# Reading: Key AI Concepts and Terminology



Geoffrey De Smet of OptaPlanner says that “AI solutions are for problems with a nondeterministic answer and/ or an inevitable margin of error.” This does not speak of “intelligence” but does encompass facets of AI like machine learning and neural networks and the fact that we have not entirely determined the boundaries, uses, opportunities, and implications of this burgeoning field. Understanding the key concepts and terminology of AI will give you the foundation you will need to make meaning and build on AI concepts.

## Cognitive Computing

Cognitive Computing is a computer programmed to learn like a human, but faster. It can process pre-programmed information as well as take in new information, independently interpret it, then make decisions, and take action accordingly. In this fashion it can “think” by ingesting and synthesizing information—and also re-formulate outcomes by rejecting data that does can assess and adapt; however, there is still a steep learning curve around context, which is, so far, the gulf between human-like AI decisions and humans.

## Machine Learning

Machine Learning is the part of AI that trains a machine on how to learn based on manually input features and classifiers. This is a method of analysis learned from data patterns or examples applied to learning experiences that result in unique data systems with minimal

human influence. The life cycle of machine learning is to pose the problem, collect the data, train the algorithm, test the result, collect the feedback, and re-calibrate the solution using that feedback, and reapply it to the problem.

Through this cycle, the machine keeps data that is useful and disregards data that is not—the goal is to create an algorithm that will create a better algorithm. The challenge is to ensure that the source data is clean, accurate, well-labeled, and free of biased data.

Examples of Machine Learning include the self-driving Google car, recommendations from Netflix and Instagram, and fraud detection notices from your credit card.

## Deep Learning

Deep Learning is a specialized form of machine learning that uses many layers of neural networks that are arranged hierarchically—but is able to learn from data that is unstructured and unlabeled and will process and apply structure to make meaning automatically. [ Finding conflicting definitions of needing to be labeled vs unlabeled data]. The deep in deep learning refers to the layers upon layers of neural networks used in processing the data. Examples of deep learning are image and speech recognition, and natural language processing. In Machine Learning humans act as trainers for the program; in Deep Learning neural networks stand-in for the human and act as the trainer for the model.

## Neural Networks

Neural Networks attempt to mimic the way the brain works and learns with multiple nodes between the input and the output with the program building connections between those nodes. The interrelation and strength of those connections are what influence the output. The more often a specific connection is made, the stronger it becomes. Patterns are built out of the strongest data and can be compared to those of other programs in order to strengthen the network and amassing knowledge of the way that human brains do. A neural network will learn from example, so that the more examples it sees, the better it learns. And when it has enough examples and non-examples, it is able to make comparisons and learn.

## Natural Language Processing

Natural Language Processing is the interaction between humans and computers using natural human language. This is quite complex as language needs to be processed by syntax, semantics, and context. There are also the high-level abstractions of human communication to consider like sarcasm, inference, and tone.

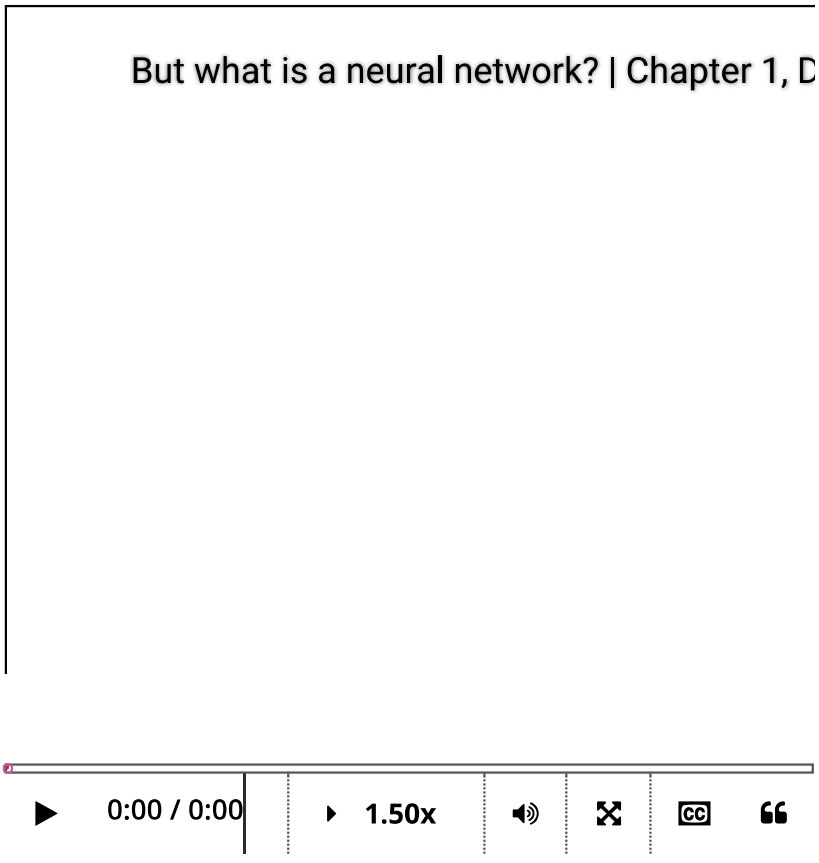
Because human language is often ambiguous and imprecise, there are still a lot of improvements to be made in this area, however, there are plenty of NLP programs widely in use: Google Translate and Babelfish are language translators, Grammarly and Microsoft Word

check grammar accuracy, Interactive Voice Response applications field customer service phone calls, and Siri, Cortana, and Alexa act as voice-driven personal assistant applications.

All NLP applications must determine a user's intent, or what is to be accomplished. This is done through reading utterance, or the example sentences from a user that trains the program; entity, which is parsing the important details from the user's intent like location, date, and time; context, which is determining the parameters of the whole session; and recognizing the beginning and end of the session. Along with those processes to make meaning, NLP programs must also recognize capitalization, verb tense, contractions, numeric words versus digits, single versus plural nouns, and vocabulary expansion.

We have highly skilled mentors to support one-one mentoring and forum-based interaction on **Questionsly.**

## Video: Neural Networks




Start of transcript. Skip to the end.

This is a three. It's sloppily written and rendered at an extremely low resolution of 28 by 28 pixels.

But your brain has no trouble recognizing it as a three and I want you to take a moment to appreciate

How crazy it is that brains can do this so effortlessly?

I mean this this and this

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