Foresight Synergy Network - University of Ottawa

Highlights from FSN Seminar:

History & Future of Artificial Intelligence - Opportunities & Threats

By

Peter MacKinnon

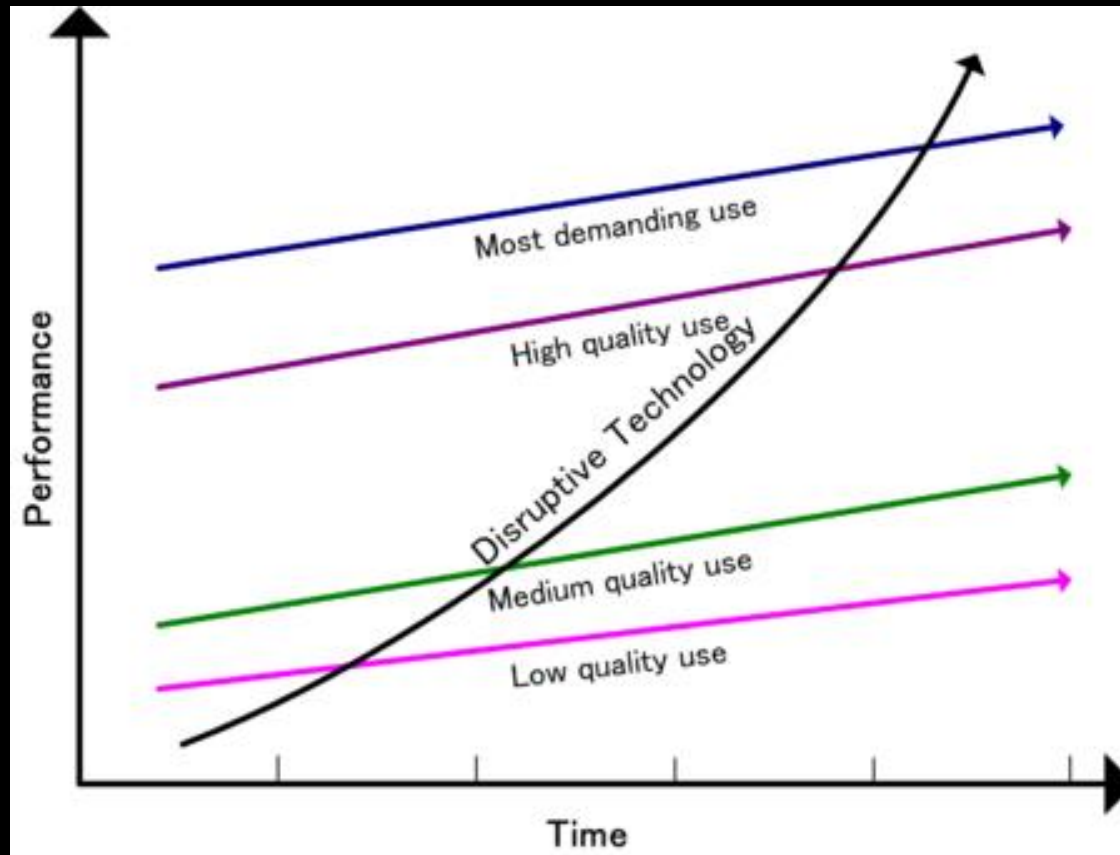Managing Director

Synergy Technology Management

Ottawa, Canada

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AI has hit the Big Times

- AI has skyrocketed into worldwide news with stories of promise & peril for good & bad

- The 'truth meter' for a considerable swath of the public is riddled with misunderstanding - ranging from anticipated impact on jobs to the potential for autonomous weapons & much more

- **But that is not the real big deal** - it is the fact that AI is a disruptive technology, perhaps even a new class of disruptive technology like 'electricity'

Disruption comes from Out of the Blue

Recent Advances in Applied AI

AI systems have proven that they can meet – and exceed – human performance in:

- image recognition
- speech transcription
- direct language translation

AI systems have learned how to:

- drive vehicles
- identify relevant information in a paragraph
- recognize human faces & emotions (even if pictures are blurred)
- create their own encryption schemes & detect malware
- detect crop diseases
- write cookbook recipes, sports news articles, movie screenplays, music & published poetry
- find their way around the London Underground using a map

Societal Concerns

- If the development of AI & its introduction into society is rushed or mishandled, public concerns over technological unemployment, machine bias, automated surveillance & propaganda will create critical legitimacy problems driving public distrust & societal backlash towards AI

- It is important to think about the legal & ethical implications of AI & consider measures for the responsible supervision, regulation & governance of the design & deployment of AI systems

Arising Socio-economic Impacts

- Accelerating job losses across multiple business sectors primarily arising as a result of robotics & machine learning
    - This is a serious global public policy issue
- Emergence of Basic Income
- New kinds of jobs, primarily in knowledge intensive areas, often assisted by AI systems
- Dual use prospects are high & broadly worrying

AI & Ethics

- Ethical questions surrounding AI systems are wide-ranging: spanning creation, uses & outcomes
  - Take for example autonomous weapons
    - Should they be created & on what grounds?
    - If created, under what rules are they to be used?
      - There are no rules today!
    - If they are used, what outcomes & constraints on outcomes are practical, monitorable, measureable & enforceable?

Is AI a Danger?

- The basic answer to this question is 'it depends'
  - It is like asking if a match is dangerous, well 'it depends'
- Until now automation has meant industrial robots & computer hardware & software designed to do predictable, routine & codifiable tasks
- Yes, there are reasons for concern, both technical & socio-economic
  - Machines are now able to take on less-routine tasks & this transition is occurring during an era in which many workers are already struggling
  - Automation anxiety is made more acute by a labour market that has tilted against workers over the last 30 years, with increasing income inequality & stagnant real wages

Dual Use Concerns

- Areas of emergent concern regarding nefarious applications of AI:

Existential threats	My projection over next 25 years
• Autonomous weapons	Likely
• Super intelligence	Nil – Low

Growing threats	
• Cyber security	High
• Cyber crime	High
• Cyber espionage	High
• Cyber warfare	Likely
• Cyber threats to privacy	High
• Cyber threats to governance	Increasing

And then there are . . .

Disruptors

- Increasing difficulty of making new breakthroughs
- Eventual hardware limitations

Wild Cards

- A breakthrough in cognitive neuroscience
- Human enhancement
- Quantum computing
- A 'Sputnik event'
- Societal distrust & disinclination

An Emerging AI Race – for What?

- The notion that there is an emerging AI race is real

- Why?

  - As we have seen AI is a disruptive technology in its own right with great promise for wide-scale use

  - AI enables other disruptive technologies creating as yet poorly understood synergies that could be of a dual use nature

  - AI capabilities & capacity will define the competitive advantage of nations in the future

Summary of AI Opportunity & Threat Issues

- Transformative disruptive technology

- Major dual use technology

- Posses major moral & ethical issues

- Governance & laws are lagging AI advances

- Capacity & capability are evolving at an increasing rate globally – can Canada keep up & does it matter?

- AI can be a significant social good – will it?