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By Sam Toman

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UNIVERSITY PRESIDENT

Manager, Executive Communications

WATERLOO NEWS

Cybersecurity, privacy and artificial intelligence in health

Conference highlights opportunities and pitfalls of current approaches

Challenges Conference."

care at the right time.

be higher.

Canada's adoption of the latest information technology in the

That was the consensus of experts at a recent Waterloo

Artificial Intelligence in Health Data: Advancements and

healthcare system is a hot button issue, and the stakes couldn't

conference held in Ottawa called "Cybersecurity, Privacy, and

The good news is, with the right information technology, the

Canadian health-care system has the potential to optimize

AI are moving so fast that administrators and front-line

their full use across the healthcare sector.

information safe and secure."

most aspects of medical care to ensure patients get the right

One of the main challenges is that advances in technologies like

workers may not fully trust in them such that they can enable

"Our health data is something we rightfully want to keep safe

and secure. It's deeply personal information," says Dr. Vivek

Goel, President and Vice-Chancellor at the University of

Goel, who chaired The Expert Advisory Group for the Pan-

the national agenda for the healthcare sector's use of data.

digital age. In Canada, the collection, organization and

management of health data is not consistent. The primary

obstacle we encounter is not technological but cultural in

The problem is, Goel continued, "our systems, processes and

policies are geared towards an analog world, while we live in a

This incredible potential for the development of technologies in

the healthcare sector was the key topic of discussion in Ottawa,

where Waterloo's Cybersecurity and Privacy Institute (CPI) and

conference. The workshop was funded by the university's

developed by Sen for the **Data Analytics and Behavioural**

<u>Insights (DABI) certificate</u> offered by WatSPEED.

Master of Public Service (MPS) program and based on courses

Predictably, much of the focus was on the rapid emergence of

AI-powered large language models (LLMs) such as ChatGPT

and what role they should play in modernizing how health data

of our healthcare data puzzle.

is used in Canada.

and statistics.

institutions.

Canadian Health Data Strategy, played a leading role in setting

SEARCH

Waterloo, and an expert in governance, health data and policy. "The challenge is ensuring that we appropriately steward data

to improve outcomes for patients and communities, health system management, population and public health, and research and innovation while ensuring that we keep this

Waterloo Artificial Intelligence Institute hosted the special session. The day long-session, organized by Dr. Anindya Sen, professor of economics and CPI associate director, with funding from Health Canada, Statistics Canada, and the Canadian Institute for Health Information (CIHI), featured diverse experts from Waterloo, each exploring different facets Sen also taught a data and coding workshop for federal government employees, which was held the day before the

"Is the algorithm less effective at designing treatments for individuals from certain demographic groups? Has the algorithm picked up on spurious correlations in its training data, resulting in worse utility after deployment? Is it okay to

healthcare systems, and with clinician researchers at University Health Network, specifically those performing liver transplants. She is well aware of the ethical issues raised by Kamath and Meyers, while also being acutely aware of the practical aspects of incorporating AI into our healthcare "Making Canadian healthcare systems, what I call "AI Ready", is an urgent priority." she says. "AI/ML offers tremendous potential for our resource constrained healthcare systems, however patient information in our current healthcare systems is extremely fragmented and siloed-off, and we really don't understand the populations we serve. There are ways to make

Minister of Health Canada Dr. Stephen Lucas were all also critical in its conception. An informal conversation following the dinner, and moderated by President Goel, was an opportunity to share ideas and perspectives on how data can be used securely to improve patient outcomes. The mood in the room was hopeful, as nearly everyone agreed that the promise held by innovative technologies can only go as far as the willingness among stakeholders to collaborate towards a common goal.

President, Innovation Sanjeev Gill, Sen, Goel and Deputy

Anil Arora, Chief Statistician of Canada, who was also

use of health data for the benefits of all Canadians."

instrumental in making the gathering happen, described the

dinner as "generating positive momentum in the responsible

He added, "I believe we can and need to play a leadership role

in setting data standards, in data linkage as well as in ensuring

that world class frameworks and statistical infrastructure

remain strong foundational elements for progress. I look

forward to concrete next steps and to deepening our

SCIENCE

Canada's health data gaps need a bold, person-centred vision to chart a path back to global health information leadership

nature. Our fragmented approach and deep-seated distrust are what's slowing down what we already know we can achieve."

"There's quite a few reasons, ranging from technical, to legal, to moral, that we may want to pump the brakes on adopting LLMs," says Dr. Gautam Kamath, an assistant professor in the Cheriton School of Computer Science at Waterloo, recently named as a Canadian Institute for Advanced Research (CIFAR) AI Chair and a Vector Institute Faculty Member in recognition of his contributions to differential privacy, machine learning

demographic groups. This has implications for public acceptance of government policy, and the acceptance of recommended health behaviours – including data sharing," Meyer says. "The COVID-19 pandemic brought the notion of trust, as it relates to health broadly, to centre stage. The amount of disinformation about the pandemic and vaccines was staggering. We need to better understand why individuals look to, and trust, alternative forms of information that might be harmful. It is also critical we consider how to make our institutions trustworthy, and particularly for marginalized populations, if we are asking people to share personal and

Meyer's research explores how we can measure trust in an

strategies, tailored for specific populations, to (re)build trust in

ever-changing political climate in hopes we can develop

our social institutions. This starts with transparency and

Dr. Sirisha Rambhatla, assistant professor in Management

Sciences at UWaterloo also presented at the conference. She

works closely with healthcare providers such as Grand River

Hospital on building AI models to address inequities in

train a model on sensitive medical data, and how do we ensure

handle the cases when the algorithm makes mistakes, and who

conference and noted that marginalized communities could be

rightfully cautious in the face of this new technology given their

"We are seeing diminished trust in social institutions across all

experience with systemic oppression across Canadian social

that it is used in a privacy-respecting manner? How do we

Dr. Samantha Meyer, an associate professor at Waterloo's

School of Public Health Sciences, also presented at the

should be held liable when it does?" he asks.

confidential information about their health."

accountability, she says.

sector.

AI models fair. But for any kind of AI/ML modeling, we need to ensure that patient healthcare records are consolidated and made accessible to patients, clinicians, and researchers via a central system to give us a full picture." "Updating these systems is costly. Our cash-strapped health systems need funding to support these efforts, and guidance to build systems which are interoperable. Otherwise, we will remain in this deadlock for decades, and we can't afford that with our growing and aging population." Rambhatla continues. The evening prior to the main conference, WatSPEED, Waterloo's professional education program, hosted a dinner and discussion with health leaders from industry, government and academia. While the event was organized by Waterloo Associate Vice-

collaboration." RESEARCH **HEALTH FUTURES UNIVERSITY PRESIDENT**

Al-powered symptom checkers can help healthcare systems deal with the COVID-19 burden AI-powered symptom checkers can potentially reduce the number of people going to in-person clinics during the pandemic, but first, researchers say, people need to know they exist.

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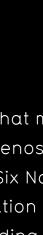
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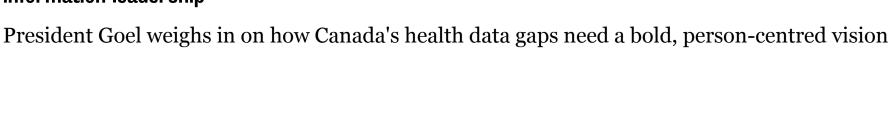
FEEDBACK The University of Waterloo acknowledges that much of our work takes place on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. Our main campus is situated on the

Haldimand Tract, the land granted to the Six Nations that includes six miles on each side of the Grand

River. Our active work toward reconciliation takes place across our campuses through research, learning, teaching, and community building, and is co-ordinated within our Office of Indigenous



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