Introduction To Machine Learning

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Introduction

Machine Learning (ML) is a field of study in artificial intelligence concerned with BLAH BLAH BLAH … **OMG I KNOW MACHINE LEARNING IS, WHY DO YOU THINK I AM HERE?!!?**

If you couldn't tell from the cover, this is not your typical textbook. What you are about to read are my personal notes and a record of my journey into the fields of artificial intelligence and machine learning.

These notes are being compiled over time as I explore new concepts and experiment with various algorithms and techniques. This is an evolving, open-source resource that I share on GitHub for the community.

You can find the repository here: github.com/JoshuaSchell/Introduction-To-Machine-Learning. A PDF version of whatever horrific state I have currently left this project in will be provided and the Typst files used to generate this document are available there as well.

In the spirit of open collaboration, I encourage you to contribute. If you find errors, have suggestions, or want to add new content, feel free to submit issues or pull requests. This is a living document—a continuously updated diary of my learnings rather than a polished, final textbook. Maybe one day, with enough contributions, these notes will be turn into a *professionalish* textbook.

"WHY aRe YOu uSIng tyPST" you maybe crying into the empty void. I have used both LaTex and Markdown extensively, *note that I purposefully did not say well*, in the past and both have their pros and cons and a friend from college recommended typst to me, so I thought I'd try it out and use this project to learn Typst alongside my ML learning 🤷 🤷 🤷

Supervised Learning

Supervised learning is a type of machine learning that is trained on labeled data.

Training data consists of input-output pairs. The model learns by mapping the given inputs to their corresponding given output. The end goal being the model's ability to predict the *correct* output for new, unseen inputs from its learning.

$$x_{\text{input}} \rightarrow y_{\text{output}}$$

Common use cases of supervised learning:

- Classification: mapping inputs to a set number of outputs
  - ‣ Example: Is this image a dog or a cat? (only two possible outputs)
- Regression: mapping inputs to any number of outputs
  - ‣ Example: What should this home be sold for? (infinite possible outputs)