Face mask Using Deep Learning

Introduction

Wearing a face mask will help prevent the spread of infection and prevent the individual from contracting any airborne infectious germs. When someone coughs, talks, sneezes they could release germs into the air that may infect others nearby. Face masks are part of an infection control strategy to eliminate cross-contamination. In this work, I have develop a system that can automatically identify face mask from given image using deep learning.

Project Objective

- The main aim is to provide a practical way to detecting the face mask automatically instead of the manual scoring process.
- This work can eventually contribute to reduce some disease and keep person healty in real wolrd.

Methodology

- To reduce training time and improve performance, I fine tune our model from previously trained models.
- Resize images into sub-images of 416*416 pixels to identify the small tassels accurately.
- Convert pascel voc annotation to yolov5 formet
- Developing an object detection model to detect and classify mask were incorrect,with mask and without mask from the images.
- Measuring the performance of the model using test images.

Dataset

- Image data was collected from Kaggle.
- Dataset contain 848 images.From this dataset I split the dataset for traning set 593, for validation set 170 and for test set 85 images.

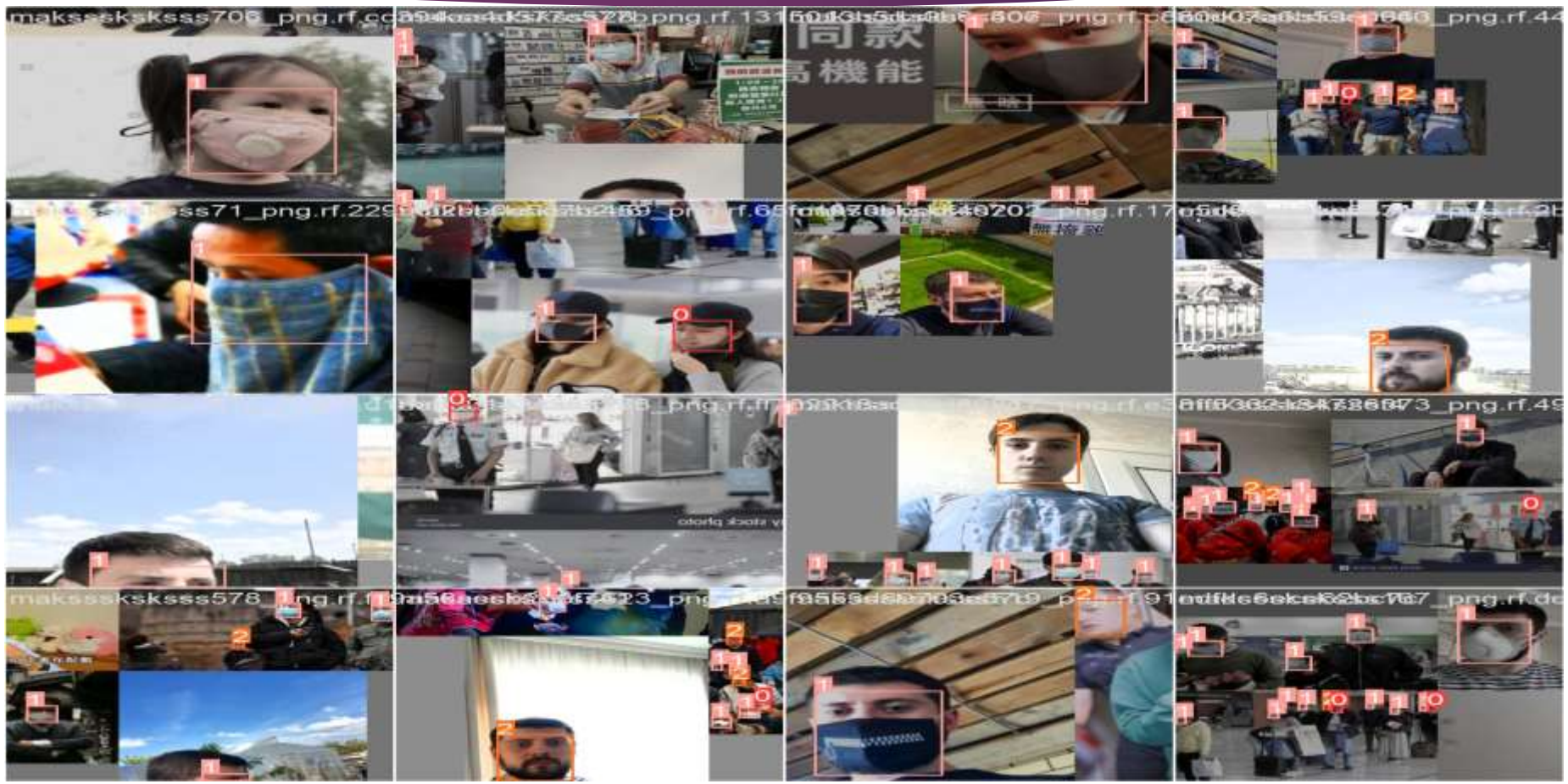
Dataset(Samples)

- Examples of the Face mask detection dataset in this study.

Dataset(Processed images for training)

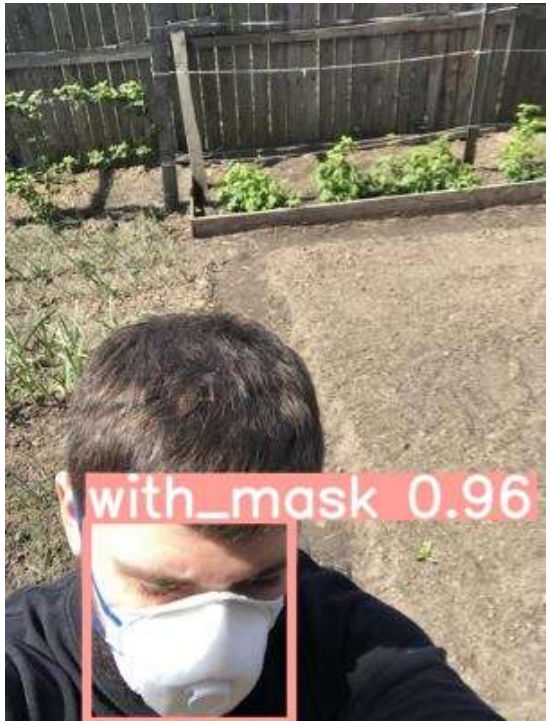
- We have divided high resolution(3000*4000 pixels) images into sub-images of 1000*800 pixels to identify the small tassels accurately.
- We have annotated the locations of tassels manually by drawing bounding boxes around each tassel.

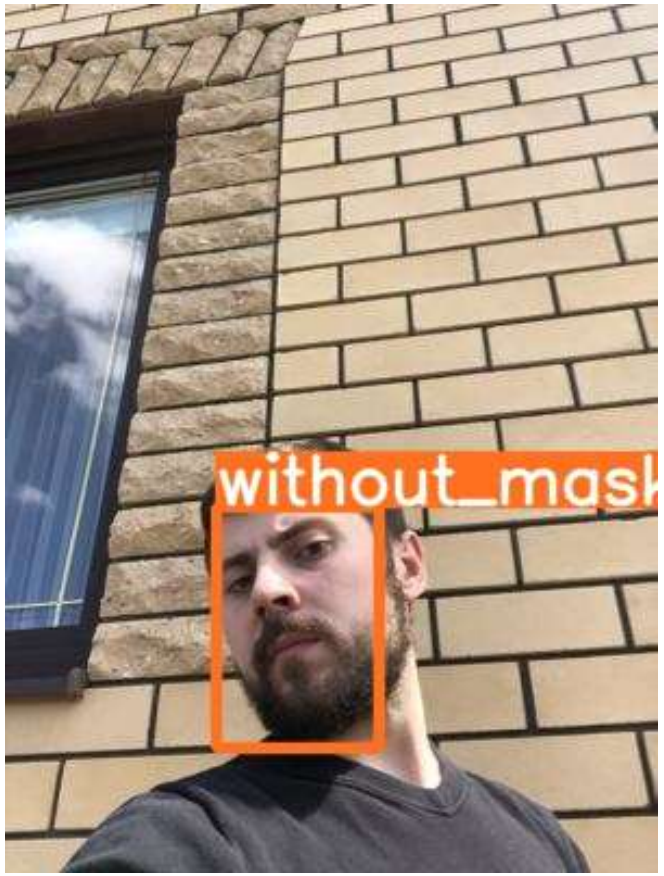
Samples of training image



Samples of input images from test set

Samples of Output Images





Video inference on real world data

Colab notebook

- Colab notebook link

Graphs

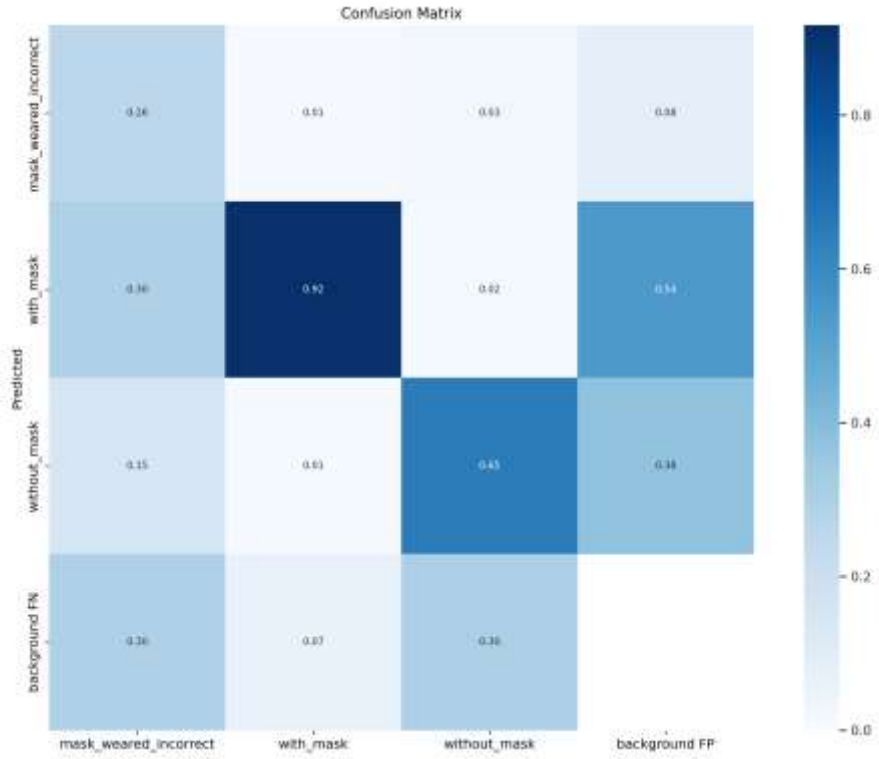


Fig : Confusion matrix

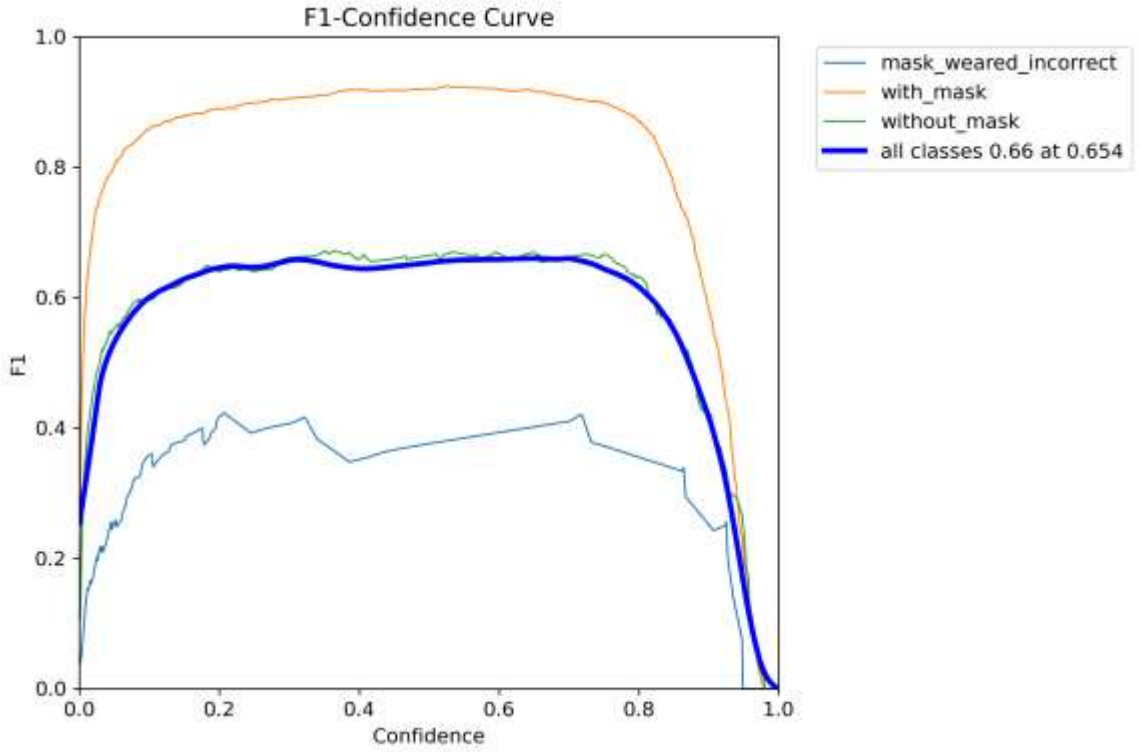


Fig : F1 curve

Graphs

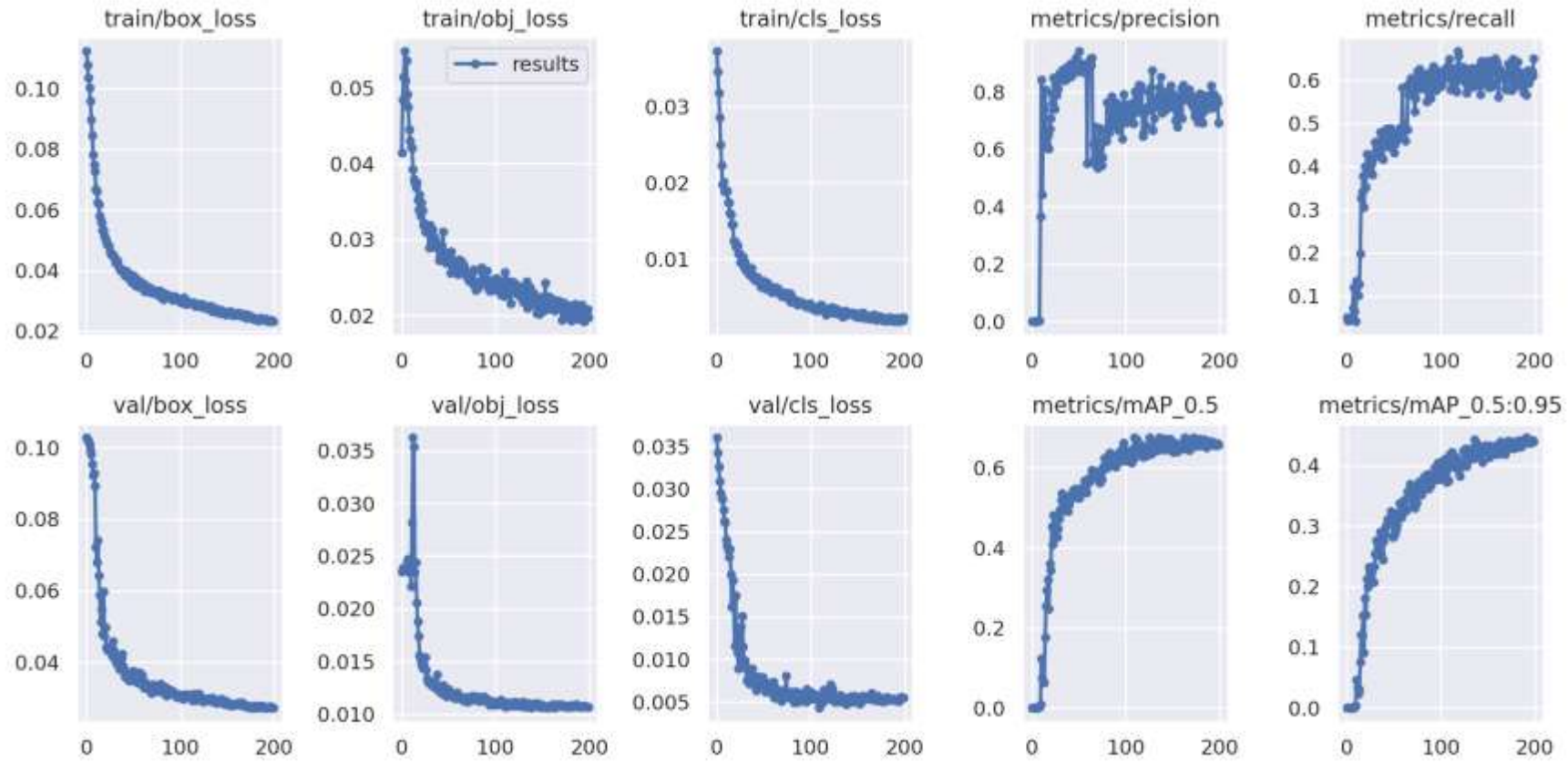


Fig : Loss curves

Performance Analysis

- A yolov5 model was trained to detect the mask were incorrect,with mask and without mask from the images.
- In terms of test evaluation, the model achieved an mean average precision(mAP) of 0.66% on test images.

Thank You!