



Technology Readiness

- NOW
- 1- 2 YEARS
- 2- 4 YEARS
- >4 YEARS

Important technology for NZ business to be exploring

Sources:
 Frost & Sullivan "Artificial Intelligence- R&D and Applications Road Map" (Dec 2016), Harvard Business Review- "The competitive landscape for Machine Intelligence (Nov 2016), Shivon Zilis and James Chan "The State of Machine Intelligence, 2016" (2016), Stanford University. "Artificial Intelligence and Life in 2030" (2016), https://en.wikipedia.org/wiki/Artificial_Intelligence (2017)

Artificial Intelligence Portfolio



Artificial Intelligence is computer systems that exhibit human like intelligence. It is a group of science fields and technologies concerned with creating machines take intelligent actions based on inputs.



DEEP LEARNING

A high powered type of Machine learning algorithms that uses a cascade of many computing layers. Each layer uses the input from the previous later as input.

Enabled by Neural networks. Given big data sets, Deep Learning algorithms are great at pattern recognition, and enable things like, speech recognition, image recognition, natural language processing. The combination of neural networks (enabled by the cloud), machine learning technology, and massive data sets (the internet), has made Deep Learning one of the most exciting AI sub-fields recently.

EXAMPLES: Google's DeepMind beating the best human at the game "Go"



MACHINE LEARNING

Algorithms that can learn from and make predictions on data. Overlaps with Computational Statistics. Overlaps with Bayesian Statistics. Underpins Predictive Analytics. Underpins Data-Mining.

Three subgroups:

- Supervised learning the system is presented with example inputs and known desired outputs and learns how to map inputs to outputs
- Unsupervised learning The system finds patterns without requiring example inputs and outputs.
- Reinforcement learning The system is "rewarded" when it gets something right and learns as a result.

EXAMPLES: Recommender systems (Like NZ's own Movio which recommends movies)

Xero uses Machine Learning for automated processes (like automated cost-coding)

WEKA at the University of Waikato

JV between Goat Ventures and Minter Ellison for legal AI



AUTONOMOUS SYSTEMS

Autonomous robots, self-driving vehicles, drones, all enabled by AI.

EXAMPLES: HMI Technologies (trial at Chch Airport)



PATTERN RECOGNITION

A branch of Machine Learning and Deep Learning which focusses on recognition of patterns in data.

EXAMPLES: DeepFace, (Facebook)



NATURAL LANGUAGE PROCESSING

Technologies that enable computer systems to interact seamlessly with human languages.

Includes:

- from written language and speech recognition),
- sentiment analysis (understanding the sentiment underneath what is being said)
- translation
- understanding meaning within text/speech
- language generation

Note- experts believe that another technological breakthrough is required before systems can truly interact seamlessly with human languages.

EXAMPLES: Siri, Alexa, Cortana

NZer Mark Sagar's new company Soul Machines

NZ company Entopix (Natural Language Processing consultancy)

NZ Company Booktrack



THOUGHT CONTROLLED GAMING

The application of AI, wearable technology, and brain computing interface technology to enable seamless interaction with social gaming environments in real-time, through avatars without the need for joystick type devices.

EXAMPLES: Emotiv, Games Research Lab (Columbia Uni)



VIRTUAL COMPANIONS

Cloud connected, Virtual Reality based avatars powered by AI engines that can behave and interact just as a human would.

EXAMPLES: Digital companions that provide caregiving companionship for the elderly.



REAL TIME EMOTION ANALYTICS

The application of AI to analyse brain signals, voice and facial expression to detect human emotions.

EXAMPLES: Emotiv



REAL TIME UNIVERSAL TRANSLATION

The application of Natural Language Processing to enable two humans (with no common language) to understand each other in real-time

EXAMPLES: Microsoft Translator



NEXT GEN CLOUD ROBOTICS

Convergence of AI, Big Data, Cloud and the as-a-Service model will enable a cloud based robotic brain that robots can use for high powered intelligent and intuitive collaboration with humans

EXAMPLES: Cloud Minds



AUTONOMOUS SURGICAL ROBOTICS

Cloud based AI platforms can help robotic surgeons to perform precise surgeries by learning from large historical surgical data sets (like video)

EXAMPLES: Imperial College of London, MIT



COGNITIVE CYBER SECURITY

Cloud-based AI systems trained on historical cyber threat data, capable of mitigating real-time cyber threats

EXAMPLES: Deep Instinct



ROBOTIC PERSONAL ASSISTANTS

Cloud base AI learns from Big Data to enable human-like social robots that can perform usefully as personal assistants

EXAMPLES: Kuka Robotics Boston Dynamics



NEUROMORPHIC COMPUTING

Future generation computing hardware that mimics the function of the human brain in silicon chips.

EXAMPLES: The Human Brain Project

IBM's TrueNorth processor chip

NZ's Professor Simon Brown at University of Canterbury



CHATBOTS

A software robot that interacts with humans online, receiving and sending conversational text with the aim of emulating the way a human communicates. An example of Natural Language Processing.

EXAMPLES: Kiwi start-up Jude.ai (an AI based financial advisor)

Kiwi company Wine Searcher



NEURAL NETWORKS

Computing systems that organises the computing elements in a layered way that is loosely modelled on the human brain. Enables Deep Learning.

EXAMPLES: The computing system that sits behind Baby X at Auckland Uni

NZ's Professor Kasabov at AUT (Neucube)

Sources:
Frost & Sullivan "Artificial Intelligence- R&D and Applications Road Map" (Dec 2016), Harvard Business Review- The competitive landscape for Machine Intelligence (Nov 2016), Shivon Zilis and James Chan "The State of Machine Intelligence, 2016" (2016), Stanford University. "Artificial Intelligence and Life in 2030" (2016), https://en.wikipedia.org/wiki/Artificial_intelligence (2017)