L01: What is Deep Learning

CSci 560 Deep Learning w/ Python (Chollet) Ch. 1

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Artificial Intelligence, Machine Learning, Deep Learning, Generative AI

- **Artificial Intelligence** (AI): *the effort to automate intellectual tasks normally performmed by humans*
- **Machine Learning** (ML): *machine looks at input and answer and figures out the rules*
- **Deep Learning** (DL, DNN): *learning successive layers of increasingly meaningful representations*
- **Generative AI** (GenAI): *extend from reactive to creative activities*

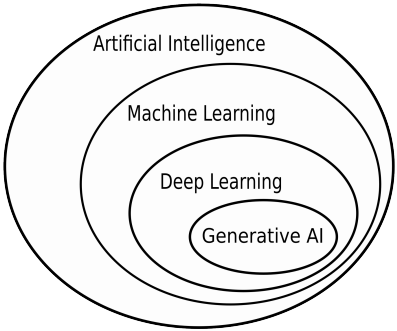

Figure 1: Relation of AI with ML, DL and GenAI. Each is a more specialized subset of the larger discipline. (Chollet, 2021, pg.2)

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Machine Learning

- Usually have human programmer write down rules (a computer program) that turns input into approproate answers.
- In ML paradigm, you give a ML algorithm the input and answers, and it "learns" the rules.

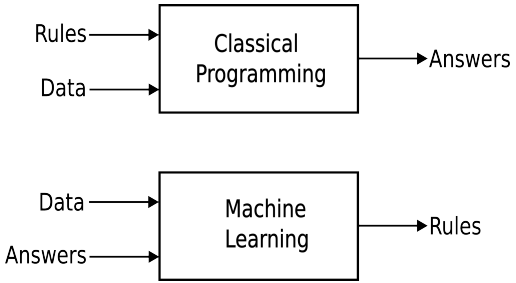

Figure 2: Machine Learning coordinage change and learning representations.. (Chollet, 2021, pg.4)

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Learning Rules and Representations from Data

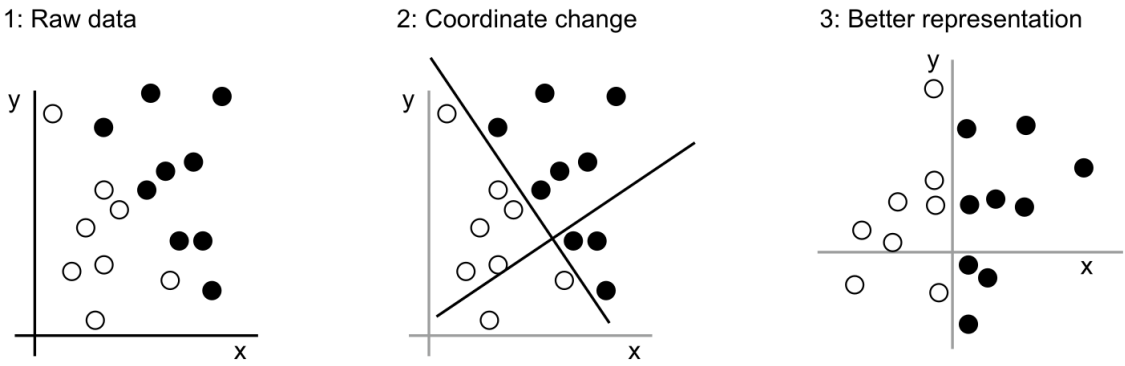

Figure 3: ML a new programming paradigm. (Chollet, 2021, Fig. 1.4)

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Neural Networks and Deep Learning: The “Deep” in “Deep Learning”

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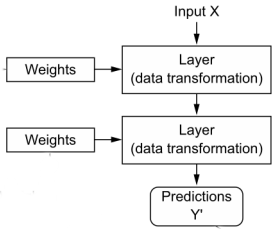
Understanding how Deep Learning Works

Goal: finding the right values for these weights



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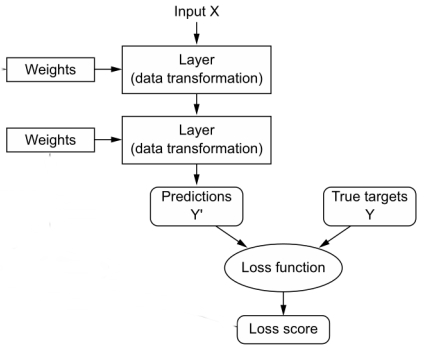

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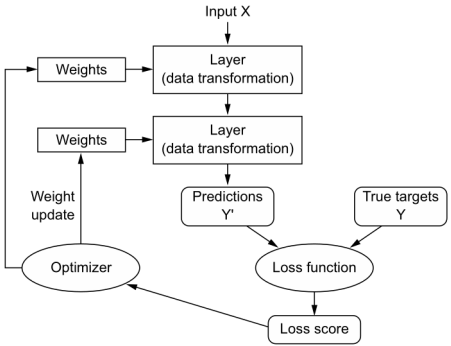

- A neural network is parameterized by its weights.
- A loss function measures the quality of the network's output.
- The loss score is used as a feedback signal to adjust the weights.

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AI Boom / Bust and AI Winter

The Modern Machine Learning Landscape

Why Deep Learning? Why Now?

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Bibliography

Chollet, F. (2021). *Deep learning with python* (second). Manning.

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