

Introduction to Deep Learning

Deep learning has revolutionized the technology industry. Modern machine translation, search engines, and computer assistants are all powered by deep learning. This trend will only continue as deep learning expands its reach into robotics, pharmaceuticals, energy, and all other fields of contemporary technology. It is rapidly becoming essential for the modern software professional to develop a working knowledge of the principles of deep learning.

In this chapter, we will introduce you to the history of deep learning, and to the broader impact deep learning has had on the research and commercial communities. We will next cover some of the most famous applications of deep learning. This will include both prominent machine learning architectures and fundamental deep learning primitives. We will end by giving a brief perspective of where deep learning is heading over the next few years before we dive into TensorFlow in the next few chapters.

Machine Learning Eats Computer Science

Until recently, software engineers went to school to learn a number of basic algorithms (graph search, sorting, database queries, and so on). After school, these engineers would go out into the real world to apply these algorithms to systems. Most of today's digital economy is built on intricate chains of basic algorithms laboriously glued together by generations of engineers. Most of these systems are not capable of adapting. All configurations and reconfigurations have to be performed by highly trained engineers, rendering systems brittle.

Machine learning promises to change the field of software development by enabling systems to adapt dynamically. Deployed machine learning systems are capable of learning desired behaviors from databases of examples. Furthermore, such systems