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Ethics and human-centric science: integrated research, big data, and AI Bourgeois-Doyle, Dick

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Ethics and Human-centric Science

Integrated Research, Big Data, and AI

3 Nov. 2017



Modern Human Research Ethics

arose from Nazi War Crime Trials

The Nuremberg Code

Human and Legal Rights

means

Informed and Voluntary

Consent

Later - egregious research in Canada/U.S.

(incl. NRC) amplified need for Ethics

nature
International weekly journal of science

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NATURE | NEWS

Canada used hungry indigenous children to study malnutrition

Ire follows article detailing tests on unwitting aboriginal citizens in the 1940s and 1950s.

Brian Owens

23 July 2013

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Canadian government scientists used malnourished native populations as unwitting subjects in experiments conducted in the 1940s and 1950s to test nutritional interventions. The tests, many of which involved children at state-funded residential schools, had been largely forgotten until they were described earlier this month in the journal *Social History*¹ by Ian Mosby, who studies the history of food and nutrition at the University of Guelph in Canada.


The work began in 1942, when government scientists visited several native communities in

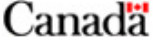



Today

Consent and Ethics in human research

Tied to **Privacy and Protection of Personal Information**

Government of Canada
Gouvernement du Canada





Panel on Research Ethics
www.pre.ethics.gc.ca

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TCPS 2
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1. Ethics Framework

TCPS 2 - Chapter 5
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NRC policy for research involving human participants

1.0 Overview

Through this policy, NRC affirms that excellence in ethics and respect for human dignity are essential to excellence in research.

NRC has specific, well-defined requirements

olicies and procedures for adhering to

val of the NRC Research Ethics Board
NRC Secretary General pursuant to t

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The following definitions of "research", "human participants" and "NRC participation" describe the breadth of activities covered by this policy.

2.1 Research

For the purposes of this policy, "research" includes fundamental research which is defined as "an undertaking intended to extend knowledge through a disciplined inquiry or systematic investigation." "Research" under this policy also includes applied research carried out for practical applications with the intention not only to gain new knowledge, but to confirm existing knowledge, to generate hypotheses, to evaluate concepts, and to develop new products, processes, or technologies.

2.2 Human Participants

And NRC has a
history of
innovative,
Human-Machine
research



Today's NRC presenters feature Interdisciplinarity – Human and Social Sciences



But NRC is facing Global move toward fully “Integrated Science”

Elon Musk

“Potentially more
dangerous than nukes.”

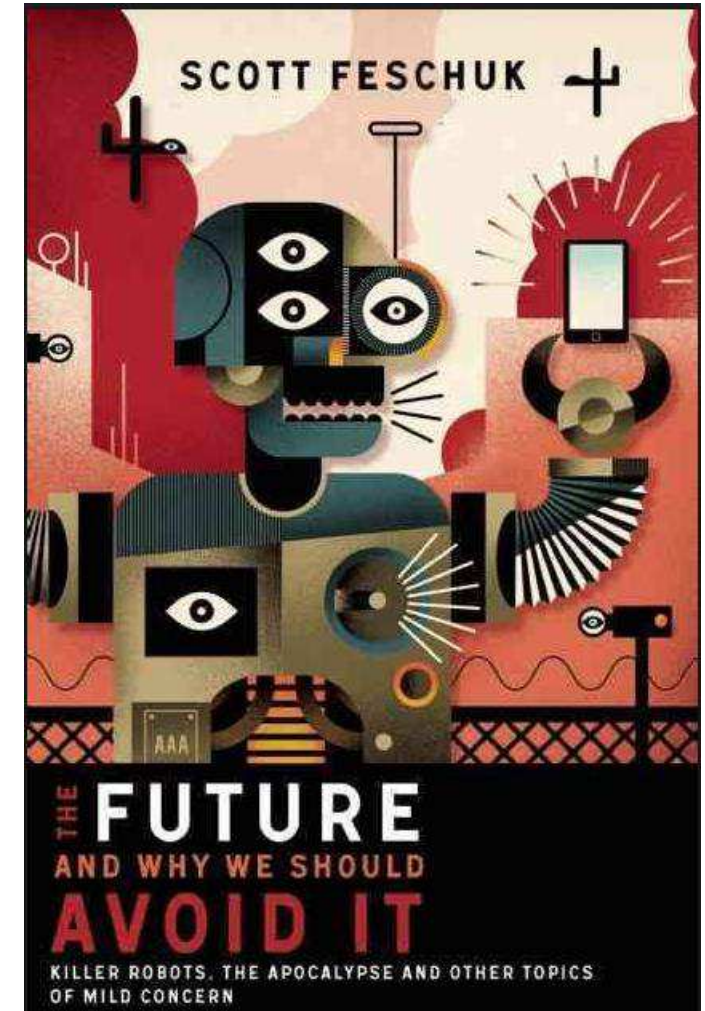
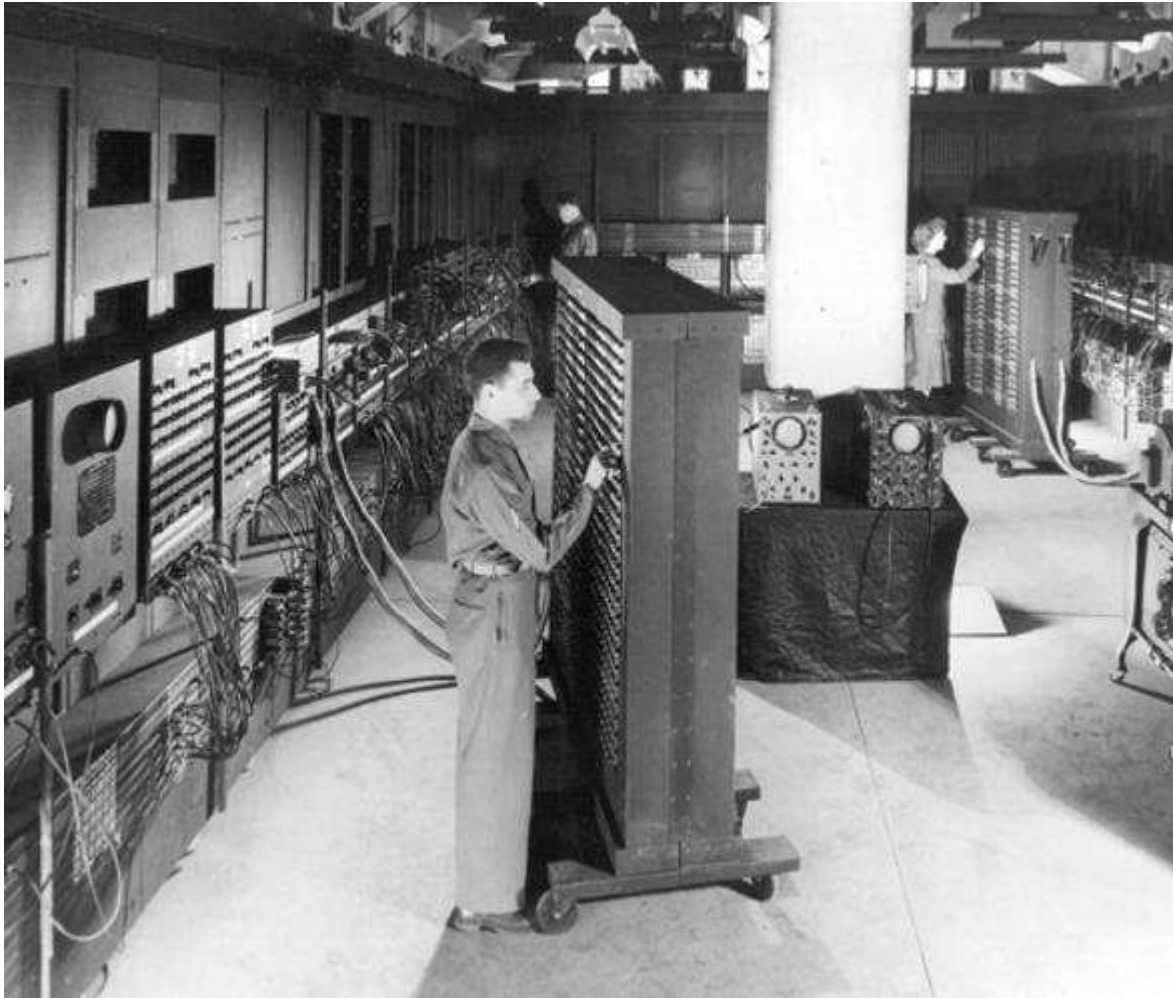
Stephen Hawking

“The development of full artificial intelligence could spell the end of the human race.”

And
we have a new,
game-changing
challenge

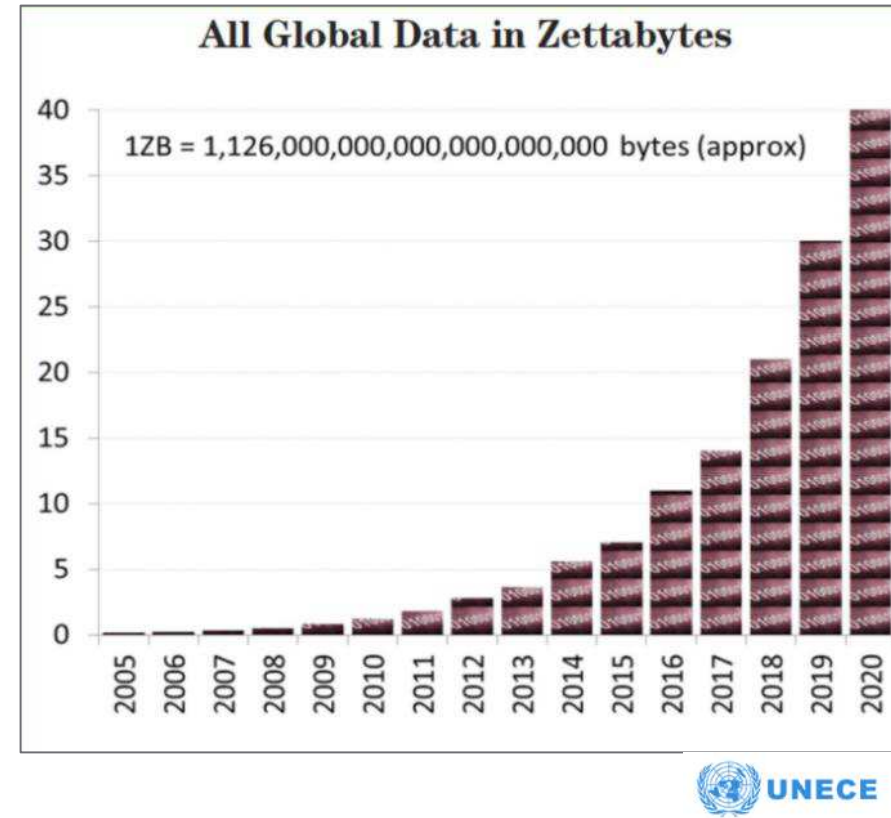
“we’re selling taxi licenses while Uber drives away with the baby ...”

Human Ethics
in
Big Data and AI



Haven't we heard all this AI gloom before ?

Yes – but – now we are at the confluence
of sophisticated tools such as
backpropagation that induce neural
networks to correct for errors –
Deep Learning – empowered by massive
data and data processing.



Google Deep Learning Projects

| | |
|------|--------|
| 2012 | 2 |
| 2013 | 1,000+ |

We see it at NRC too !

2009

NRC IRAP

30% (40 -45)

of all active human ethics projects

2017

77% (100 +)

Mostly ICT/Data/Analytics

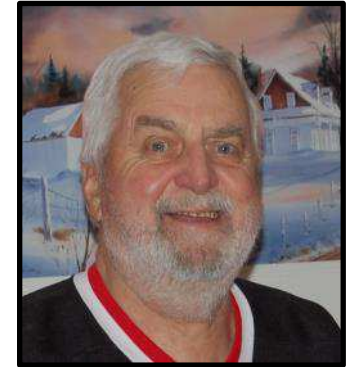
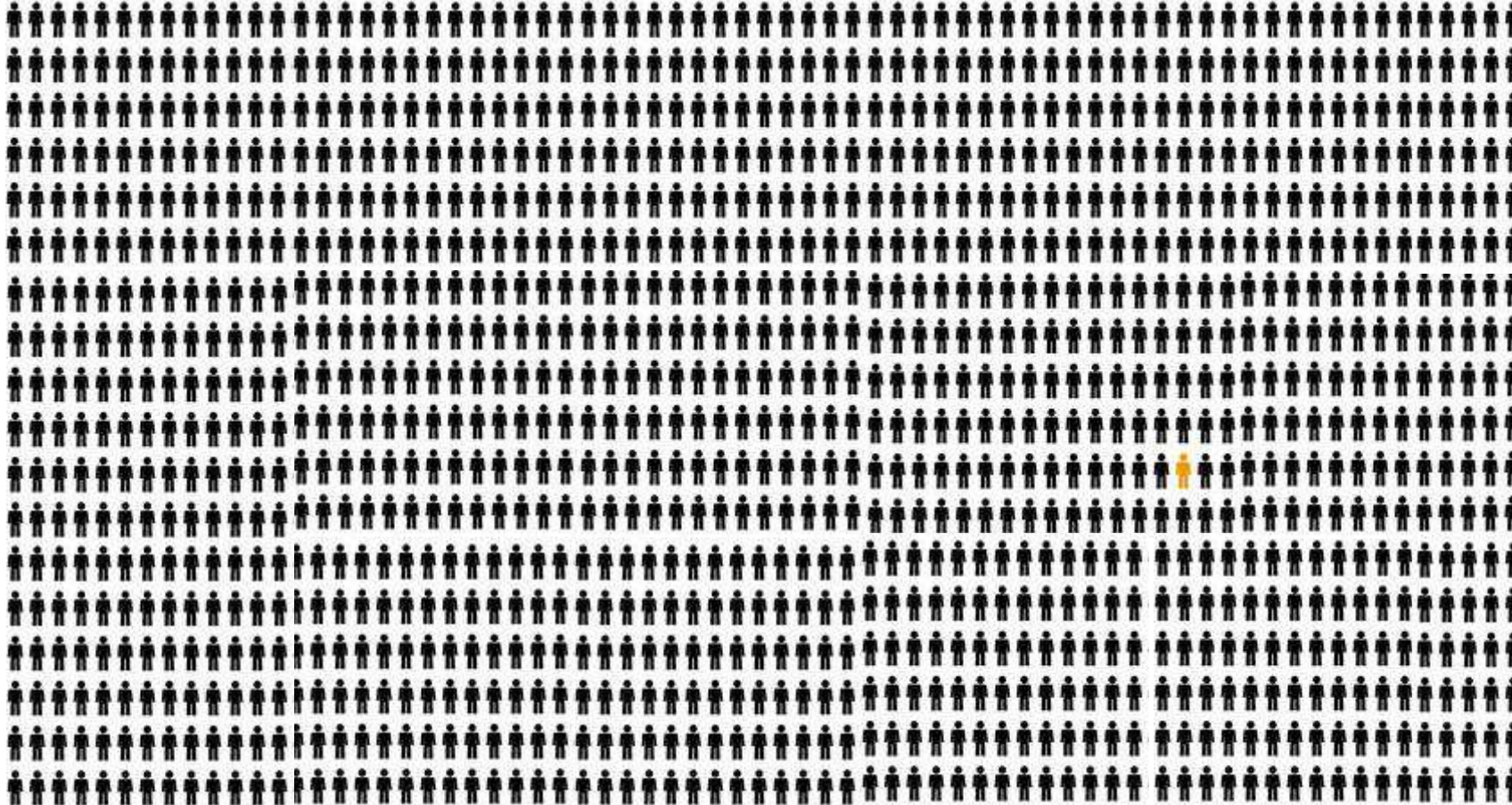


250 clients identify as AI

virtually Zero - 0

just a few years ago

So – who cares ? I’m just one in a Million



Boomers

“I have nothing to hide.”



Millennials

“I hide nothing I have.”

It's the Juxtaposition of Big Data – AI - and Human Research – Fully Integrated:

Really difficult to attest to meaningful free and informed consent, to protect personal information, or even come close to knowing the human benefit and risk ratios.

Wendall Wallach

Yale University Centre for
Bioethics

“Up to now, we’ve had in place
a principle (in research) that an
agent is responsible ...

Artificial Intelligence threatens
to undermine that.”

As early as 2002 – it was shown that “87 per cent of Americans could be identified by records listing solely their birth date, gender and ZIP Code”

M. Zimmer

Ethics of Info Tech 2010

“Simply stripping names from records is rarely a sufficient means to keep a dataset anonymous .”



Open Data in a Big Data World

An international accord



In a regime of open sharing in which data are passed on from their originators, there is loss of control over future usage, whilst anonymisation procedures have been demonstrated to be unable to guarantee the security of personal records.

Dr. Ann Cavoukian

3-Term Ontario
Privacy Commissioner

Privacy by Design



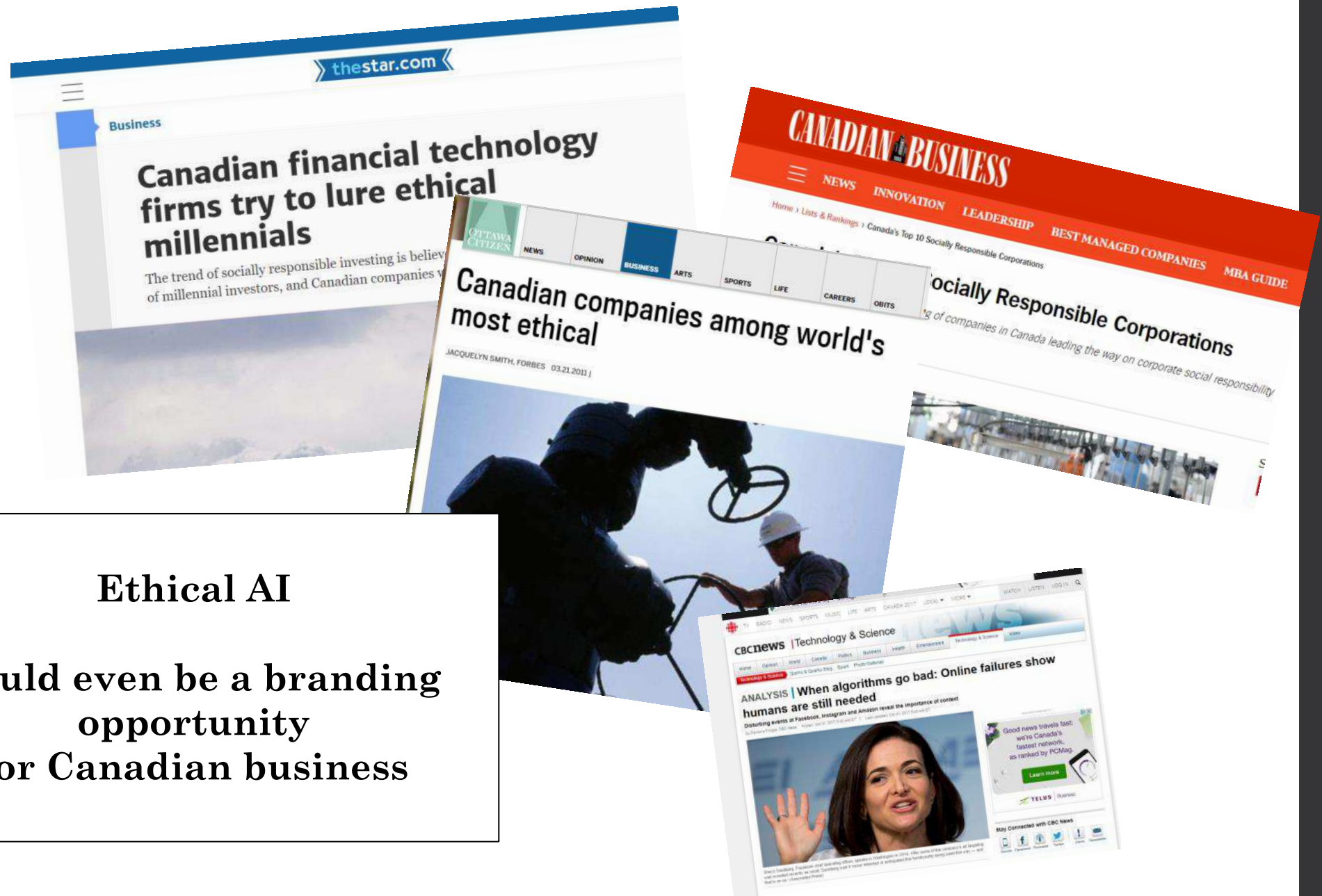
But

Canada has proven it
can be a leader ...

“Privacy cannot be assured solely by compliance with regulatory frameworks, rather, privacy assurance must ideally become an organization’s default mode of operation.”

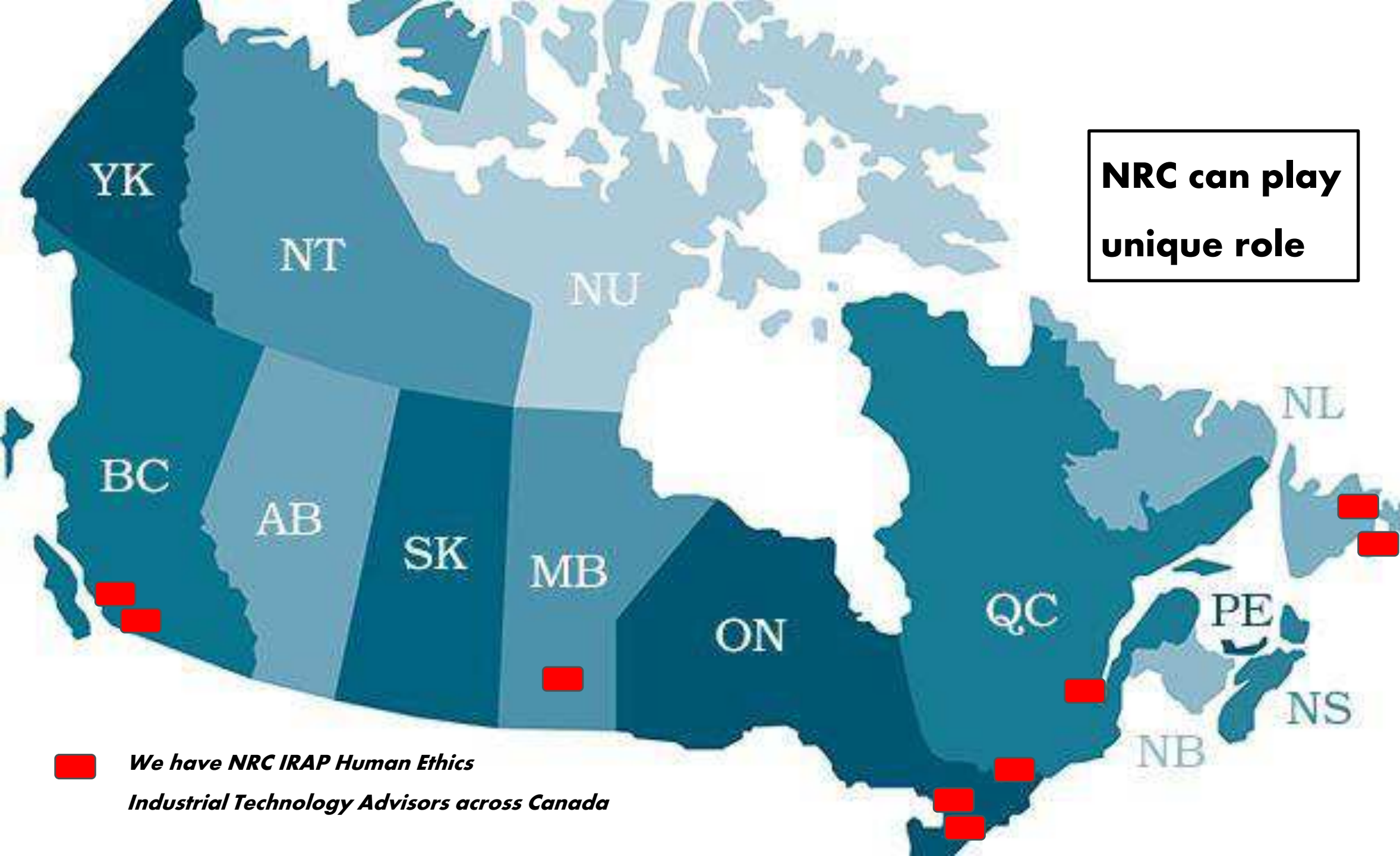
Ethical AI

**Could even be a branding
opportunity
for Canadian business**



Smart-home-device market to
reach \$13.4 Billion in 2017

a 35 per cent increase from 2016



**NRC can play
unique role**



***We have NRC IRAP Human Ethics
Industrial Technology Advisors across Canada***

Human Ethics Principles

Big Data and AI

NRC

Research Ethics Board

Acting as

Working Group

on AI and Human Ethics

- Chair - Gordon DuVal, SJD
Carleton University Office of Research Ethics
- Roxanne Deslauriers, Ph.D.
Vice President Research: Thunder Bay Regional
Health Sciences Centre
- Steven Beyea, Ph.D.
School of Health Sciences- Dalhousie University
- Christopher Brown
Industrial Research Assistance Program
National Research Council
- Robert Czerny
Chair - Ethics Practitioners' Association of Canada
- Geneviève Gagnon
Children's Hospital of Eastern Ontario
- Margaret McKay, MSc, JD, PMP
Policy and Governance - National Research Council
- Jonathan Power, Ph.D.
Ocean, Coastal and River Engineering
National Research Council
- Martine Richard
General Counsel - Office of the Conflict of Interest
and Ethics Commissioner
- Dan Trudeau
Industrial Research Assistance Program
National Research Council
- Jennifer Veitch, Ph.D.
Construction - National Research Council

Starting with this event

L'innovation scientifique doit être accompagnée d'une innovation éthique à proportion des enjeux.

Emmanuel Hirsh

Université Paris-Sud

Ethical Intelligence

for Artificial Intelligence





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Advisory Statement on Human Ethics in Artificial Intelligence and Big Data Research (2017)

1. Preamble

Consistent with the NRC Policy on Research Involving Human Participants (the NRC Policy), the NRC affirms that excellence in ethics and respect for human dignity are essential to excellence in research.

NRC is therefore committed to supporting research involving human participants only when it has approval of the NRC Research Ethics Board (NRC-REB) or as otherwise prescribed in Standard operating procedures (SOP) approved by the NRC Secretary General under the policy.

The NRC-REB recognizes that the administration of these requirements will be challenging and increasingly so in the face of scientific and engineering research that is:

- Multi-disciplinary and rapidly evolving,
- Empowered by extremely large data sets, and
- Defined by advanced computer systems and technologies

often labelled as deep learning or artificial intelligence.

2. Principles

Within this context, the NRC-REB reaffirms its commitment to meeting obligations under the NRC Policy and to upholding the following basic principles in the review of research driven by big data and artificial intelligence applications. To this end, prior to approving support for such research involving humans, the NRC-REB advises that research plans should:

a. Protect Privacy and Personal Information

- Take special measures in the design and planning of research to protect the privacy of individuals and personal information about themselves as required by the NRC Policy and its model, *The Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS or the Policy)*;
- Recognize the right of individuals to access their personal information held by NRC;

b. Ensure Discrete and Authentic Consent

- Involve human participants and/or data that is personally identifiable with them only through free and informed consent;
- secure participant consent or consent for the use of use personal information in a way that is clearly given and separate from the acceptance of any form of inducement, deprivation, or the exercise of control, or authority as cited in terms and conditions for the purchase of a product or service;

c. Preserve Human and Legal Rights

- Ensure that the consent to use personal data or otherwise participate in research is not be conditional upon and does not include any statement to the effect that, by consenting, participants waive have not waived basic human rights or any rights to legal recourse in the event of research-related harm;
- Respect the rights of involved communities as a whole when, for example, data and information studied has implications for a specific community such as an Indigenous People;
- Take particular measures to protect the rights of children and other vulnerable individuals.

