Prerequisites Resources

Go through the resources to brush up your concepts and pre-requisites that will help you with implementation during the Cohort.

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1. **Git**
   - Introduction to Git. YouTube [link](#)
     - Video notes [link](#)

2. **Python**
   - Basics of Python
     - Python Official Documentation [link](#)
     - Python Tutorials Playlist 1: YouTube [link](#)
     - Python Tutorials Playlist 2: YouTube [link](#)
   - Basics of Pandas
     - Complete Pandas Tutorial [link](#)
     - Pandas - 10 minute introduction - Official Documentation [link](#)
   - Basics of Numpy
     - Complete Numpy tutorial [link](#)
     - Numpy quickstart [link](#)
   - Jupyter Introduction
     - Introduction, Setup and Walkthrough of Jupyter notebook: YouTube [link](#)
     - How to use Jupyter notebook: Blog [link](#)

   Task:
   - Download the test images from this Kaggle dataset, and place them all in a folder
   - Define a function in the jupyter notebook to do the following tasks:
     - **Input:** Takes the path of the folder as the input
     - **Process:**
       - Loads all the images and convert them to an array
       - Convert all the images to grayscale images
     - **Output:**
       - Number of images
       - Format type of the images
       - Saving all the grayscale images to another folder

   Bonus:
   Convert the background of the images to white before converting them to grayscale

3. Neural Network concepts & Architectures (Basics)
- ○ Deep Learning with keras [link](#)
  - ■ Index: Page 20
  - ■ Refer to Chapter 1 [Pg 55-115]
- ○ [Machine Learning] Andrew NG lectures
  - ■ Cost function - [link](#)
  - ■ Backpropagation -
    - ● Part 1 - [link](#),
    - ● Part 2 - [link](#)
  - ■ Gradient checking - [link](#)
  - ■ Random Initiation - [link](#)

4. OpenCV
- ○ Tutorials. Youtube [link](#)
  - ■ First 15 videos should be sufficient

Task:
1. Download the data from the link [here](#)
2. Write a function in python script to do the following:
   - **i.** **Inputs:** Input the folder name and csv filename through command line
   - ii. **To-Do:**
     1. Read all the images
     2. Read the csv file, and get the image label names and coordinates
     3. Draw the bounding boxes for every image, using the corresponding image's coordinates (**Use different colour and thickness for the bounding boxes**)
     4. Add labels for every image (**Use different font, font colour, font size**)
     5. Create another folder and save all the images to the folder
     6. Push the code to GitHub, and show few samples of the before and after on the **Readme.md** file.

5. Keras (Tensorflow)
- ○ Deep Learning with keras [link](#)
  - ■ Index: Page 20
  - ■ Refer to Chapter 3 [Pg 188-243]
- ○ Hands on Introduction to Keras.[Neural Networks] Kaggle notebook [link](#)
- ○ Hands on Introduction to Keras [CNNs] Kaggle notebook [link](#)

Task:
AIM: To create a neural network model of the highest accuracy, with the least number of parameters (what are parameters? Link)

1. Download the dataset from the link [here](#)
2. Create all the pre-processing steps similar to the one from the above notebooks
3. Create a Neural network model using Keras and train the model on the training dataset
4. Test the model on the test dataset
5. Push the code on Github, showing the model architecture, number of parameters and test accuracy on the **Readme.md** file.

After all the tasks you will be familiar with:
1. Pandas and OpenCV
2. Implementing different stages of the machine learning pipeline.
3. Creating a model from scratch and hyper parameter tuning
4. Version control in GitHub

6. **Damage Detection**
   [This is not a prerequisite to the cohort, however the link below helps you understand the problem statement we are going to solve in the cohort]
   ○ Analytics Vidhya blog [link](#)
   ○ Detecting Vehicle Damage using Deep Learning. [Link](#)

7. **Computer Vision Problems Basics [[Blog](#)]**
   ○ Image classification
   ○ Object Detection [In details]
   ○ Segmentation