

# AI: Machine Learning Foundations

# What is CanCode Communities?

**A 501(c)3 nonprofit founded in 2016 as AlbanyCanCode, CanCode Communities develops non-traditional talent and advocates for a vibrant, inclusive tech talent pipeline.**

The organization designs and delivers workforce **training courses**, hands-on K-12 **coding programs**, and community code **literacy workshops**, in alignment with the needs of employers, educators, talent and the community in general. Its mission is to shift mindset about who can work in technology, remove cultural and economic barriers to joining the tech workforce, and establish and promote pathways to tech careers throughout the region.



The background is a dark blue field filled with numerous small squares in various colors including green, pink, yellow, and cyan. These squares are scattered across the entire frame, creating a dynamic, pixelated effect. In the bottom-left corner, there is a small, stylized logo consisting of four colored lines (cyan, green, yellow, and pink) forming a diamond shape.

# Meet your Instructor(s)

# Introductions

Who are your peers?

- Why are you taking this course?
- Have you programmed before? If so, what languages?
- Have you used AI before? If so, what capacity?
- What is your favorite hobby?



# Expectations for the Course

- You are expected to participate in class exercises.
- Ask questions if you have them.
- Reach out if you need additional help.
- You should be completing any exercises assigned.

Please refer to your Welcome Guide for more detailed information on the expectations.



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# Outline of the Course

# Projects

- To complete this class, you will need to complete a midpoint and a final project.
  - Midpoint Project: Build a chatbot with function calling capabilities that connect to real-time and verified information.
  - Final Project: Build a convolutional neural network (CNN) to classify hand drawn digits.
- The project details will be presented to you closer to the time of the projects.



# What is Artificial Intelligence?

Intelligence is the ability to acquire and apply knowledge and skills.  
Artificial Intelligence is the science of training computers to display intelligence.





# Neural Networks

- These decision making systems are designed with the structure of the human brain as inspiration.
- Neural Networks are made up of multiple layers of nodes, which relate to the neurons in the brain.
- These nodes pass data to each other much like neurons pass electrical signals.
- These networks are trained on terabytes of data to build the necessary relationships between nodes to make a prediction of the correct response.



# Importance

The importance of AI lies in its name.

Humans are regarded as the most intelligent beings on earth. Artificially manufacturing intelligence will create an opportunity to boost efficiency and quality of work in every field.

Automating intelligent systems can lead to significant positive or negative outcomes.



# How can we use AI to improve our work?

We can leverage AI to help us within everyday tasks and complex projects with the use of:

- Chatbots - learning, writing, and planning
- Task specific tools - code, video editing, and creative production/designing
- Models trained on specialized/proprietary data - to perform niche tasks or provide secure information



# Exercise

Sign up/log in to Chat GPT and have a conversation (5 back and forths minimum) with it about a personal interest

Some things to consider:

- How fast were the responses?
- How long would it take you to research or create the responses yourself?
- How was the quality of the responses?
- What training data do you think was “used” to respond?
- How creative do these responses feel?



# Take Home Exercise

Have a conversation with ChatGPT and Google Gemini.

- Try asking the model the same question multiple times.
- Try asking the same question to both models.
- Try asking the model a broad question and then a detailed question.
- Are there any noticeable differences between the responses?

We will discuss this at the beginning of the next class.

