ACM AI + ACM TeachLA

Session #2: What is Machine Learning?

Slides Link: https://tinyurl.com/aimlsesh1
Attendance Link: https:/tinyurl.com/aimlhello

ACM AI

Artificial Intelligence

What do you think?

- What are artificial intelligence and machine learning?
- What’s the difference between them?

AI Definition Recap

- **Artificial Intelligence** - The theory and development of computer systems able to perform tasks that normally require human intelligence, such as visual perception, decision-making, and translation between languages.

- **Machine Learning** - A type of AI that provides computers with the ability to learn without being explicitly programmed.

AI vs ML

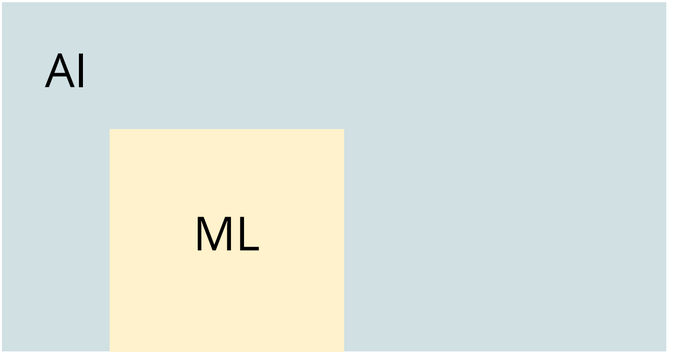
- Put simply, machine learning is a specific type of artificial intelligence

- All machine learning is artificial intelligence, but not all artificial intelligence in machine learning!
  - (AI ⟷ ML) is like (rectangle ⟷ square)

AI / ML Examples

What are some examples of artificial intelligence that are NOT machine learning?

- If-else statements
- Probability trees and Bayesian decision-making
  - Bayes' Theorem
- Data mining
  - Graph-based brain: data are like neurons



AI / ML vs the “normal” way

- Normal
  - Given input and defined relationship / function, give me the output
- AI/ML
  - Given input and output, give me the defined relationship / function

What can machine learning do?

Here are some examples of problems of what ML can solve:

- Predict housing prices
- Classify animals in pictures
- Predict weather for the next week
- Classify handwritten digits
- Detect and count the number of cells in an image taken by a microscope
- Determine your glucose levels by analyzing a picture of your eye

Notice any patterns / trends? Similarities / differences?

ML: the two types of tasks

Two main kinds of tasks ML tries to perform:

- Classification (cat or dog, benign or malignant tumor, object detection in image)
  - Can be classifying between two or many classes → binary vs multi-class classification
- Regression (more “continuous” output like a housing price, weather forecast in Fahrenheit, star age estimation)

ML: the two types of tasks

Let’s try and classify different tasks as either regression or classification!

- Predict housing prices
- Cat or dog
- Classify animals in pictures (ImageNet)
- Classify handwritten digits (MNIST)
- Detect and count the number of cells in an image taken by a microscope
- Determine your glucose levels by analyzing a picture of your eye
- Predict age of a person
- Auto-generate music
- Apply Snapchat filter
- Auto-triage medical visits (Heal)

Key ML techniques: an outline

Various kinds of ML that try and accomplish classification and regression

- Linear regression
  - Regression!
- Logistic regression
  - Classification!
- Neural networks
  - Classification!
  - Multiple kinds of neural networks (NNs):
    - fully-connected (FCNNs), convolutional (CNNs), recurrent (RNNs), generative adversarial (GANs)

ML: the types of neural networks

Let’s try and classify different tasks by type of NN!

- Predict housing prices
- Cat or dog
- Classify animals in pictures (ImageNet)
- Classify handwritten digits (MNIST)
- Detect and count the number of cells in an image taken by a microscope
- Determine your glucose levels by analyzing a picture of your eye
- Predict age of a person
- Auto-generate music
- Apply Snapchat filter
- Hyper-realistic face generation

Closing Comments

Last Takeaways

- AI and ML are worth learning about!
- Get to know your peers!
- Feel free to reach out to us!
- Have fun!

ACM AI

Thanks!

Fill out our Feedback Form:

https://tinyurl.com/aimlworld

Check out our Github

Read our Blog

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