Title – Detection of face mask using computationally efficient neural network.

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Abstract – This is a company-sponsored project. I will be in touch with a company named UtopiaTech Pvt. Ltd. in India and solve a problem statement that will be a component of their final product. The motivation behind choosing this topic is that I want to develop some applications that can solve real-world problems. The unique advantage my project will provide is that it will identify the best neural network for face mask detection, which has an almost low computation cost and can be easily deployed on hardware such as the Raspberry Pi. This project will help me thoroughly understand every concept of neural networks.

Introduction – The development of this project will be from the perspective of a real-world application. This application is going to be installed in an ATM facility. The camera will always be at the top-end corner of the facility, so achieving a similar kind of dataset will be a big task. Yet, we expect to generate our dataset, which can be as close as possible to the real-world setting. I will be in touch with the co-founder, Mr. Mitesh Bajaria, regarding the project, which in turn will help me with any support required in terms of hardware or software.

There are multiple models available, such as Mobilenet SSD and Yolo, with several versions along with a tiny version to deploy on hardware. However, these models provide less accuracy at a high computational cost. Hence, my aim while developing the project will be to identify the best configuration of models that provide the maximum accuracy and have the least computational cost when deployed on hardware, thus giving us a fair FPS to process and work on.

The plan is divided into four steps as follows:

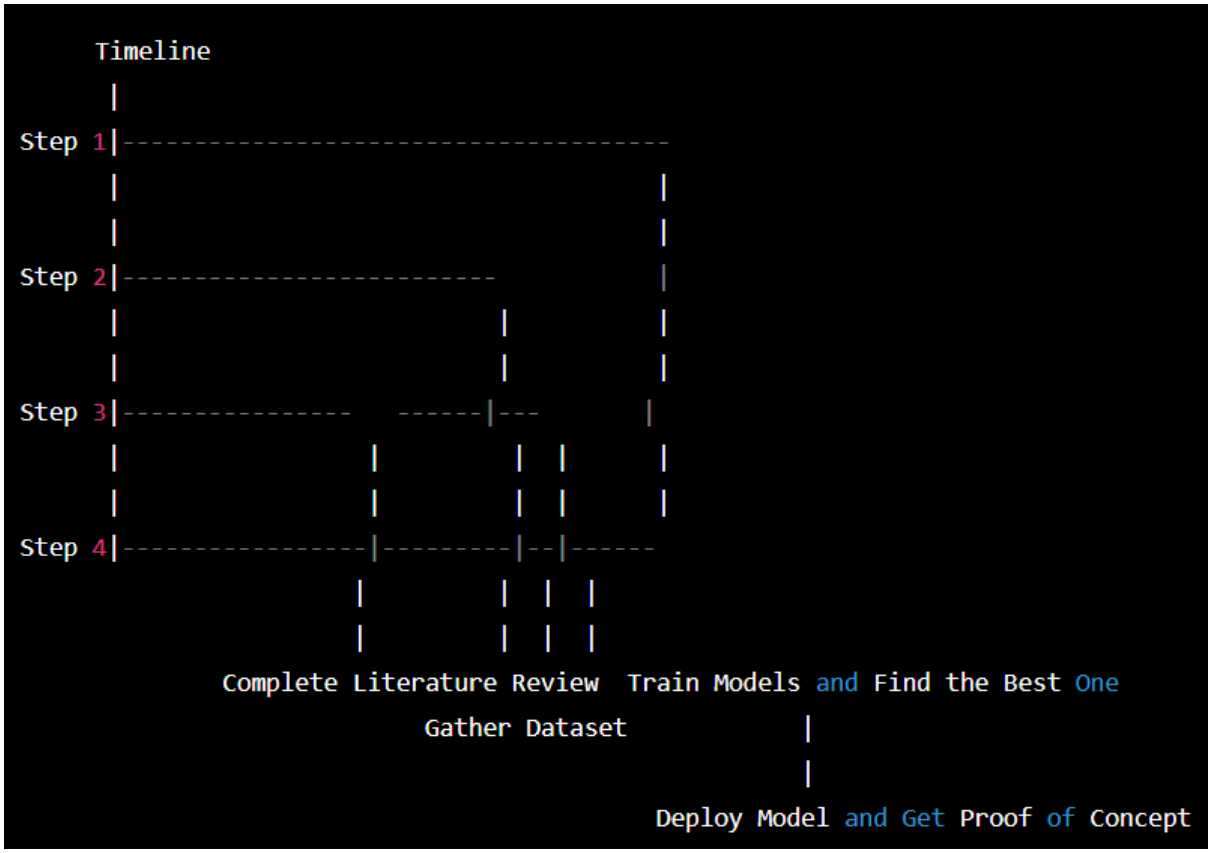
1. Literature review to identify all the possible models which can be used for the application.
2. Generate and gather the dataset.
3. Train a bunch of models and find an accurate setting that has the most accuracy and least computational cost.
4. Try to deploy the model on a hardware setting and get a proof of concept of the application.

Once this application is developed, we can increase our dataset with multiple applications, train our model, and compare its efficiency. Thus, this will create a complete use case for a real-world application.

Literature Review and Technical Plan – Since I am in contact with the company, we are going to set up a couple of meetings where we will decide on our complete

technical plan and also do some important literature reviews that will be key beneficiaries of the project. A basic outline of the plan is described in the introduction section, yet once the discussion takes place, a more in-depth plan might be formed.

Sample Technical Plan –



The horizontal axis represents the timeline of the project, and the vertical axis represents the four steps of the plan. Each step is represented by a horizontal bar, with the start and end points of the bar indicating the start and end of the step in the project timeline.

Step 1, Literature review, is the first step and is represented by a single bar. Step 2, Generate and gather the dataset, begins before step 1 is completed and ends before step 3 begins. Step 3, Train a bunch of models and find an accurate setting, overlaps with step 2 and starts before step 2 ends. Step 4, Try to deploy the model and get a proof of concept, which starts after step 3 is completed.