



SOA Predictive Analytics Seminar – Malaysia

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Session 3

AI for Actuaries

William Yap

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WILLIAM YAP

Founder of AI Malaysia

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Agenda

- Fundamentals of AI
- Building an AI model
- AI opportunities for Actuaries

Fundamentals of AI



What is Artificial Intelligence?

- Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and react like humans.
- AI involves creating programs that can:
 - Learn
 - Reason
 - Adapt
 - Take Action

Impact of AI

- Global GDP will be 14% higher (additional \$15.7 trillion) in 2030 as a result of AI (Source: PwC)
- AI technology can enhance business productivity by up to 40% (Source: Accenture)
- Up to 800 million global workers could lose their jobs to robotics by 2030 (Source: McKinsey)

AI Application in Legal Industry

- In 2018, 20 top US corporate lawyers were pitted against LawGeex AI
- Task was to spot issues in five Non-Disclosure Agreements (NDAs)
- Accuracy Rates: LawGeex AI 94% > Lawyers 85%
- Completion Time: LawGeex AI 26 seconds < Lawyers 92 minutes

AI Application in Medical Industry

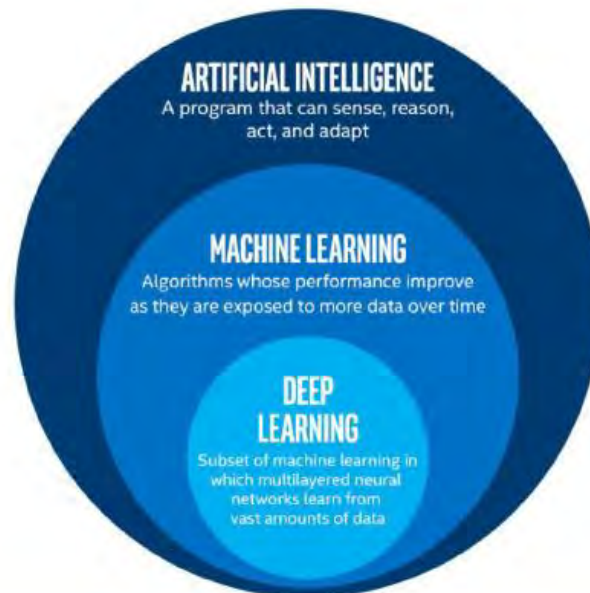
- In a study by Heidelberg University, researchers developed a neural network which diagnosed skin cancer more accurately than a group of 58 international dermatologists
- Accuracy Rates: Neural network 95% > Dermatologists 87%
- The tool was created using Google's AI technology and was trained using 100,000 skin images

What does this mean for Actuaries?

- Some companies are already developing AI-based solutions for actuarial work
- Various legal regulations ensure that qualified actuaries will always be an important part of the insurance industry
- Actuaries, similarly to lawyers and doctors, will learn to use AI tools and techniques to stay ahead

Using AI to add more Value

- Churn Prediction
- IBNR Reserving
- Pricing with GLM
- Experience Studies
- Mortality Forecasting
- Customer Service



Different Types of Machine Learning

	Supervised	Unsupervised	Reinforcement
Method	Task Oriented	Data Driven	Learn from Mistakes
Algorithm	Random Forest	K-means	Markov Decision Process
Application	Spam Email Filter	Recommender Engine	Computer Games

Building an AI model



Porto Seguro's Safe Driver Prediction

- Porto Seguro is one of Brazil's largest auto and homeowner insurance companies
- Held a competition on Kaggle to predict if a driver will file an insurance claim next year
- <https://www.kaggle.com/c/porto-seguro-safe-driver-prediction>

Python

- Most popular programming language for AI
- It has a great range of Machine Learning libraries (e.g. Scikit-learn)
- It has a large and active community, hence there is plenty of material and documentation to be found online for help

Jupyter Notebook

- The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text
- It can be used as an Integrated Development Environment for Python

AI opportunities for Actuaries



Why use AI for Actuarial work

- Utilise Big Data efficiently
- Innovative modelling techniques
- Increased accuracy and speed in valuation
- Price more competitive products
- Improved communication with data visualisation

AI Proof of Concept

1. Select area for improvement
2. Assemble team
3. Collect relevant data
4. Create AI model
5. Evaluate results
6. Deploy application

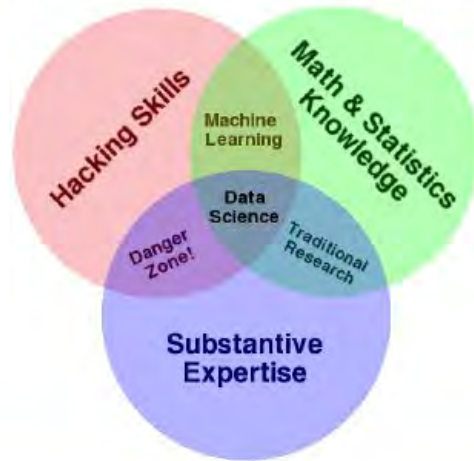
Lemonade

- An American property and casualty insurance company
- Customer Service done by AI Chatbot called Maya
- Uses AI to evaluate claims and is said to have settled a claim, from approval to pay-out, in just 3 seconds (Source: Lemonade Blog)

Fukoku Mutual Life Insurance

- A Japanese insurance firm replaced 34 employees with IBM Watson (Source: BBC)
- Used AI to calculate insurance pay-outs to policyholders
- Target to increase productivity by 30% and save US\$1.2m per year

Drew Conway's Venn Diagram



AI Flywheel Effect



Next Steps

- Online Learning Platforms
- Workshops and Bootcamps
- Community Groups
- Kaggle and Side Projects