Synopsis from the missed lecture at 11/6/2021

This lecture was a continuation of the lecture 1. In lecture 1 we define what we learnt from ML1 class. Difference in labeled and unlabeled data.

Professor showed us a network diagram of all the machine learning model that currently exists.

Neural networks are the topic for this lecture. Neural networks work on signals. Passing signals from 1 box to another with some logic happening in each box.

Then we learnt about the history of neurons in neural networks. How it stared, how weights were added, how multilayer structure started. Then we talked about energy nodes, where different functions introduced. Then backpropagation, and how they are used in training a neural network.

Then we discussed how neural networks are used in each discipline, e.g. Speed recognition, econ and finance, medicine and how the usage started flatlining. The machines couldn’t keep up with the use case. Then markets started using, Hidden Markov Model, Support Vector Models, and other such algorithms. In 2010, when parallel computing, cloud and GPU architecture picked up some steam, the NN started again. This version was called Deep Learning.

Then we tackled the question of why Neural Network?

* They are suitable for big data models. Million Trillion data records that exists out there. NN help with analyzing that volume of dataset.
* Adaptive learning algorithm which can better an existing model with time
* Adaptive speech recognition
* Adaptive Self-Organization
* Real Time Operations: (More in Lab3) Working a live video, due to parallel processing

Then the class discussed about the applications of neural networks

* Google Maps
* Speech Recognition (Deep Learning, Expectation Maximization, Hidden Markov Model)
* Robotics
* Self-Driving Cars
* Gameplay

How does NN imitate human brain? How are neurons connected via axons and how they transfer data to synapses. The neural networks structure is close to how brain functions uses to communicate.

(Paused for last slide)

The slide shows how a neural network works. Input-function-output. The function has a math function in it.

Python installation

* Download Anaconda
* Update python with the newer version, ver3.7 or higher works for this class
* Download and open Jupyter Notebook for this class
* New > Python3 kernal
* Teach\_python module on canvas, helps with the basics that this course will need

SKLEARN or Sci-Kit Learn is an important machine learning library

Digits dataset will be used for class project. The dataset includes handwritten numbers which we will use to recognize the digit.