

Introduction to Machine Learning Methods in Economics

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Course Objectives

- ✓ Learn Python as a programming language for data analysis
- ✓ Get familiar with basic machine learning ideas and tools
- ✓ Able to conduct data analysis with real data

Course Structure

- Weekly lectures (10%)
 - Tuesday – Theory
 - Thursday – Coding
- Assignments/short projects (40%)
- Term paper (50%)

Big Data

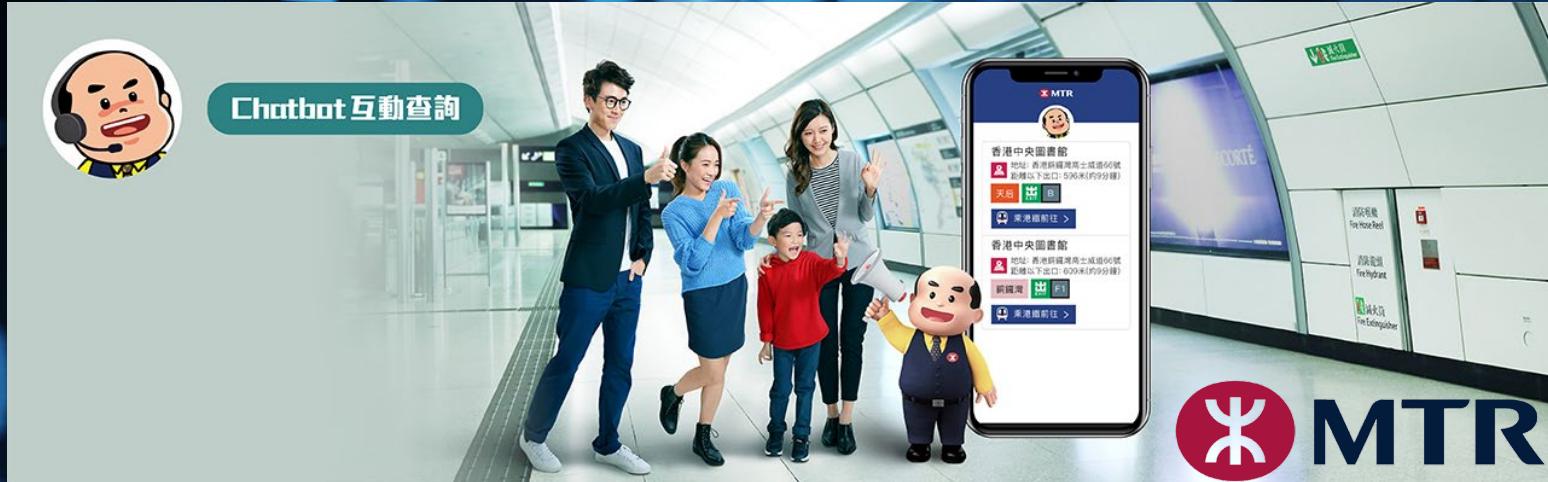
Machine
Learning

AI

Data Analytics

What's in your mind when
you hear the term "A.I.?"





We've Suggested Tags for Your Photos

We've automatically grouped together similar pictures and suggested the names of friends who might appear in them. This lets you quickly label your photos and notify friends who are in this album.

Tag Your Friends

This will quickly label your photos and notify the friends you tag. Learn more

Who is this? Who is this? Who is this?

Who is this? Who is this? Who is this?

Who is this? Who is this? Who is this?

A screenshot of the Facebook "Tag Your Friends" feature. It shows a grid of six small profile pictures of people, each with a "Who is this?" label below it. A large blue Facebook logo is at the bottom right.

Taco Tuesday

Jacqueline Bruzek x

Taco Tuesday

Hey Jacqueline,

Haven't seen you in a while and I hope you're doing well.

A screenshot of a Gmail inbox. The subject line "Taco Tuesday" is bolded. Below it is a snippet of an email from Jacqueline Bruzek. The body of the email continues the subject line and adds a friendly greeting and a comment about not seeing the recipient for a while.

Machine vs Human

An AI just beat top lawyers at their own game

[f Share](#) [t Share](#)



BY MONICA CHIN
3 DAYS AGO

The nation's top lawyers can't interpret contracts as well as an AI

Futurism

REPLACED BY ROBOTS

Jobs with high probabilities of being automated in the near future

Mail Carrier

68%



Jeweler

68%



Logging Worker

79%



Farm Laborer

97%



Drill Press Operator

94%



Insurance Underwriter

99%



SOURCE: CAREER CLUSTER, FREY AND OSBORNE, CITI RESEARCH

What Powers Data Science?



Statistics



**Machine
Learning**



Big Data

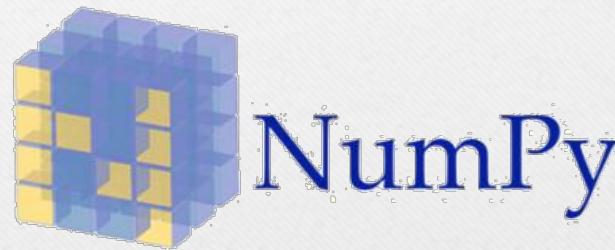
What Power Data Science?



Estimating
Unknown Effects

Statistics

What Power Data Science?



Statistics



What Powers Data Science?

Make
Accurate
Predictions



**Machine
Learning**

What people
usually mean
when they say
“A.I.”
(it’s also what we focus
on in this course)

What Power Data Science?



Machine
Learning



TensorFlow

What Power Data Science?

How big is
Big Data?



Big Data

Age of Big Data

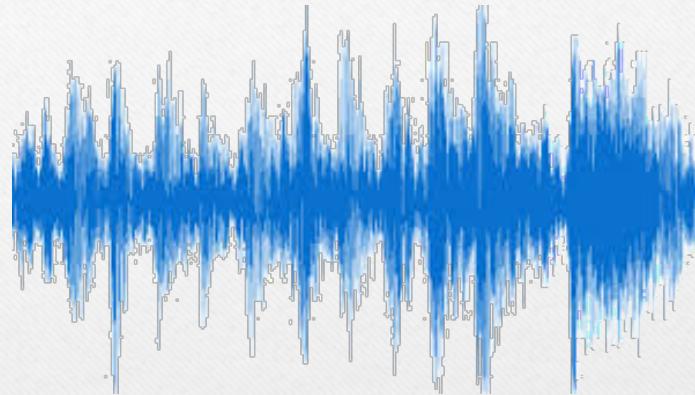
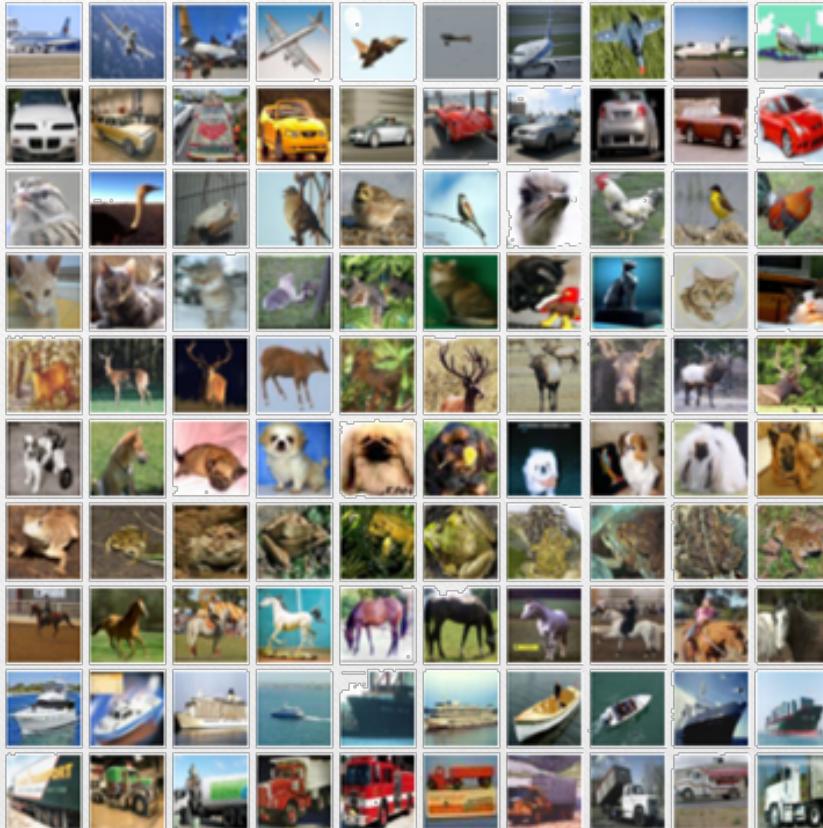


Image Recognition

- **ImageNet**
14 million images
- **CIFAR-10**
60,000 images
- **COCO** (Microsoft)
330,000 images
- **Open Images Dataset**
(Google)
9M images



<http://www.image-net.org>

[https://www.cs.toronto.e
du/~kriz/cifar.html](https://www.cs.toronto.edu/~kriz/cifar.html)



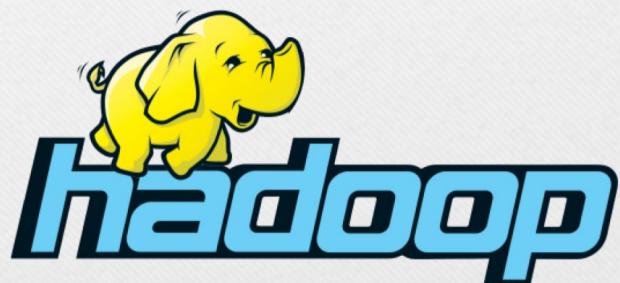
coco

Common Objects in Context

<http://cocodataset.org>

[https://storage.googleapis
.com/openimages/](https://storage.googleapis.com/openimages/)

What Power Data Science?



Big Data

What is AI Good at?

Today's AI systems are only good at specific task. We are very far from **Artificial General Intelligence**.

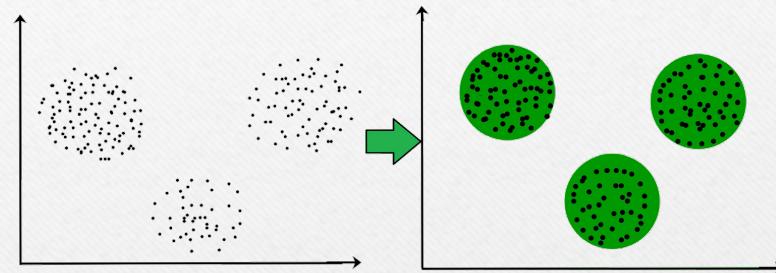


What is AI Good at?

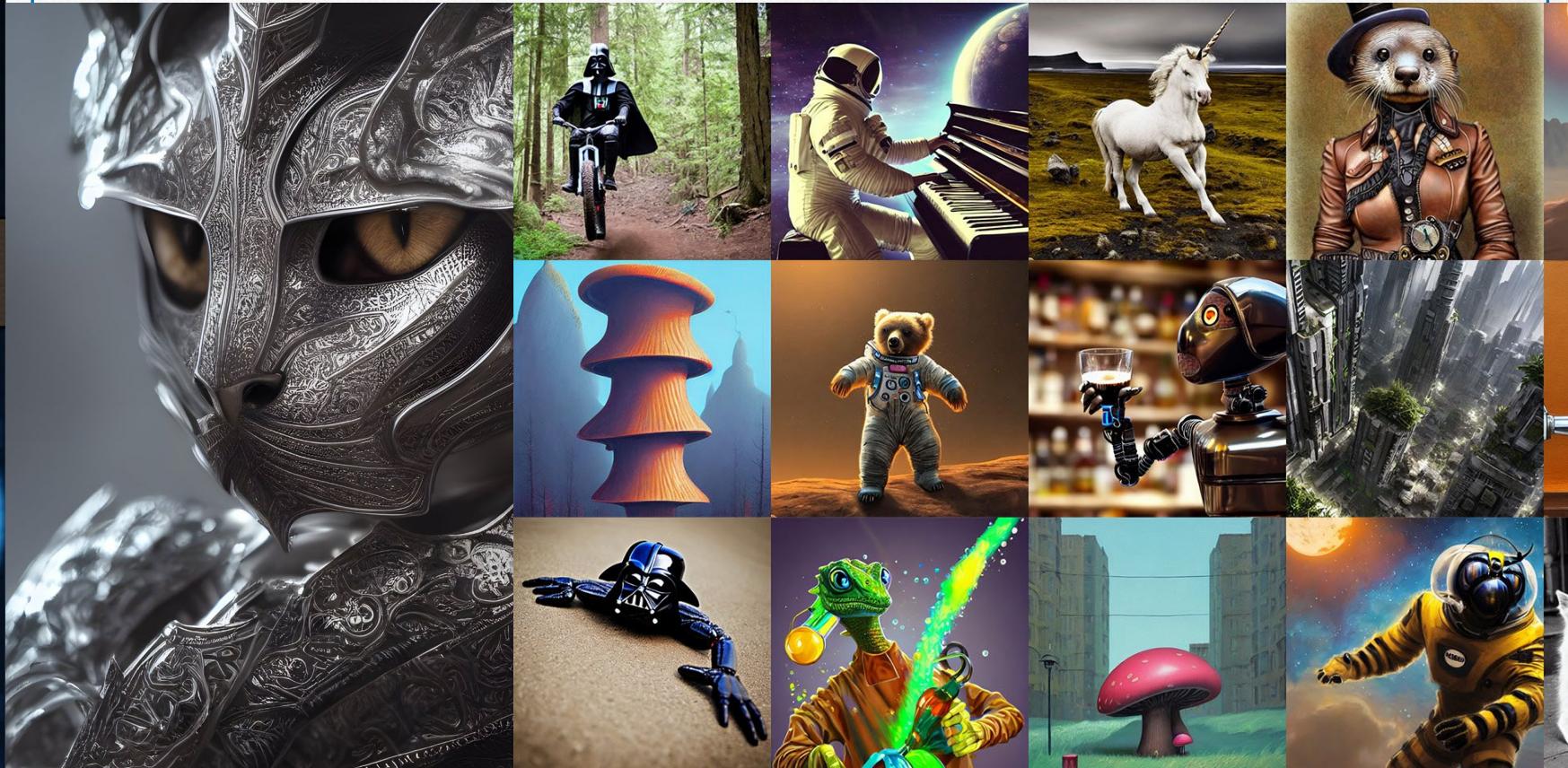
- AI is generally very good at **making predictions**.
 - What is contained in this image?
 - What does this line of Chinese mean in English?
 - What is correct response to the received inquiry?
 - What is the chance of this person having lung cancer?
 - What is the best move in this game of Go?

What is AI Good at?

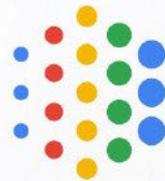
- AI is getting better at **generating content.**
 - Automatically categorizing your data.
 - Generating and modifying images to a style of your choice.
 - Simple writing such as short news articles.



2022: Stable Diffusion



O1
生活



Google AI

學啲喇波仔!
(設計對白)



李嘉誠基金會

3星期批10億靠 Google AI 幫手!



Chatbot 互動查詢





NEWSLETTER

MEDICALNEWS TODAY



Using Facebook to predict depression

Written by [Ana Sandoiu](#) on October 17, 2018 - Fact checked by Paula Field

New research uses over half a million Facebook status updates to predict depression diagnoses in people at risk.



Your Facebook posts may predict whether you will develop depression.



Demand

Take account of 75% and make in one forecast



Watch

AI turns you

COMMENT
24 SEP 2019

The potentials of

Using machine learning and Symphony RetailAI's demand forecasting improves forecast accuracy, allows you to optimize planning, reduce inventory and spoilage, and detect patterns and anomalies.



Adam Booth

Data scientist, AI

AI has a bit of an image problem. It has a bias to Brexit, it feels like there have been accusations of. So, when I read

Improvement in forecast accuracy:

3x

Demand Forecasting and Planning

Leverage Artificial Intelligence for dramatic improvement in forecast accuracy and planner adoption

Consumer Goods organizations struggle with using multiple versions of the demand signal, coming from multiple systems, to drive their decisions resulting in margin leakage and service level issues.

Antuit has the industry's first driver-based Demand Forecasting and Planning cloud solution, powered by Artificial Intelligence and Machine Learning. We deliver dramatic forecast accuracy improvement and enable planner adoption. When combined with DSD Predictive Ordering and Trade Promotion, the entire solution delivers the intelligence to predict and shape demand.

40% to 60%

No Touch Planning

↑ 2500 BPS

Daily Forecast Accuracy

↑ \$60M

Gross Margin

What is AI **NOT** Good at?

- AI is generally not so good at **explaining things**, partly because complex models are hard to apprehend.
- If you are interested in pinpointing the relationship between two variables, traditional statistical analysis would probably be more suitable.

What is Your Objective?

Are you trying to:

- Let the data tell you what relationship is contained within it, without needing you to provide any guidance?
 - **Unsupervised learning**
- Trying to predict a continuous variable?
 - Supervised learning - **regression**
- Trying to predict a discrete variable?
 - Supervised learning – **classification**
- Train an AI to do things on its own?
 - **Reinforcement learning**

SCRP

HPC Cluster

- Run your code on the cloud
- All necessary software installed and maintained
- GPU access
- scrp.econ.cuhk.edu.hk

