal is a collaborative process with the app's body of knowledge developed by Professors Alarie, Niblett, **Albert Yoon** and JD/MBA student **Ramn Wright** with the support of computer science students **Yana Davis**, **Daniil Kouznetsov** and **Jonathan Webb**.

Niblett has something in common with Watson. He also won Jeopardy!

"The number of questions Watson could get right would dominate the number I could get right – easily," said Niblett, who recalls the computer's appearance on the game show before he won on Christmas Day in 2013.

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