

# Deep Learning

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This document serves as a very brief summary of each chapter in the book Deep Learning [1].

*Disclaimer: This document is completely extracted from [1], the author does not attribute any ownership over the material.*

## 1 Introduction

- Deep Learning (DL) learns complicated concepts by building them out of simpler ones. DL is the study of models composed of either learned functions or learned concepts.
- Data Representation is key when finding patterns.
- Many AI tasks can be solved by designing the right set of features to extract.
- **Representation Learning:** discovers the mapping from representation to output and the representation itself.
  - Makes use of an *Autoencoder* which is a combination of:
    - \* Encoder: Converts the input data into a different representation.
    - \* Decoder: Converts the new representation back into the original format.
- Factors: sources of influence in the model.
- **Depth**, in a DL model, enables the computer to learn a multistep computer program (not all the information in a layer's activations necessarily encodes factors that explain the input). There are two ways to measure it:
  - Based on the number of sequential instructions, or
  - Based on the depth of the graph describing how concepts are related to each other (used by deep probabilistic models).
- DL is not an attempt to simulate the brain. It borrows ideas from different fields (one of which is neuroscience).

## References

- [1] Ian Goodfellow, Yoshua Bengio, and Aaron Courville. *Deep Learning*. MIT Press, 2016. <http://www.deeplearningbook.org>.