What is Machine Learning?
- Field of computer science that gives computers the ability to learn without being explicitly programmed.
- Allow computers to learn features from training data, without having to hardcode them, and then using the features to perform tasks on the data

AI v/s ML
- Artificial Intelligence is the broader concept of machines being able to carry out tasks in a way that we would consider "smart".
- Machine Learning is a current application of AI based around the idea that we should really just be able to give machines access to data and let them learn for themselves.

Major Tasks that ML is suited for
- Classification

  Given a set of inputs, map each to one or more of a predefined set of categories. Eg. Classifying a handwritten digit, given a movie poster classifying the movie into specific genres.
- Regression

  Given a set of inputs, map them to a continuous function. Eg. Given data about house, predicting price
- Clustering

  Task of grouping a set of objects in such a way that objects in the same group are more similar (in some sense or another) to each other than to those in other groups (clusters). Eg. Given a bunch of colored points, group them, without explicitly telling what the colors are
- Dimensionality Reduction

  Simplify a given input mapping it to lower dimensional space. Eg. to visualize datasets.

Types of ML Algorithms
- Supervised Learning

  Given data and corresponding output, learn a general function that maps input to output.
- Unsupervised Learning

  GIven only the data, discover hidden patterns and/or structure in the data.
- Reinforcement Learning

  Learn from the feedback from the environment to the actions taken by the model.

Importance of Data
- Along with increased compute power, availability of data enabled the resurgence of ML.
- Most of the foundational ideas of popular algorithms and models proposed in 1980s, but insufficient data and compute power hindered progress.
- Quality of data also important along with Quantity. (Can't give 10000 images of the same dog and expect to recognize other dogs.)
- Important to select model carefully based on the data available and process the data before using it.

Cool ML Stuff

- Google (Speech Recognition, Google Assistant, Inbox Smart Replies, Pixel 2 Portrait Mode), Youtube(Recommender System), Facebook (Targeting Ads based on interests, Detecting inappropriate content), Tesla(Assist).
- https://www.youtube.com/watch?v=l92J1UvHf6M (OpenAI Dota)
- http://myselph.de/neuralNet.html (Digit Recognizer)
- https://tcwang0509.github.io/pix2pixHD/
- https://www.youtube.com/watch?v=OJw4HTWvGdY (Flappy Bird RL)
- https://www.youtube.com/watch?v=0aN9tKNCYxM (MuseGAN Song)