

Deep Learning Fundamentals

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1 About this course

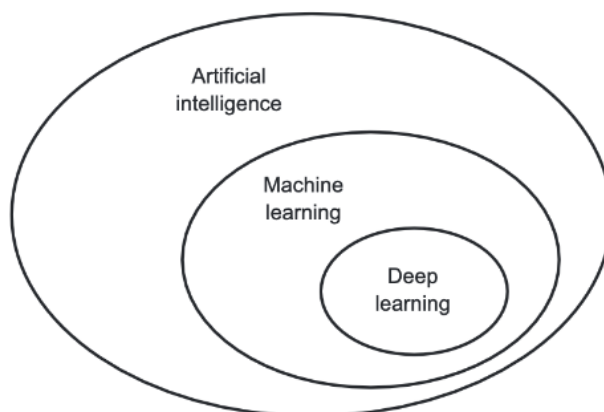
Explore deep learning from scratch or broaden understanding of deep learning, via practical hands-on code examples to solve concrete problems. We'll utilise the Python language, and deep learning framework Keras with Tensor flow as a backend engine

2 Resources

- **Deep Learning with Python** (1st Edition) by François Chollet.
Manning publisher

3 What is deep learning?

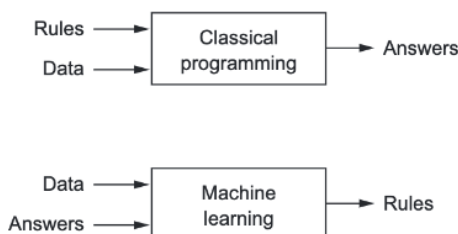
3.1 Artificial Intelligence



the umbrella of Artificial intelligence

We'll define Artificial intelligence to be the *effort to automate intellectual tasks normally performed by humans*. AI is the general field that encompasses machine learning, which deep learning is a subfield of.

- Early AI took the approach of programmers manually implementing a large set of rules for manipulating knowledge; this was known as **symbolic AI**.
- Symbolic AI turned out intractable, when applied to more complex problems like image classification, speech recognition, language translation, etc.
- Machine Learning was the new AI paradigm that rose to replace symbolic AI. It arises from the question: can computers go beyond what we tell it to do? How do computers learn on their own how to perform a specific task.



rules instead of answers in the ML paradigm

- Recent AI trend driven by increase in computing power (faster hardware), and larger datasets.

3.2 Learning representations from data

To do basic machine learning, three things are needed:

1. **Input data** such as sound files, images, text documents, etc.
2. **Examples of expected output** for training purposes
3. **A way to measure the success of the algorithm** to determine the distance between algorithm's current output, and expected output.

The central problem in machine learning, and deep learning is to meaningfully transform data. Meaning, to learn useful representations of the input data, which get us closer to the expected output. The learning aspect involves finding data transformations within an already defined set of operations called the **hypothesis space**.