Overview of AI & Machine Learning

Module 1 – Day 1

Welcome to the AI Boot Camp! In this this module, we will delve into the fascinating world of Artificial Intelligence (AI) and Machine Learning Learning (ML). Join us as we explore explore the principles, applications, applications, and potential of these these cutting-edge technologies.

Class Resources

AI (canva.com)

Graduation Requirements

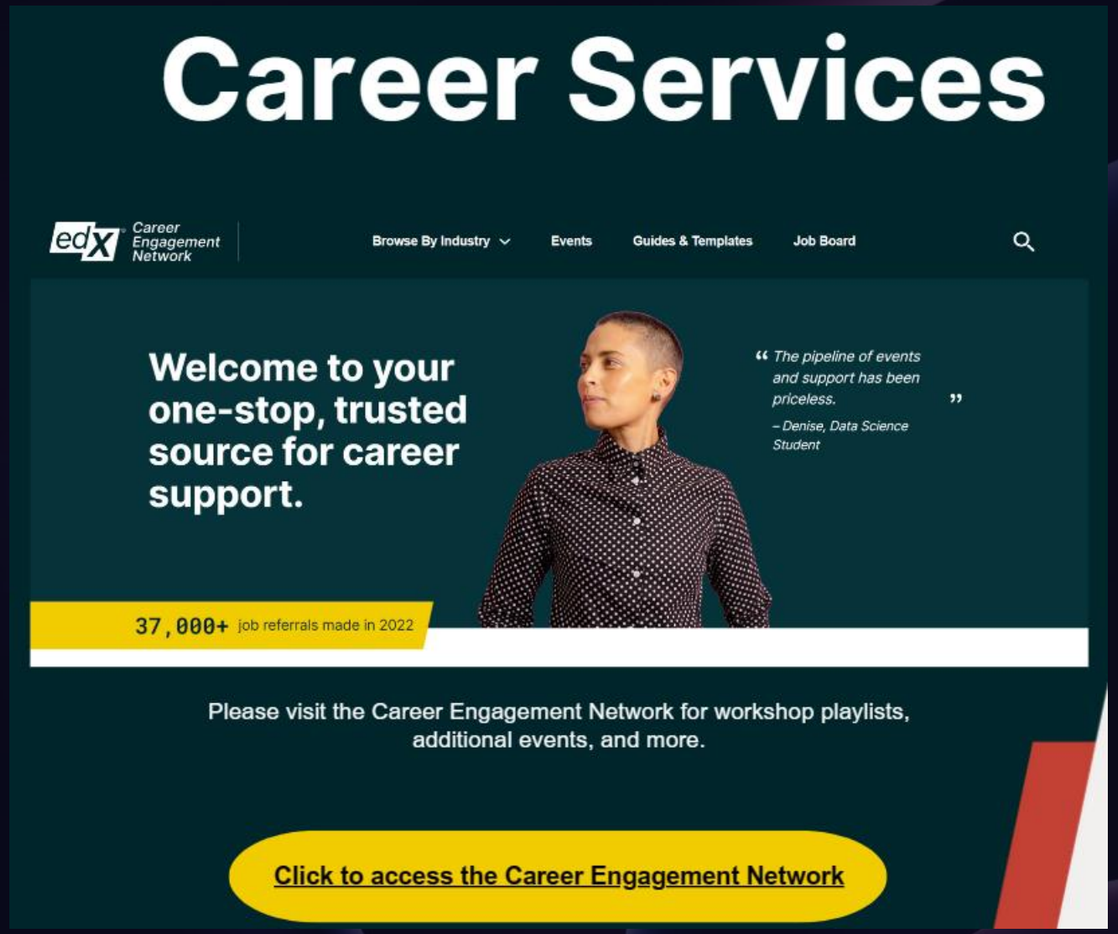
Completion Requirements

- Miss no more than 4 Virtual Classes
- Participate in all group projects
- Miss no more than 2 homework/challenge assignments
- Fulfill tuition requirements

Attendance Requirements

- Arrive to class on time
- Stay for the duration of class
- Turn on your camera

Support & Career Services



Tutoring Sessions

- 25 Included for the entire course
- Pace your use of them
- Office Hours

Class Objectives

By the end of class, you will be able to:

1. Identify the instructional team and classmates.
2. Understand the course format and certification requirements.
3. Recall the course topics and agenda.
4. Define AI & ML.
5. Differentiate between AI & ML
6. Illustrate the differences between generalized and narrow AI.

Instructional Team

1. What is your career history?
2. What have you accomplished thus far in your career?
3. What are you looking forward to in this course?
4. Fun fact/interesting?

Section 1 - Programming and data preparation for AI

- In this first section, you will learn fundamental skills to source, source, prepare and analyze data for machine learning models models and AI applications. Building on these skills, you will you will learn to make predictive models to use for forecasting forecasting time series data.
- Portfolio project: This section will culminate in a project where project where you will prepare data and forecast predictions. predictions. You will leverage skills learned in this first section section such as programming, data preparation, visualization visualization and forecasting.

Section 2 - Machine learning fundamentals and AI ethics

- The second section takes your programming and data skills to skills to the next level through learning machine learning, using learning, using supervised and unsupervised learning, evaluating models for optimal performance and understanding understanding the legal and ethical considerations of using using artificial intelligence.
- Portfolio project: This section concludes in a project where you where you will train machine learning models, optimize the optimize the models and evaluate model performance in order in order to choose the best model for your application.

Section 3 - Natural language processing and AI applications

- The final section of the course will explore cutting-edge AI edge AI topics such as neural networks, deep learning, natural natural language processing, transformers and emerging topics emerging topics in AI.
- Portfolio project: The final section of the course consists of a consists of a capstone project that utilizes skills and knowledge knowledge from across the course. Learners are encouraged to encouraged to explore advanced techniques utilizing neural neural networks and transformers.

Embrace Your Inner Toddler

- Maintain a curious and inquisitive mindset.
- Be open to learning new things and embracing challenges.
- Approach the learning process with playfulness and creativity.
- Stay persistent and patient in the face of difficulties.

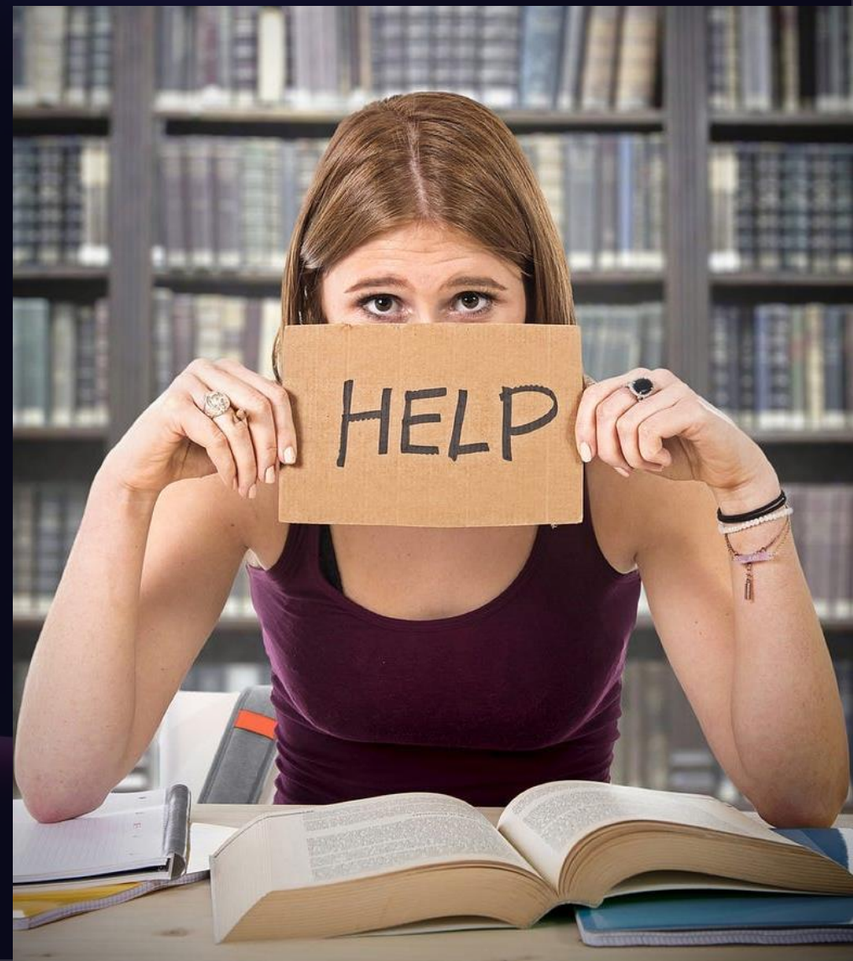
Growth Mindset (vs Fixed Mindset)

- Be curious, ask questions, and don't be afraid to make mistakes.
- Brace yourself for doubt, challenge, and confusion: See these as opportunities for growth and learning.
- Relish the novice experience and expect a lot of lightbulb moments: Embrace the process of learning something new.
- There is no shortcut. You've got to put in the hours: Hard work and perseverance are essential for mastering new skills.

Form a Community of Learners

You and your classmates are in this in this process together. Use each other for help!

You all bring value to the table. Don’t be afraid to speak up!



What Exactly is Artificial Intelligence?

Artificial intelligence (AI) is the combined application of the computer and data sciences to develop algorithms that can execute “autonomous” problem-solving.

What Exactly is Artificial Intelligence?

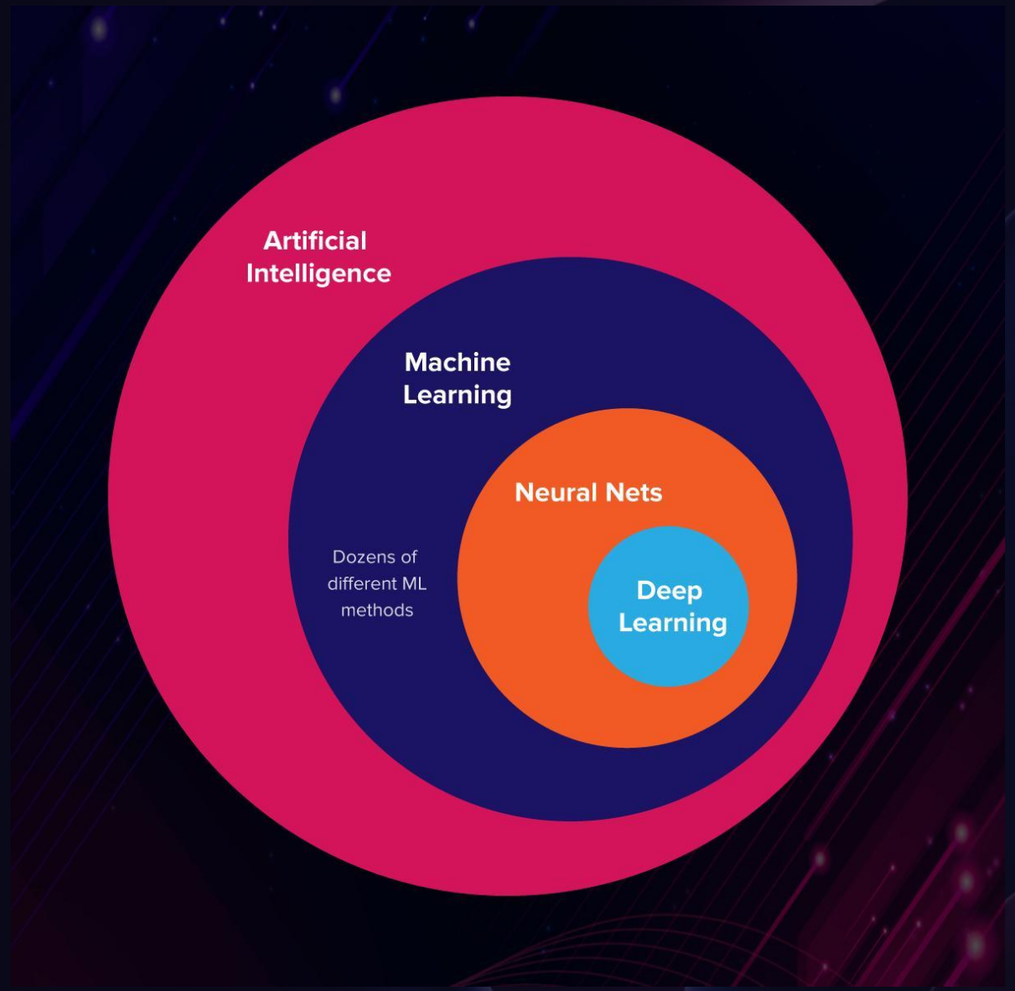
- AI, or Artificial Intelligence, refers to the simulation of human intelligence in machines that are programmed to think and act like humans.
- The goal of AI is to enable computers to perform tasks that would normally require human intelligence.
- AI encompasses a broad spectrum of capabilities, including problem-solving, learning, planning, and recognizing patterns.

Applications of AI Technology

Explore the vast array of applications where AI technology is revolutionizing the way we live and interact with machines.

- Self-driving Cars
- Complex & Simple Robots
- Generative AI
- Recommender systems

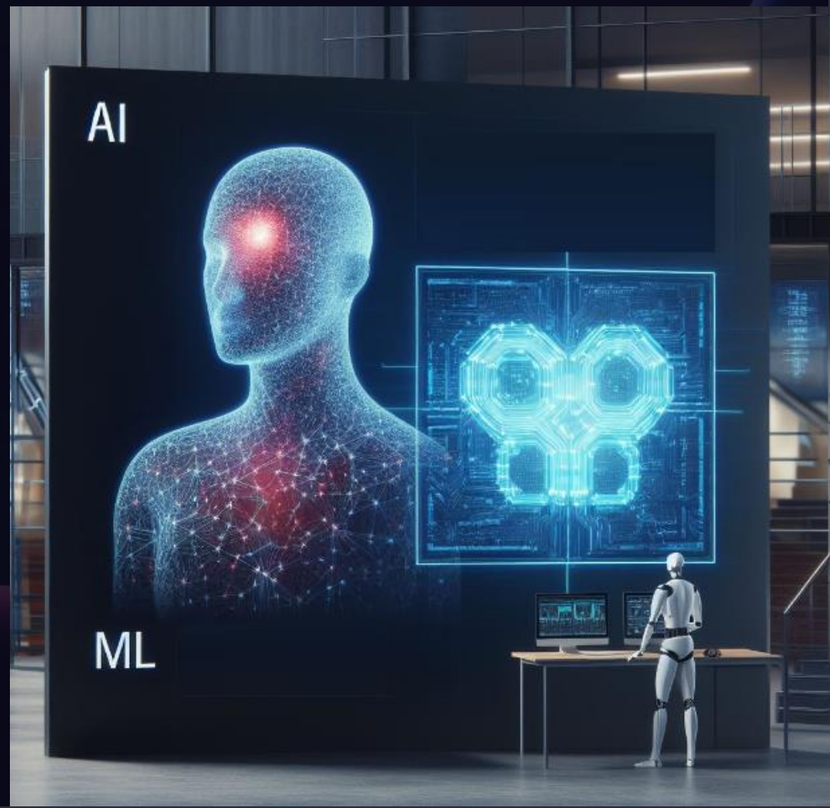
What is Machine Learning?



Machine learning (ML) is a subset of AI that enables computer algorithms to learn from data and then make decisions or predictions about future data without explicit instructions from programmers.

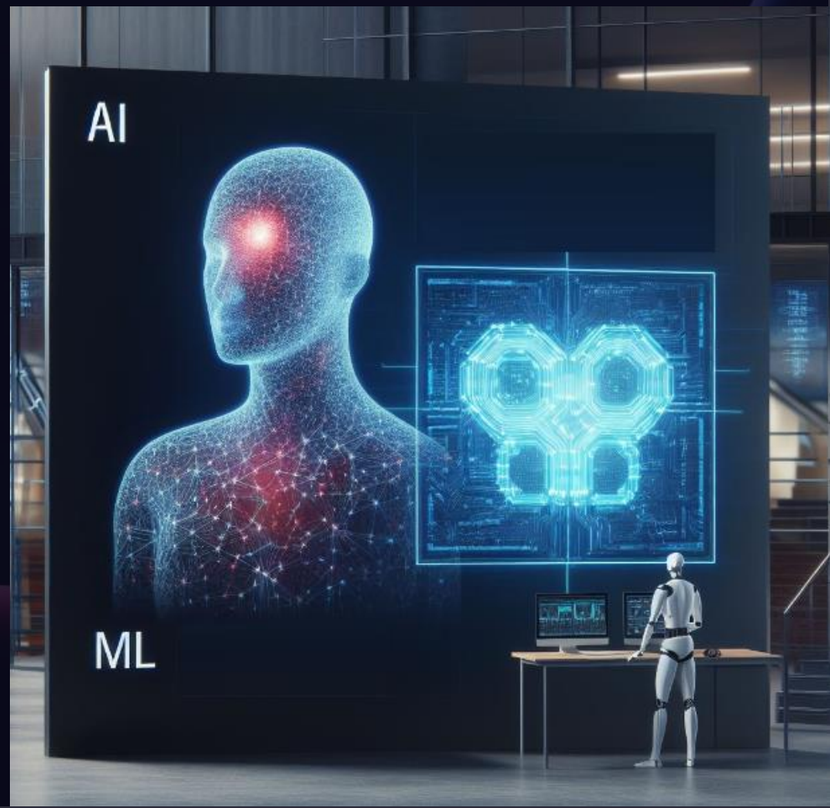
ML and AI

1. Without the aid of AI, programmers must provide a computer with all the rules and objectives required to process data. This is both time-consuming and inefficient.
2. ML differs from traditional programming because it uses data to produce predictive models and then utilizes these models to make predictions.



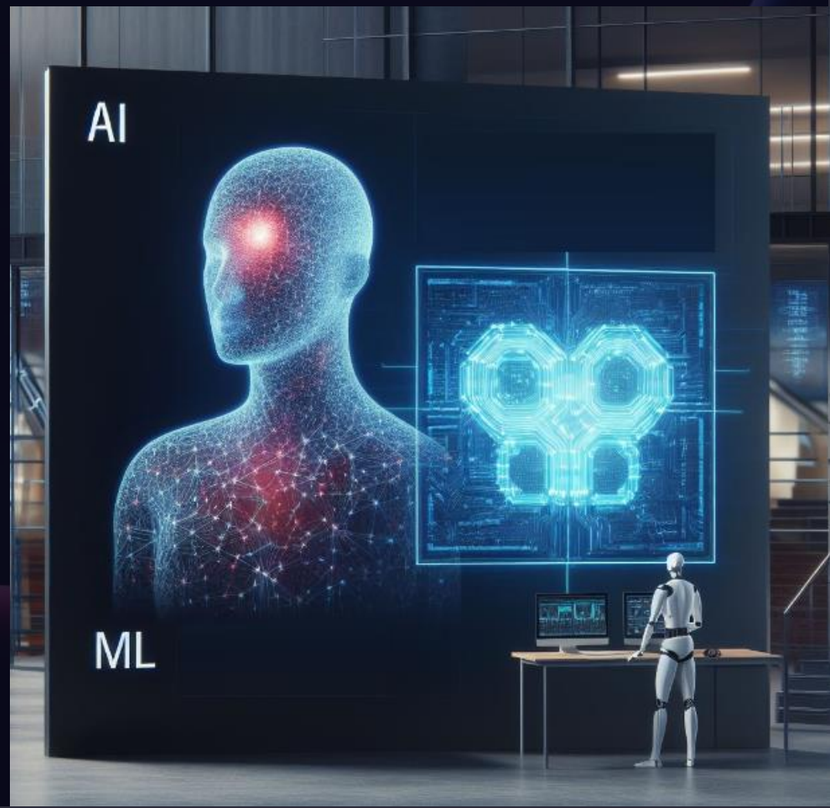
ML and AI

3. ML uses algorithms to craft and train models that make predictions based on data from the world around us.
    - The computer system improves by identifying which data points are outliers and disregarding them in future predictions, allowing it to make better predictions or decisions moving forward.
    - Best of all, programmers do not need to tell the computer how to improve; it can teach itself from the data.

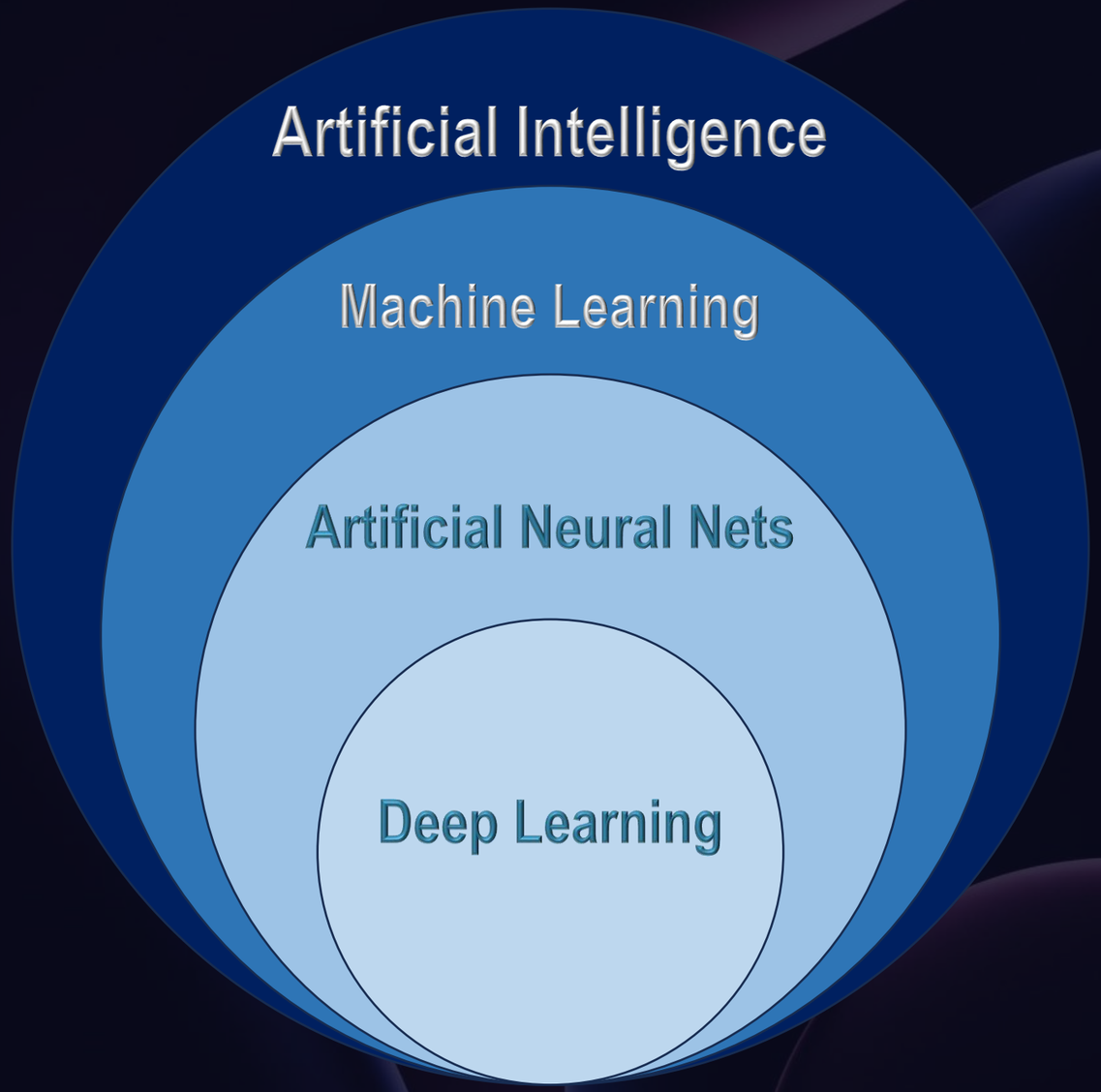


Remember

AI enables computer algorithms to perform tasks in ways similar to a human, while ML enables an algorithm to create its own intelligence.



Remember



Artificial Intelligence (AI)
Any technique that enable machines to solve a task similar to how humans do.

Machine Learning (ML)
Algorithms that allow computers to learn from examples without being explicitly programmed.

Artificial Neural Networks (ANN)
Brain-inspired machine learning models.

Artificial Neural Networks (ANN)
Subset of ML-Uses deep ANNs as models & builds hierarchy of data representations.

Key Differences Between ANI and AGI

Narrow AI

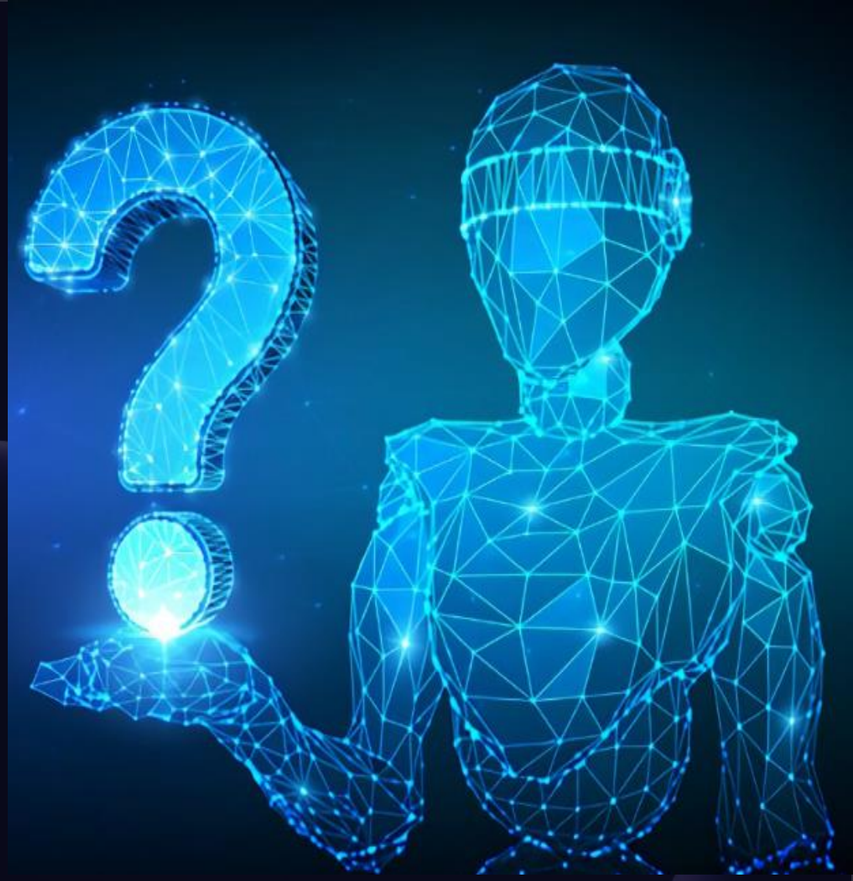
- Performs specific tasks as instructed
- Unable to transfer knowledge across domains
- Simulates human consciousness but is not conscious
- Currently in use

General AI

- Performs general tasks with little to no oversight
- Can transfer knowledge across domains
- Has human-like consciousness
- Possible in the future

While Narrow AI is designed for specific tasks, General AI aims to replicate human-like consciousness across various domains.

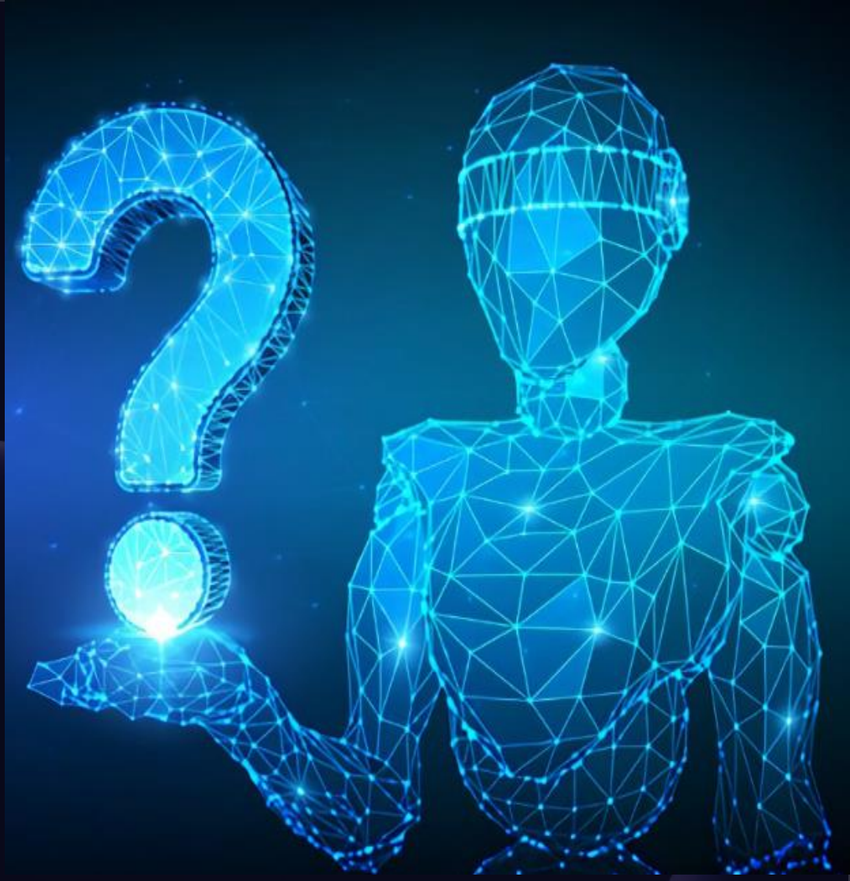
Activity: AI Discussions



Engage in thoughtful discussions with your classmates on the Topic of AI. Reflect on your expectations, interests, and confusion surrounding AI. Explore its significance and envision the possibilities it holds for the future.

Activity: AI Discussions

- What does AI mean to you? Why is it important?
- What about AI interests you?
- Where do you expect AI to take you? What are you looking to do?
- What about AI may be confusing? What makes sense?



Time's Up!

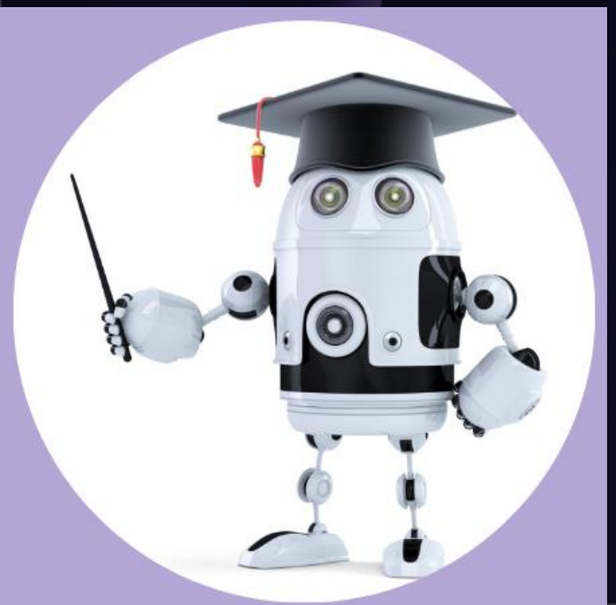
Let's Review

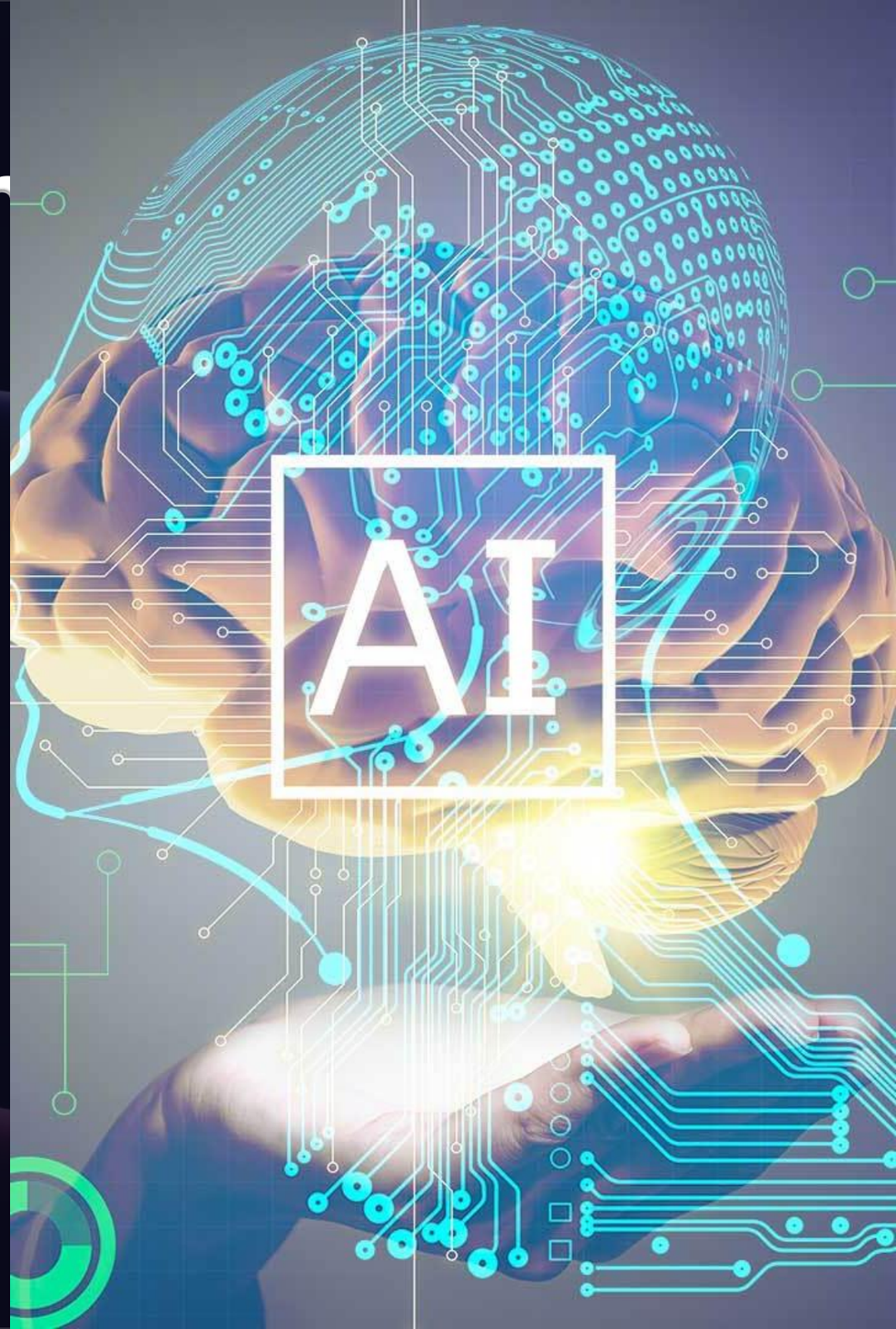
Let's Break

15 Minutes

Instructor Demonstration

AI Foundations





Structure for the Week

Classes this week will be divided in two parts:

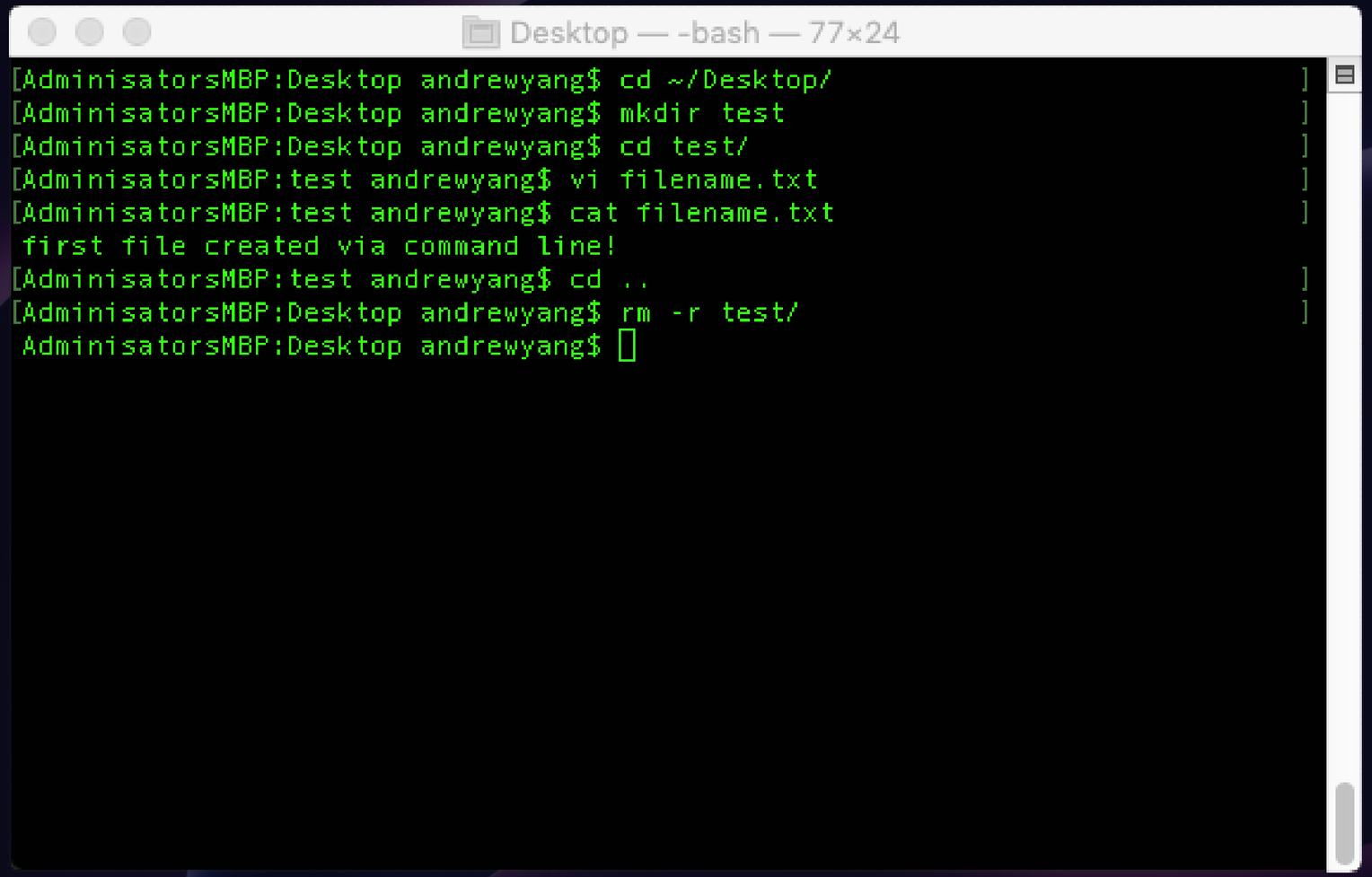
1. Conceptual Understanding

- Gain a solid foundation in AI concepts and principles.
- (What we've been doing.)

2. Foundation for AI

- Develop the necessary skills to build powerful AI algorithms.
- (What we're doing next.)

Command Line Interface



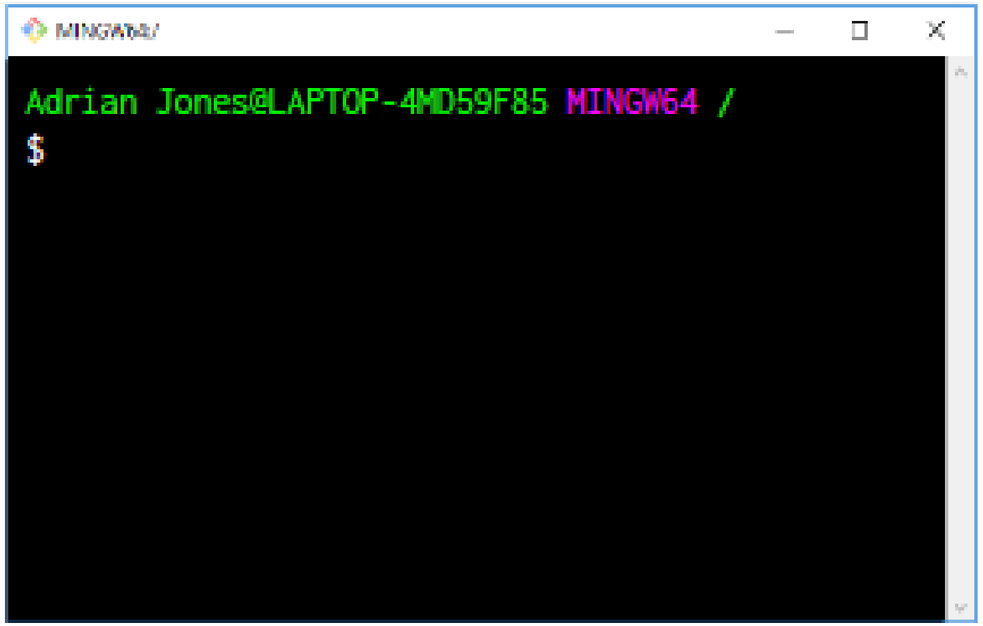
Command Line Interface

What is the Command Line?

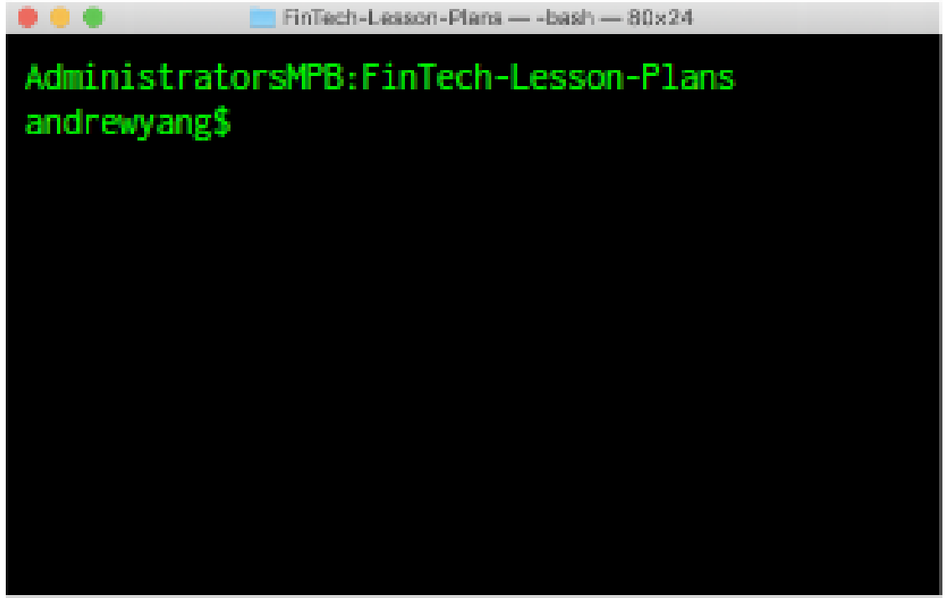
- A command line interface (CLI), or terminal, or just command line, allows a user to execute and automate commands without the need for a graphical user interface (GUI).

Command Line Interface

Windows (Git Bash)



Mac (Terminal)



Activity: Terminal

Time to get hands-on! In this activity, you will navigate and manipulate the file system using the command line. Follow the instructions provided via Slack and discover the wonders of the terminal firsthand. Get ready to become a CLI maestro!

Duration: 15 Minutes

Time's Up!

Let's Review

Let's Recap

You should be able to:

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2. Understand the course format and certification requirements.
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Next (Later this week)

In the next lesson, you'll learn the differences between unsupervised and supervised ML, and will then be introduced to more complex models such as neural networks, deep learning, natural language processing, and transformers.

Any Questions?

The End