

Welcome to MSA AI Bootcamp

1. We will be commencing shortly
 2. This is a Microsoft Teams Non-tech Live event, so you are placed on mute for the entire duration.
 3. If you have any questions, please select "Ask a question" or upvote by liking existing ones.
 4. Captions can be turned on anytime by clicking the "CC" icon.
 5. At any point where you get lost, you can rewind the live stream to any point in time.
 6. This Bootcamp is being recorded and all recordings can be accessed via the same link you used to access this live event.
 7. Having this Bootcamp being recorded, should you not consent, please feel free to leave if you wish.
 8. For updates on the program, please join our Facebook group at <https://aka.ms/MSAFacebook>
- We hope you enjoy the session!



presents

Artificial Intelligence and Analytics



Agenda

01 Keynote

02 Introduction to MSA

03 AI & ML Concepts

04 Break

05 Project Walk-through

06 Project Submission & Assignment
Instructions

07 Questions and Answers



Speaker Keynote

Joseph Gurney

Graduated from the University of Tasmania in 2018, Joseph is now working at Microsoft as a Premier Field Engineer in Data & AI.



Role

Premier Field
Engineer - Data &
AI

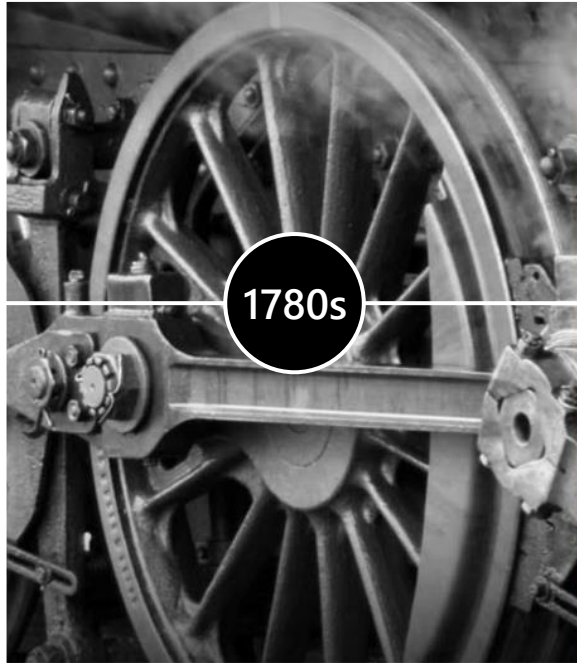


Company

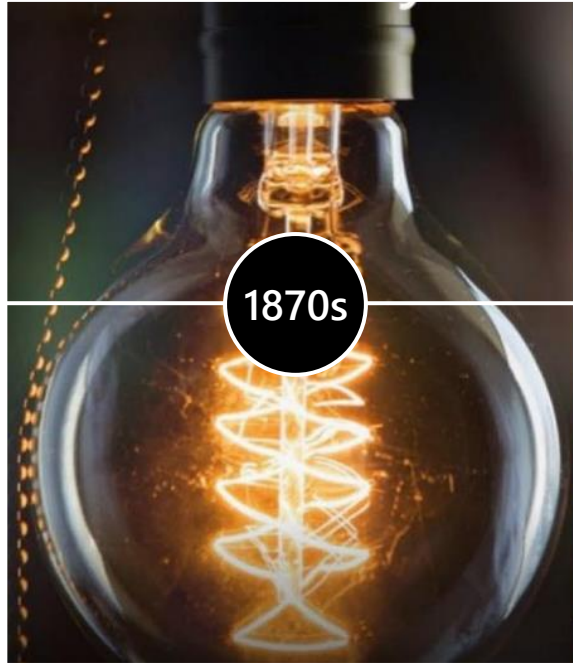
Microsoft –
Sydney, Australia



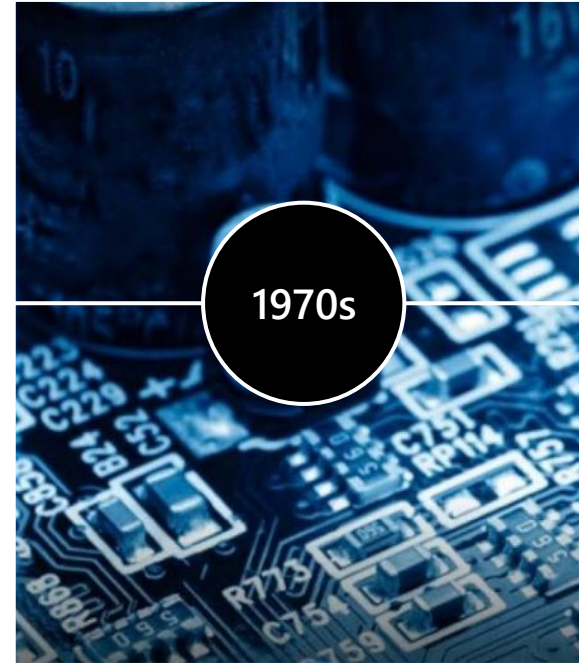
Disruption is the 4th industrial revolution



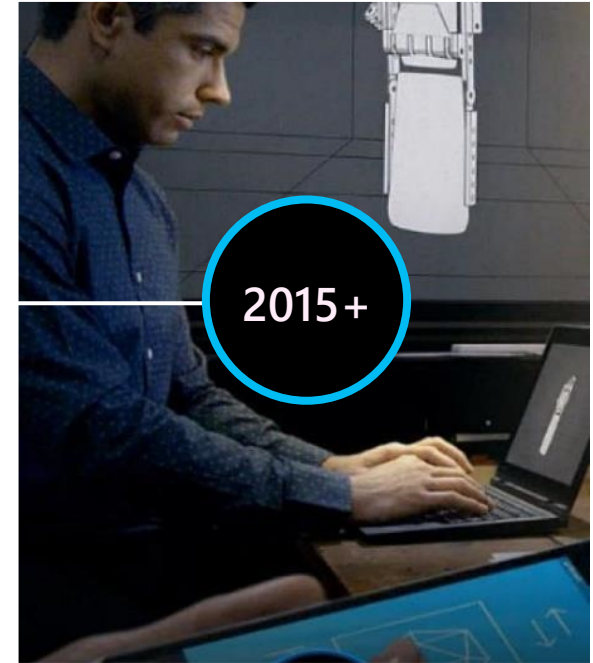
STEAM



ELECTRICITY



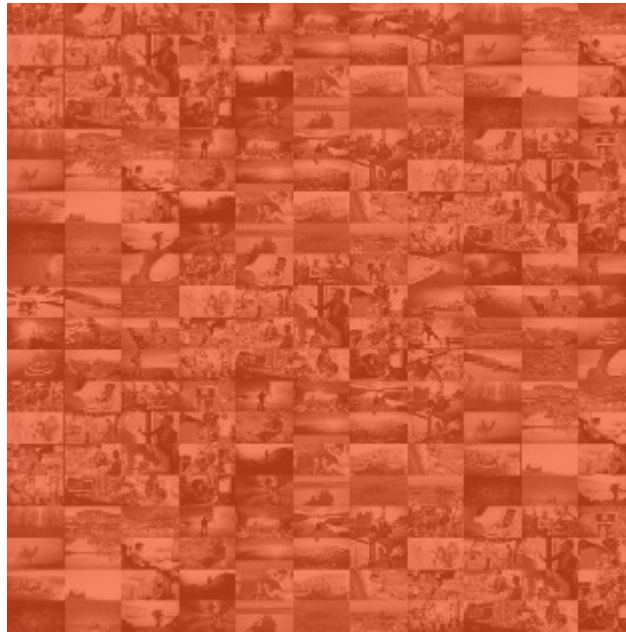
ELECTRONICS & IT

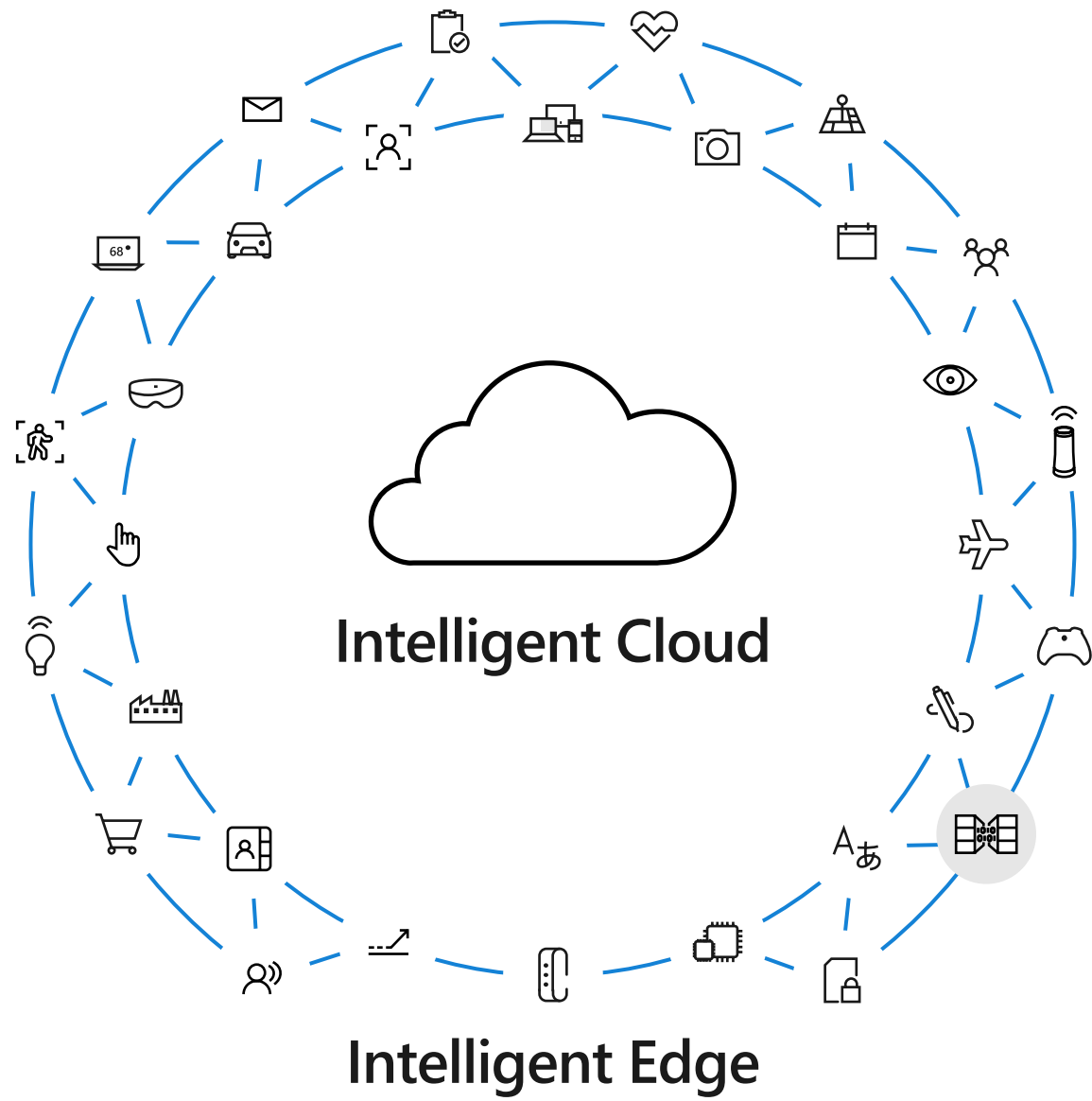


DIGITAL

Microsoft mission

Empower every person and
every organization on the
planet to achieve more





Introduction to MSA



Overview

The Microsoft Student Accelerator (MSA) program works with students to provide industry relevant training and put those skills in practice to solve a real-world problem.



Training

Start with 6 months of bootcamps, workshops and projects



Imagine Cup Mentorship

Top performing students will then be mentored for the Imagine Cup preparation



Structure

- Consists of a series of bootcamps and complimenting workshops.
- Participants are expected to complete at least 2 bootcamps to be certified as having completed the MSA Program.
- Each bootcamp will require students to finish a project and corresponding MS Learn modules.



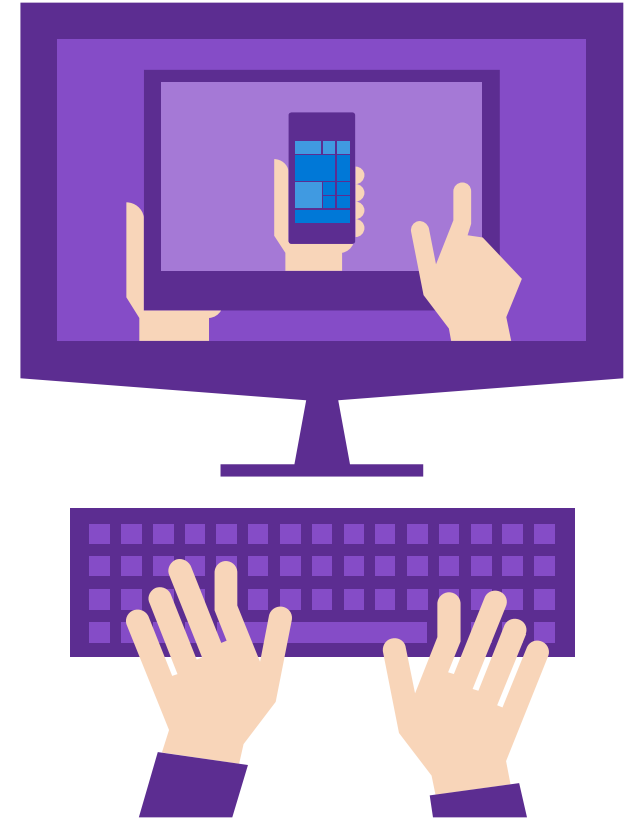
Bootcamp



Project



Workshop





Bootcamps vs Workshops



AI & Advanced Analytics



Cloud Computing with Azure



Web App and APIs

Bootcamp Topics



Git & GitHub



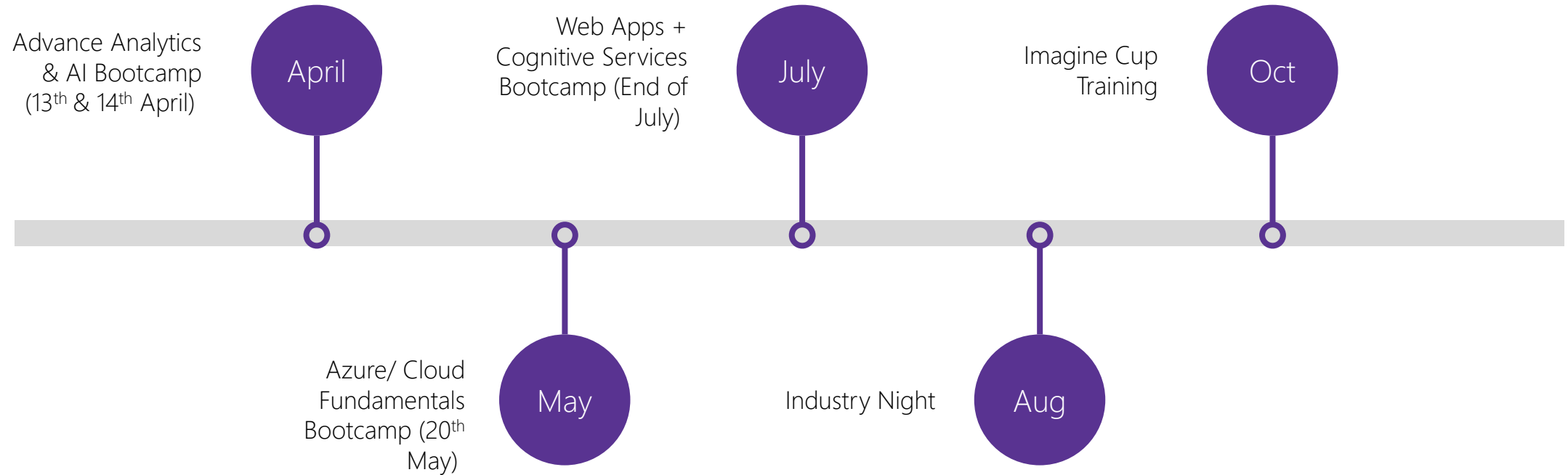
DevOps and Project Workflow



Presentation and Soft Skills

Supporting Workshops

Timeline



Points

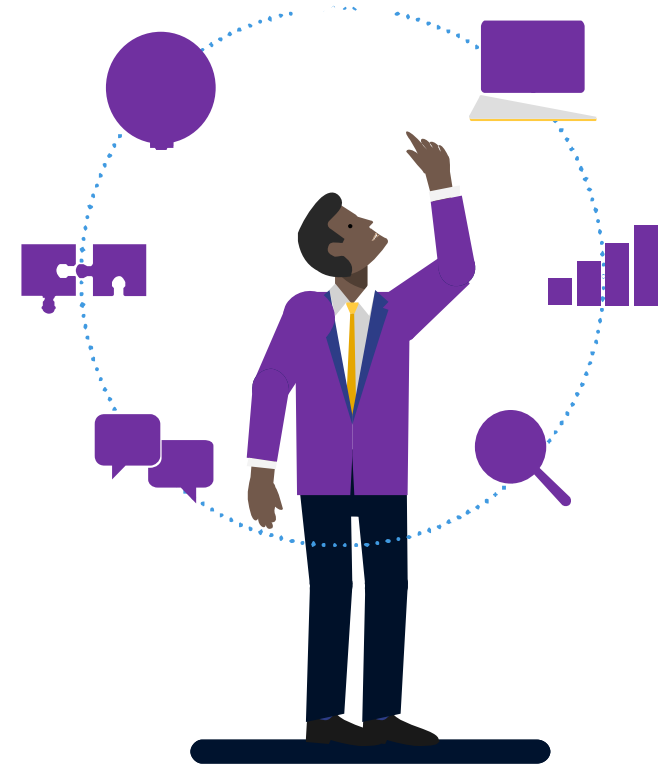
- Part of the MSA program and is an indicator of your progress. You can accumulate points through completing projects and Microsoft Learn modules.
- The top students with the highest number of points will be mentored to participate in the Microsoft Imagine Cup 2020.



Project



Microsoft
Learn Modules



Prizes

- Based on the points accumulated, while top students can earn exclusive Microsoft swags and goodies, there are special prizes for the top 3 participants.

01

Surface
Book 2

02

Xbox
One X

03

Surface
Headphone



Support and Resources

- Access to exclusive tools and resources such as GitHub, Microsoft Learn and helpdesks.
- GitHub will be your primary source of information
- Helpdesks enable participants to ask questions and get help from our volunteers.



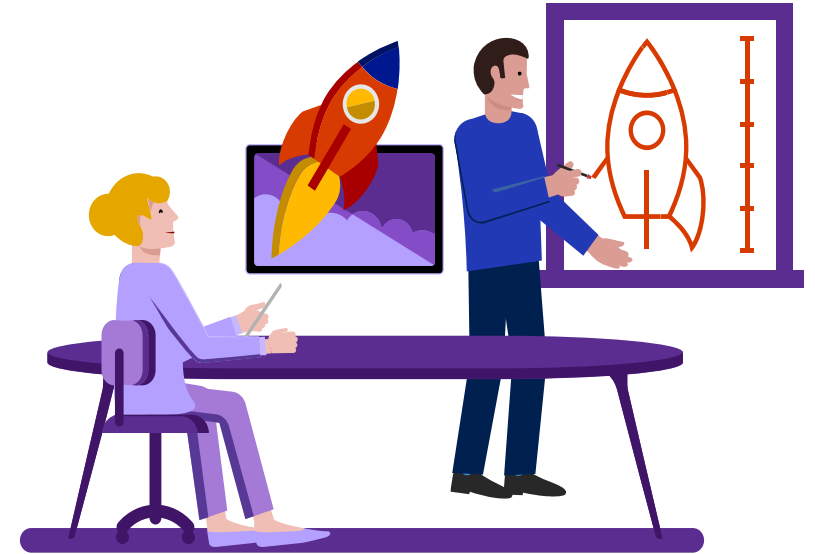
GitHub



MS Learn



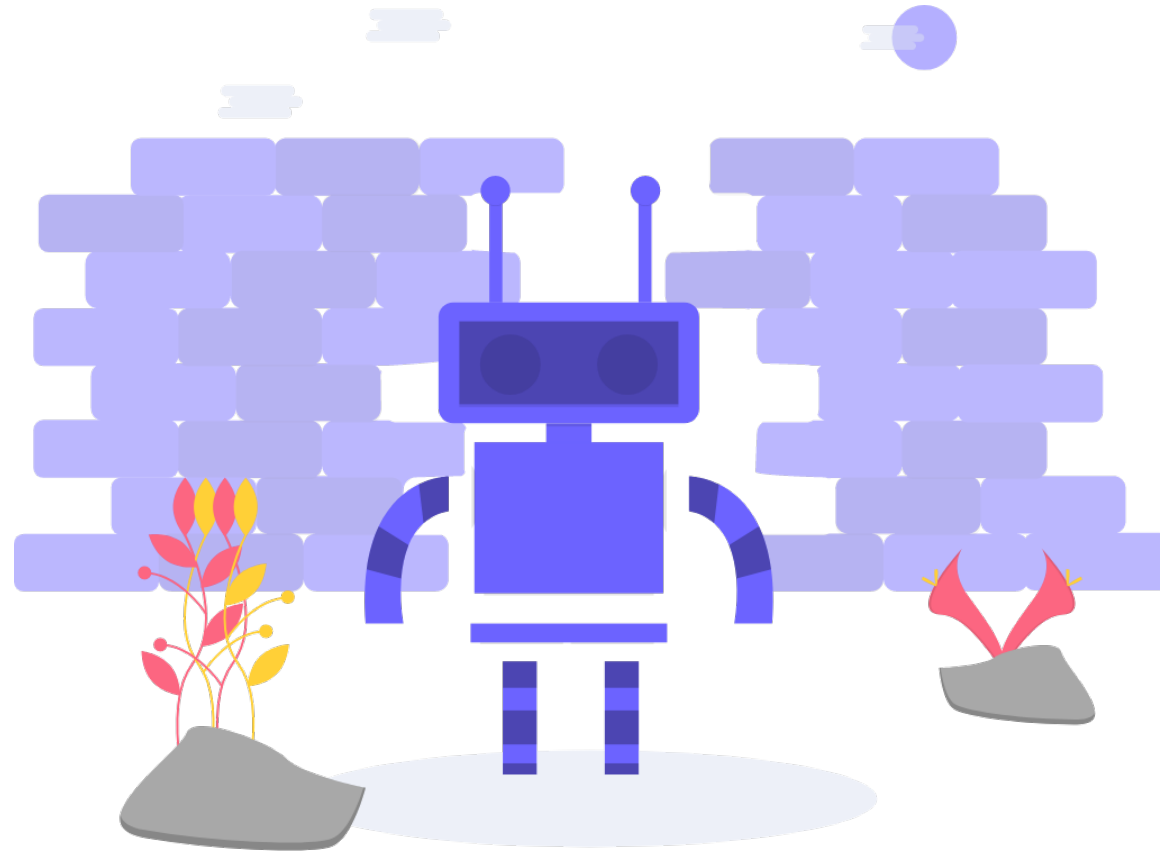
Helpdesks



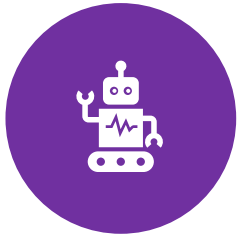


AI & ML Concepts

Story Time!



Overview



INTRODUCTION TO
ARTIFICIAL
INTELLIGENCE (AI)



AI VS MACHINE
LEARNING (ML) VS
DEEP LEARNING



WHY & WHERE DO
WE USE AI



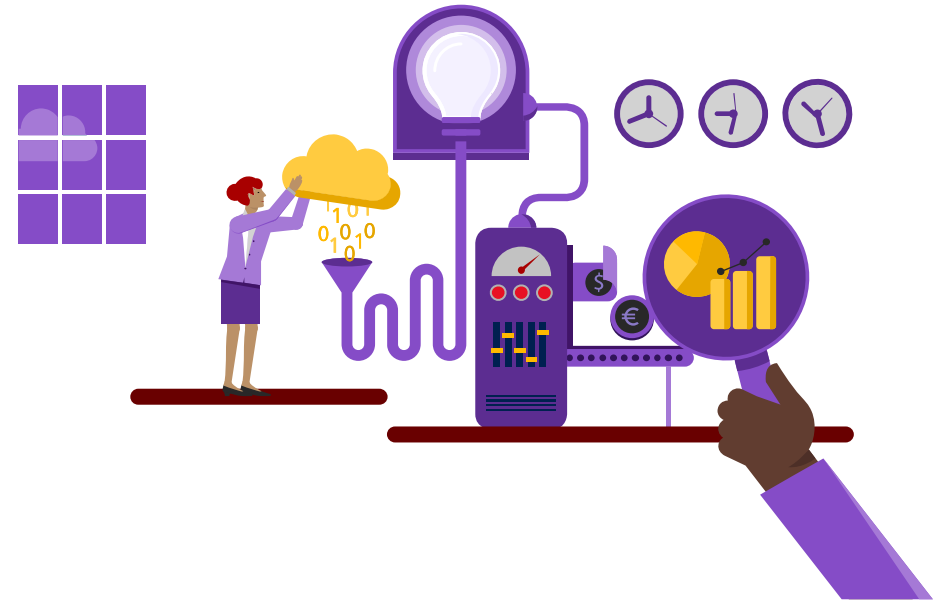
CLOSER LOOK AT
HOW AI WORKS



DEMYSTIFYING
COMMON JARGONS

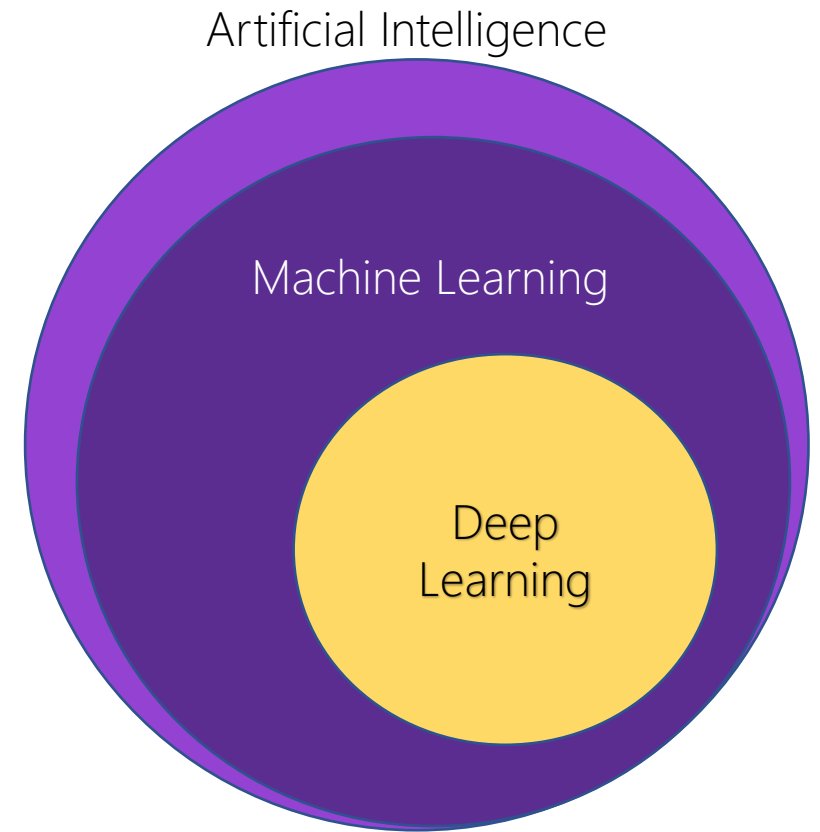
Artificial Intelligence

- Theoretical concept of “smart” or “sentient” machines
- Machine which simulate human-like behaviour
- Earliest examples date as early as Greek Mythologies (Pandora’s box)



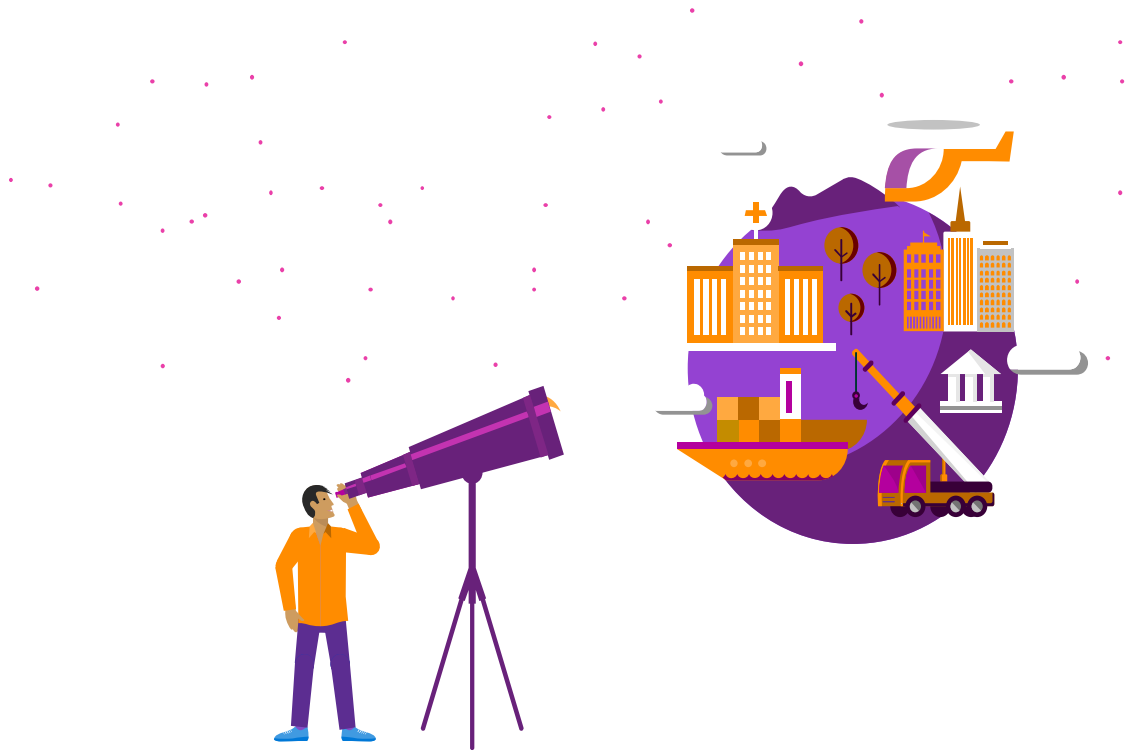
AI vs Machine Learning vs Deep Learning

- Terms often used interchangeably
- Are subsets of each other



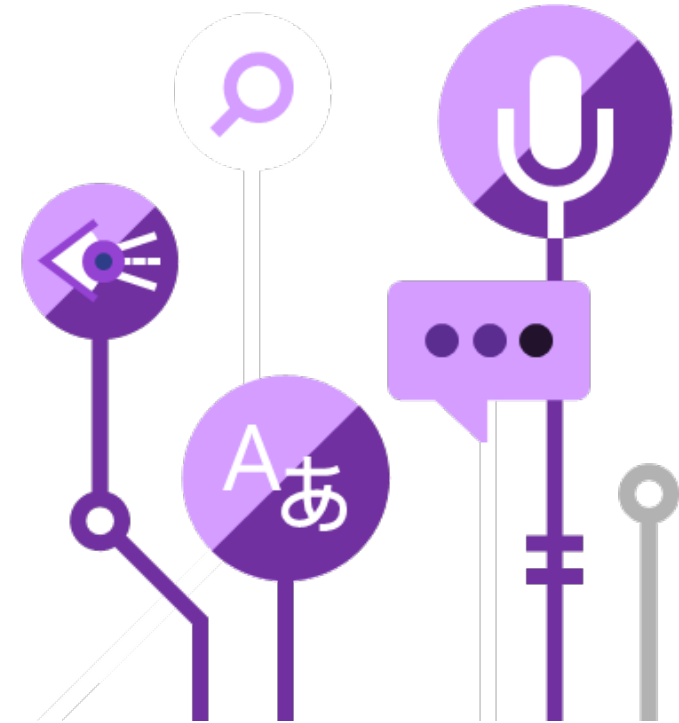
Machine Learning

- Practical application of AI using programming, mathematics and statistics
- Building mathematical models and algorithms in order to identify patterns or generalize information
- Can make **decisions** or **predictions** based on those knowledge



Deep Learning

- Subfield of ML inspired by the structure and function of the brain
- “Deep” refers to the number of layers through which the data is transformed
- Commonly applied for computer vision, speech recognition, natural language processing etc.



Why Do We Need Machine Learning?

- The amount of data is growing exponentially
- Finding patterns and other useful information in data is becoming considerably difficult for humans
- Machine Learning gives us the promise to derive meaning from the data
- Frees humans to engage in more creative or decision making tasks



Common Uses of Machine Learning



Image recognition & analysis



Fraud detection



Recommendation systems



Text & speech systems

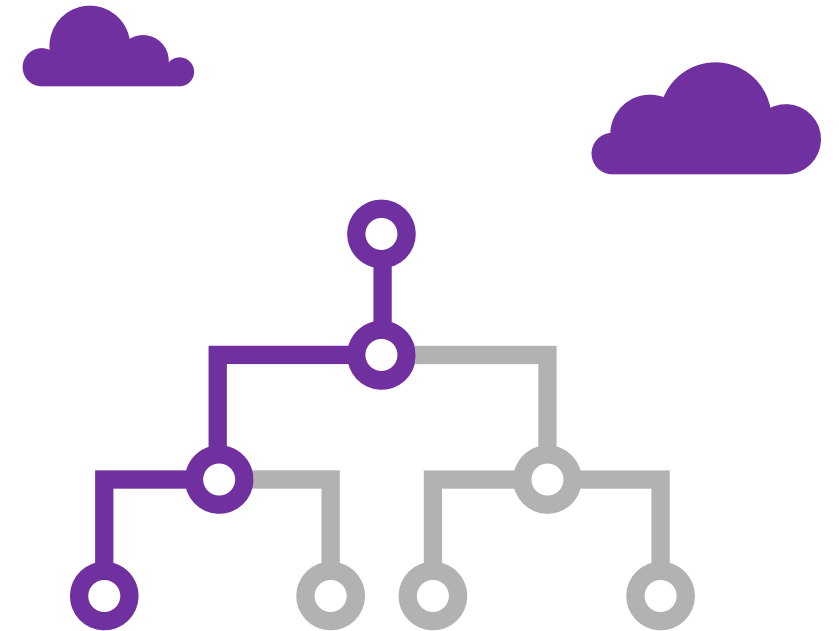


Bioinformatics

How Does Machine Learning Work?

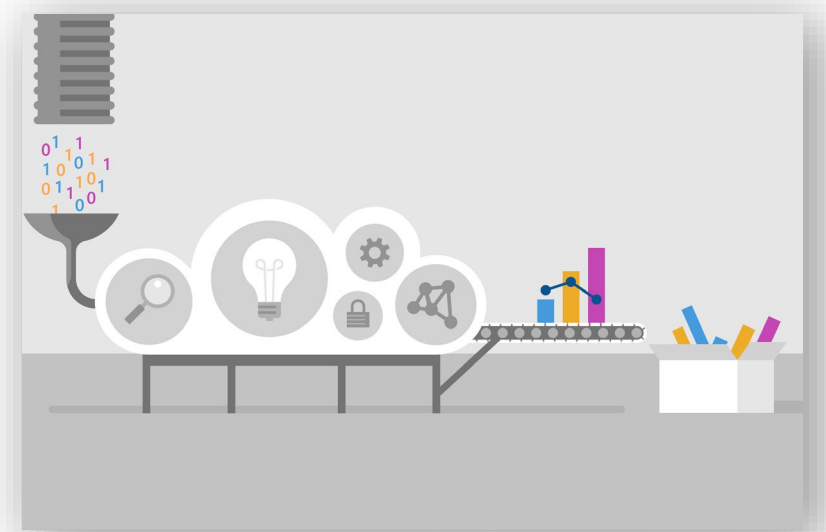
A typical model can be broken down to:

1. Identify the problem then gather and prepare data for the problem we're trying to solve
2. Select an appropriate ML model based on the problem
3. Train our model on the training data
4. Test our model and optimise
5. Launch it to the real world!



Data Collection and Processing

- Very important to collect a wide variety of data
- If not provided in a correct format, the algorithm would perform incorrect analysis
- Missing data can significantly decrease the accuracy of the model
- Focus on the features or values we want and drop the insignificant ones



Common Categories of Machine Learning



Supervised
Learning



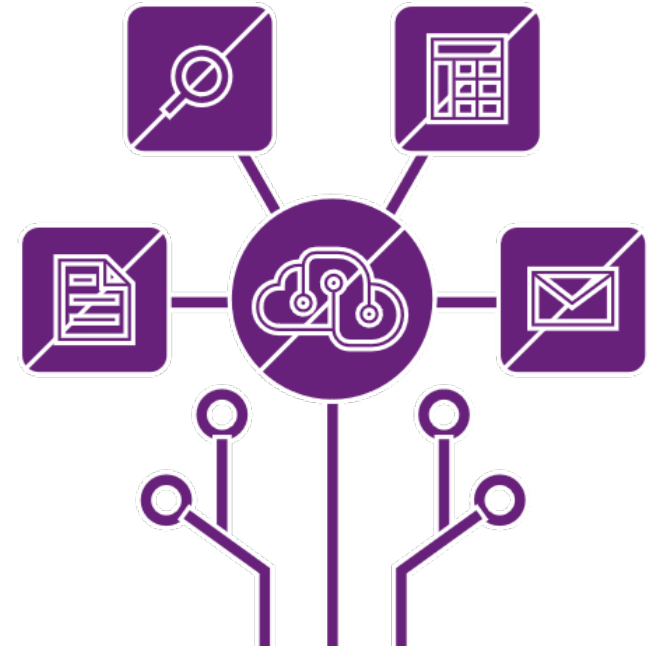
Unsupervised
Learning



Reinforcement
Learning

Supervised Learning

- Is like learning with a teacher
- Use past data to predict future outcomes
- Uses a trial and error based approach
- Often used for prediction and classification



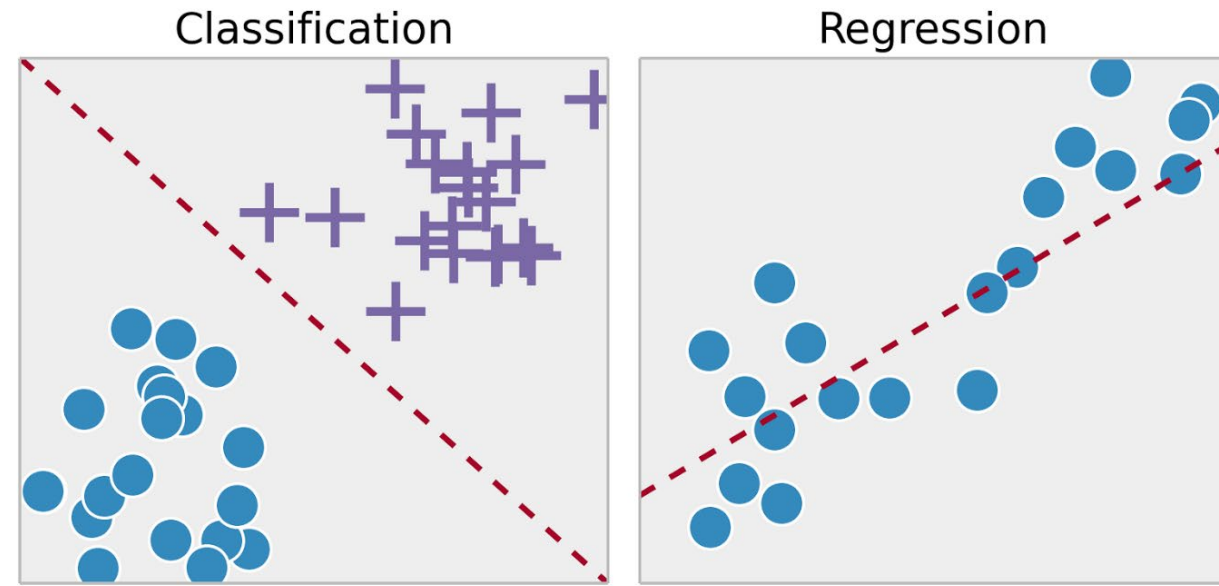
When Supervised Learning Is Used?

Classification: Machine is trained to classify something into some class.

- classifying whether a patient has disease or not
- classifying whether an email is spam or not

Regression: Machine is trained to predict some value like price, weight or height.

- predicting house/property price
- predicting stock market price



Unsupervised Learning

- Is like learning without a teacher
- The machine learning through observation &
- Tries to learn some type of structure from the data
- No specific way to compare model performance in most unsupervised learning methods.



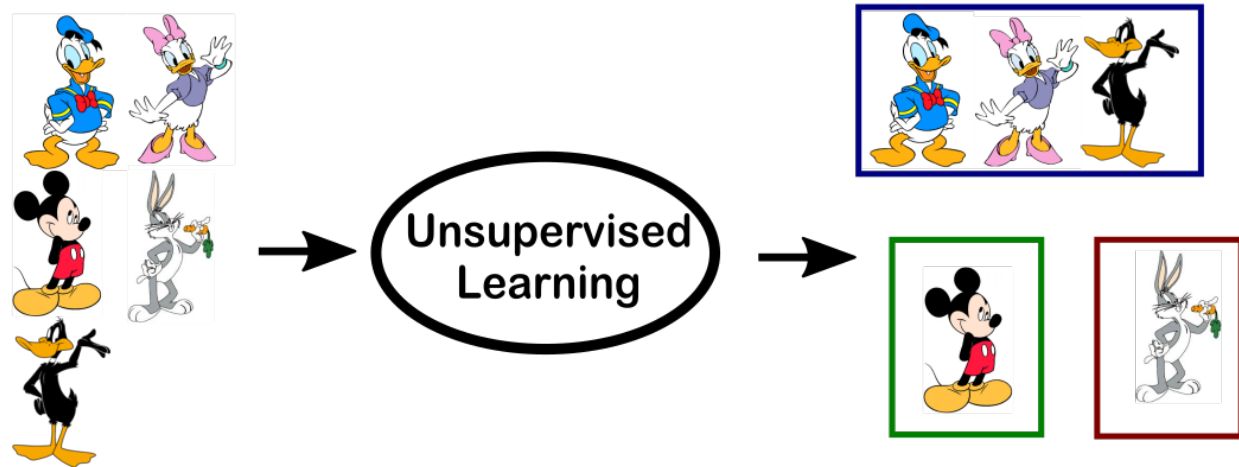
When Do We Use Unsupervised Learning?

Clustering: A clustering problem is where you want to discover the inherent groupings in the data

- Such as grouping customers by purchasing behavior

Association: An association rule learning problem is where you want to discover rules that describe large portions of your data

- Such as people that buy X also tend to buy Y



Reinforcement Learning (RL)

- The model consists of a decision process(s) and reward system
- An agent (model) interacts with the environment to maximise the total rewards.
- RL is usually modelled as a Markov Decision Process (image below):

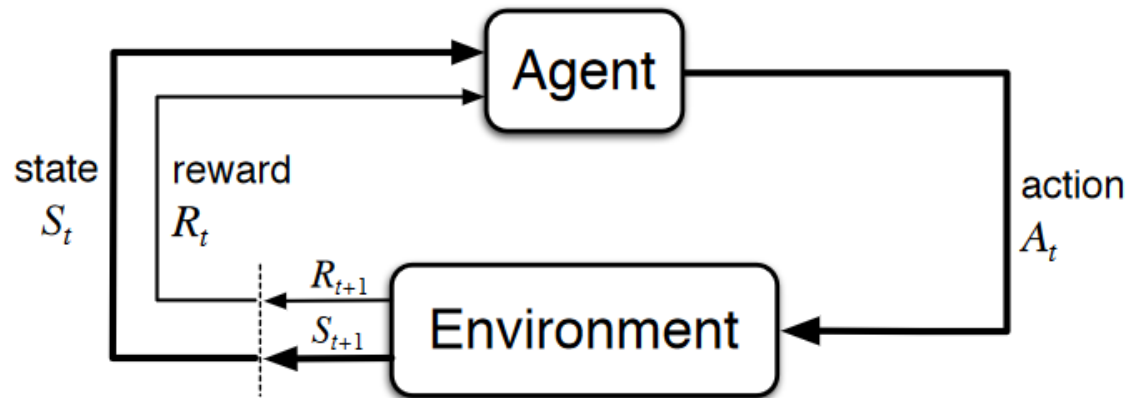


Figure 3.1: The agent–environment interaction in a Markov decision process.

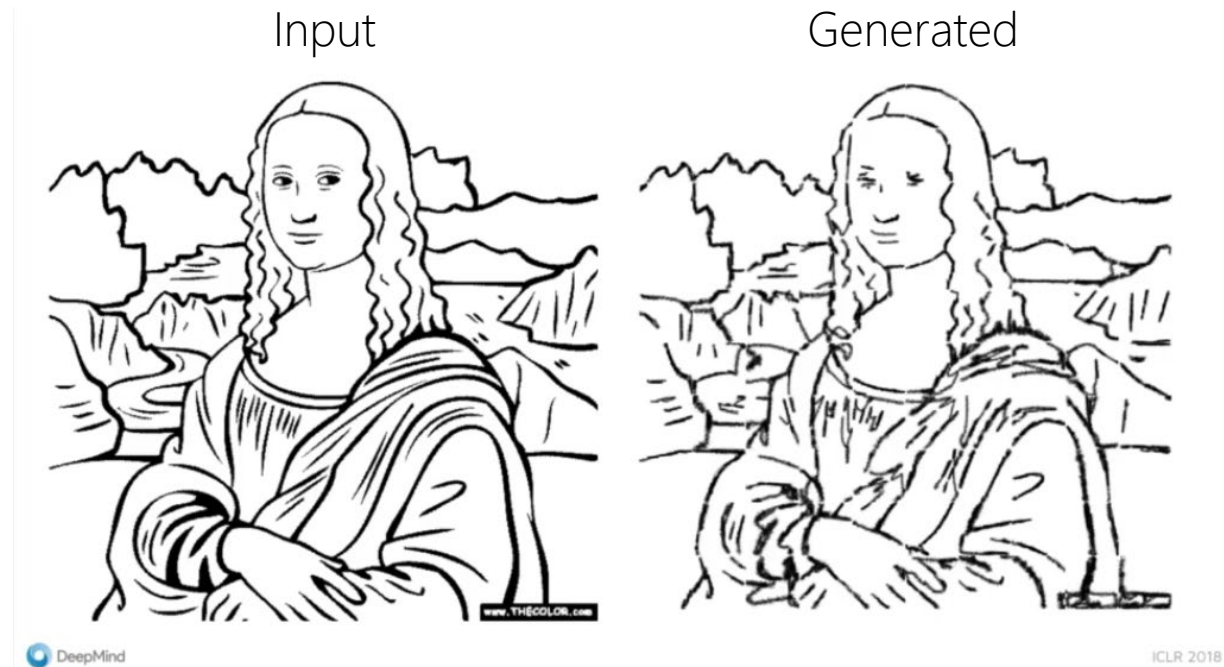
When Not To Use Reinforcement Learning?

You can't apply reinforcement learning model in all situation. Here are some condition when you should not use it:

- When you have enough data to solve the problem with supervised learning
- You need to remember that reinforcement learning is a computing-heavy and time-consuming

Common real-world applications of RL:

- A machine learning model to play chess
- Intelligent traffic control system



Importance of Proper Testing

- How the model generalizes unseen data is very important – Overfitting & Underfitting (Demystified in later slides)
- Fine tune model's parameters and optimise
- Choose the best performing model

Common Model Evaluation Techniques: Holdouts, Cross-Validation.

Read more about them [here](#).

A purple icon depicting two stylized human figures. The figure on the right is slightly behind the one on the left. A speech bubble with a white question mark is positioned above the right figure.

Demystifying Common Jargons

Weights, Biases & Hyperparameters



Weights: Initialised values that decide much influence the input will have on the output. They are updated as our model trains itself.



Biases: Constant values which act like pre-determined notions. And additional input



Hyperparameters: Parameters whose value is set before the learning process begins. Example: learning rate, batch-size etc.

Train, Test & Validation



Train: Go through the training datasets to generate output



Validation: Validate the output generated during training and update weights and biases



Test: Previously unseen data. Used to determine model's accuracy. Tune hyperparameters to optimise

Overfitting & Underfitting



Overfitting: When the model memorizes the features and information of the training data rather than generalizing it.



Underfitting: When the model can neither generalize the training data nor unseen data

Thank You!

Please ask any questions in the Q&A section of the Livestream

Attendance Form

<https://aka.ms/AttendanceForm>





Break
(10 mins)

Project walk-through



Project Walkthrough

- A sample to teach you how to use AzureML and Azure Notebooks in your project
- Uses MNIST Dataset – Predicting Handwritten digits
- *If you get lost, you can always re-watch this recording later at your own pace



Project Submission & Assignment Instructions



Assignment Instructions

- In order to complete this Bootcamp, you will need to complete its corresponding Microsoft Learn modules or tutorial and a project.
- All of these will be detailed on GitHub which you can access via a link we sent to you via email.

100PT

3PT

Project

Microsoft
Learn Module

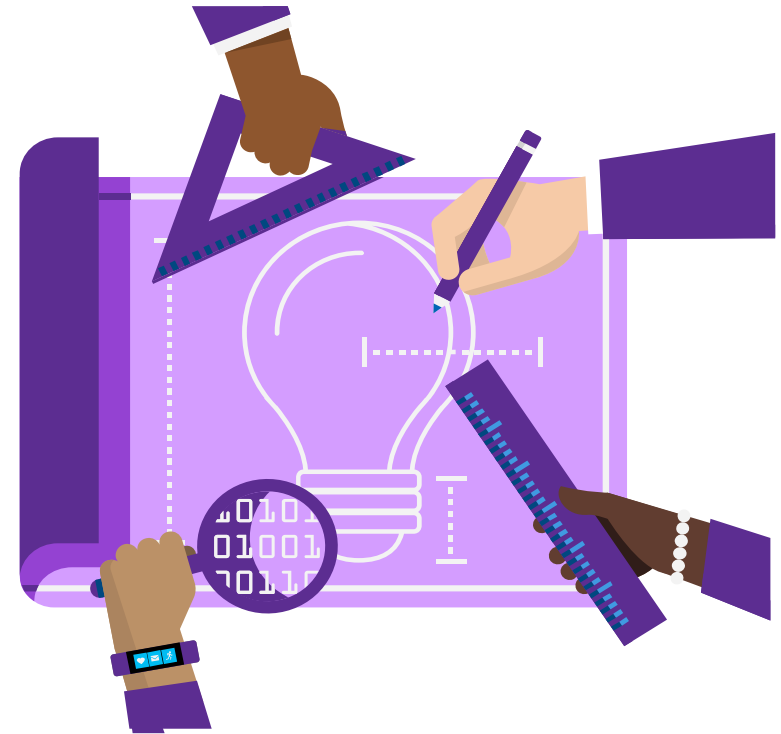


Project Submission

- Submit GitHub links and screenshots of completed tasks here:

<https://aka.ms/MSAAusProjectSubmission>

- The assessment of this bootcamp is due by 13th June 2020



Questions and Answers



Thank you for attending!

1. The recording for this Bootcamp can be accessed via the same link used to access this live event.
2. All resources can be found on our GitHub repo which can be accessed via the link we sent to your email.