A Data Mining Approach to Finding Face Mask from Bangladeshi Newspaper and News Channel.

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APPROVAL

This thesis titled on “A Data Mining Approach to Finding Face Mask from Bangladeshi Newspaper and News Channel.”, submitted by Md. Morshad Alam, ID: 173-35-2248 to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents

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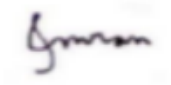

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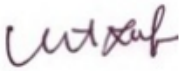

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DECLARATION

I hereby declare that this thesis (A Data mining approach to finding face mask from Bangladeshi newspaper and news channel) has been done by me under the supervision of Mr. Md. Shohel Arman. Faculty of Science and Information Technology, Department of Software Engineering (SWE), Daffodil International University (DIU). It is additionally declared that neither this thesis nor any component has been submitted elsewhere for the award of any degree. All declarations are fully verified for completeness and the validity of their data element contents.

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Contents

ABSTRACT

Face Mask Detection is currently a hot topic that has piqued the interest of researchers all over the world. Today, the entire world is dealing with the COVID-19 pandemic. To control the spread of the Corona virus, people are taking a variety of measures. There are numerous critical measures required to combat COVID-19, one of the most important of which is the use of a face mask. There is still a lot of research and study being done on COVID-19. Several studies have also shown that wearing a face mask significantly reduces the problem of viral transmission. In addition, a person wearing a face mask perceives a sense of protection. When we are at home, we take care of everything, but when we are in public places such as offices, malls, and colleges, it becomes more difficult to keep people safe. Machine Learning and Data Mining are a collection of technologies that provide effective solutions to complex problems in a variety of fields. We attempted to develop a face mask recognition system using machine learning in order to prevent the spread of the Corona virus. This is a good system for detecting a face mask in newspaper and news channel images and videos. It can recognize both Mask and No Mask faces. With the advancement of this system, it will be possible to detect whether or not a person is wearing a face mask. If the person is not wearing a face mask, it will display a message such as "No Mask," otherwise it will display "Mask Detected."

Keywords: - Detection Facemask, Newspaper, NewsChannel, Data Train, Machine learning, Data mining,

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

It is a problem of object detection and classification with two distinct classes (Mask and No Mask). For detecting face masks, A model based on deep and classical machine learning will be presented. We present a face mask detection model based on computer vision, deep learning and Data mining. The proposed model can be integrated with Picture or videos to detect people wearing masks and those who are not wearing masks. The model was created by combining deep learning and traditional machine learning techniques with YoloV5.YoloV5 base on DarkNet-53 is used in CSPDarknet53, a convolutional neural network (CNN) and backbone for object detection. It uses an approach to split the base layer's feature map into two sections, then merges them using a cross-stage hierarchy. The adoption of a split-and-merge approach allows the network to have more gradient flow. We presented a comparison of three machine learning algorithms in order to identify the most appropriate algorithm with the highest accuracy. The spread of the COVID-19 virus has slowed, but it is far from over. If everyone follows all of the safety precautions, it may come to an end.

1.2 MOTIVATION

In recent times Covid-19 become a major problem in Bangladesh. Statistics say that in 2019-2021, there were around 83k people affected Covid-19 in Bangladesh which around 13k people lost their lives. A total of around 18 core people worldwide have been infected with Covid-19 and about around 39 lakhs have died. At this point if the facemask is worn properly. Then it is possible to reduce it a lot. But people don’t want to wear facemask properly.

1.3 PROBLEM STATEMENT

There are CCTV cameras everywhere in China. They can easily find out what number of people wear face mask and they can determine what number of people do not wear the face mask. But it is not possible in Bangladesh. There are no CCTV cameras everywhere in Bangladesh. We can analysis data from various TV channels and newspapers. This will get the real data of Bangladesh, what number of people wear face mask and what number of people do not wear face mask.

1.4 RESEARCH QUESTIONS

The research question was as follows:

- RQ1 : How Yolo detect face mask from image and videos?
- RQ2: Classify image in two categories Mask and No Mask

1.5 RESEARCH OBJECTIVE

Using our own datasets, the major goal of this thesis is to construct an automatic face mask detection system from newspaper and news channel structures. Our thesis has the following objectives:

- Divide image into two Categories.
- Increase training dataset
- Train with yolov5 with our dataset.
- Save model Progress.
- Save best weight for feature prediction.
- Predict Face mask structure type from unknown test dataset.

1.6 RESEARCH SCOPE

The scope of this thesis is exiting helpful for: -

- It can detect the mask on Bangladeshi newspaper and news channel
- It monitors to public healthcare.
- It monitors in public areas.
- The appropriate weight from each repetition can be saved for future usage, cutting down on the time it takes to predict the condition.

1.7 CHALLENGES

We've had to overcome a lot of obstacles throughout the project. The following are the most significant challenges:

1.8 DATA COLLACTION:

Data collection was quite difficult for me. Because most of the pictures in the newspaper are not of good quality. There was a lot of noise in these pictures. I have collected data from almost all the newspapers in Bangladesh. Such as: The Daily Prothom Alo,The Daily Bhorer Kagoj,The Daily Ittefaq etc.

1.9 LEBEL GENARATION:

Lebel generation was difficult for me. I have divided the level into two parts Mask and No Mask.

1.10 SELECTING THE RIGHT WEIGHT:

The model generates several weights that have been trained for each epoch. In the past, deciding on the best weight was difficult. Several frameworks are utilized in the present period to choose the best weight from among the various iterations of each epoch. Yolo has worked hard to gain the most knowledge possible in this type of situation.

1.11 CONTRIBUTION

I worked on this thesis paper to make the next contribution. After all, the purpose of this study article is to provide a scientific report based on a Face Mask dataset so that researchers can learn more about which model and technique are the most effective, as well as to assist in the future implementation of the tools or models.[1] This paper used a variety of strategies to improve accuracy and model performance. The primary goal of our study is to improve the model so that it can find the best accurate estimate result from the training dataset as well. For the detection of Face Mask, machine learning approaches are justified. To improve the prediction model's accuracy, a combination of those classification models is also tested. These models are implemented using YOLOV5 learn to rearrange the training dataset and then predict whether it's Mask or No Mask using the dataset.

1.12 THESIS ORGANIZATION:

We explored other studies with research gaps on the same subject in the following chapter. The final chapter comprised our recommended research method. In the fourth chapter, we discussed

the findings of the analysis. Finally, we discuss the fifth chapter's observations and recommendations, which include assumptions, limitations, and future study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

A literature review is essentially a survey of published scholarly articles, books, dissertations, conference proceedings, and/or other materials. The review summarizes, describes, and critically evaluates a topic, issue, or area of research. It should not be confused with a work review, which is a less structured format that summarizes a work.

2.2 PERFORMANCE MACHINE LEARNING ALGORITHMS FOR FACE MASK DETECTION.

Convolutional networks are undoubtedly used for classification tasks as well.[2] Standard architectures such as Alex Net and VGGNet are packed or contain a convolutional layer load. AlexNet, the ImageNet LSVRC-2012 competition winner, consists of 5 convolution layers plus 3 fully connected layers, whereas VGGNet, an improvement of AlexNet, gradually shares large kernels with several 3x3 kernels. New architectures, such as ResNet, use an accelerated link on training accuracy, allowing for much deeper networks to avoid overload processing.[3] These architectures are frequently used in image recognition frameworks to extract original features. The VGG-16 network is fairly robust in terms of feature extraction. Less expensive in terms of computation Nonetheless, the majority of Segmentation architectures rely on input images repeatedly.[4] Fully Convolutional down sampling and up sampling Networks are, in fact, the discrete and Method for expressively comprehensive segmentation.[5] Deep Learning is made up of a massive number of components. Neural networks that make use of a processor's multiple cores to manage the neural network, a computer and video processing cards are used.

[6]A neuron in a network is classified as a single node.[7] Because of its popularity, deep learning is used in a wide range of applications, particularly in medicine and agriculture. Its applications include the identification, detection, and recognition of diseases in humans, animals, and plants, as well as the detection and grading of fruit images and image capturing robots such as face recognition via an attendance system.[8] In terms of the convolution process depicted in. It begins with the extracted input image and its features, followed by a convolution 4 © Daffodil International University filter of 3x3 across with a stride. The Conv process produces a featured map as a result of the dot product of the preceding Conv layer.[9] Each featured map retains the exact details of the original image to establish a specific input and is down-sampled using the ReLU method to keep other values intact and downgrade negative values to zero values.[10] Following each Conv, an additional down-sampling procedure known as max-pooling reduces the values to half of their original value by simply selecting the maximum values from the kernel matrix. Providing the most important clues in determining a precise image for flexible resource management is the pooling layer's work.[11] The combined-features is fully connected layers (FC) distributed and flattened layers) that convert activation values from one to zero. The SoftMax-activation function then generates probabilities. This method is quick and easy to use, but it has several drawbacks: it can only process full-frontal faces, and it's easy to fool the detector. With their hand, they cover their lips and nose. Chandrika Deb proposes a different strategy in her article. In the same way as our original pipeline proposal, In conjunction with a Caffe-based face detector, he usesMobileNetV2 has been fine-tuned for mask-wearing classification. In classifying input data, it uses neural networks. Some researchers have used RGB color information extraction to perform facemask recognition.[11] However, the article does not consider the case of non-standard mask wear,

so the algorithm's adaptability needs to be improved further. The authors achieved face mask recognition by combining YOLO-v2 and ResNet50, with DarkNet-19 serving as the backbone network.[12] DarkNet-19, on the other hand, has been optimized by CSPDarkNet53. The ablation experiment in our paper shows that the CSP1 X module outperforms CSPDarkNet53. Furthermore, a paper proposed a combination of SSD and MobileNetV2 for mask detection, but its model structure is too complex and its performance is inferior to YOLOv5. A paper proposed combining SSD and MobileNetV2 for mask detection, but its model structure is too complex and its performance is inferior to YOLO-v5. I've been reading a lot of papers. They highlighted some of their flaws in these papers. Because their data contained a lot of noise. Their video had a much lower frame rate. For maximum detection, the accuracy levels were much lower.

2.3 CONCLUSION

There are two key points for detecting face mask wear.[13]. Face occlusion, variable face scale, uneven illumination, and other factors can all contribute to the current object detection algorithm's shortcomings.[14] Density, and so on, and these issues have a significant impact on the algorithm's performance. In addition, the traditional object detection algorithm employs a selective search method.in feature extraction, resulting in issues such as poor generalization ability and redundant data, low accuracy and poor real-time performance.

CHAPTER 3

RESEARCH METHODOLOGY

We employed a YoloV5 architecture-based convolutional neural network (CNN). Input level, convolutional level, pooling level, ReLU, and fully connected level are some of the modules of CNN. Residual neural networks were utilized. We come to know from the above topic that the news has two categories, irrespective of whether it is Mask or No Mask. In a blood type test, the significance of the challenge first needs to be known before choosing our model and assessing the effect. AI is full of its calculations, but some of them are helpful in defining and some are on a daily scale.

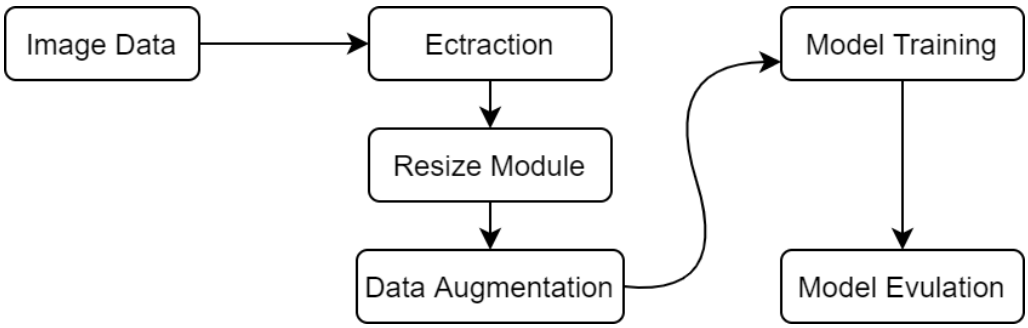

Figure 1 : Research Methodology

3.1 DATA COLLECTION

I collected pictures from almost all the newspapers in the country. I collected pictures from almost all the newspapers in the country. I collected a lot of pictures of these, about 100 are for image datasets. I have used about 30 pictures for Prediction. I separate these pictures in two classes, Mask and No Mask. The pictures were in jpg format. From the outset, we start by choosing a Data-set that can be used to identify Facemask. People in our country do not want to wear face mask easily. After the arrival of Covid19, the last wear mask has increased a bit.Face Max is one of the most important things in today's life.I have collected data from almost all the newspapers in Bangladesh. Such as: The Daily Prothom Alo,The Daily Bhorer Kagoj,The Daily Ittefaq,The Daily Janakantha,The Daily Jugantor,The Daily Star,The Financial Express (Bangladesh) and The Daily Sun (Bangladesh).I had collected about a thousand pictures from these newspapers.I collected the data that there was a large gathering of people inside them.I collected about 136 pictures from these pictures which had good resolution and face data. Examples of images in the face mask dataset are shown in Figure 2.

Figure 2: Collacted Dataset of Facemask

3.2 DATA PREPROCESSING

After a diversification of knowledge, the arrangement and reduction of information in a form that is efficiently deciphered and interpreted by machines is extremely necessary in the field of machine learning.[15] Data preprocessing can also be used to prepare knowledge for use by a machine learning model. This is the first and most important step in the creation of a machine learning model. When designing a machine learning project, we don't always come across clean, formatted data. And, when performing any data process, it is necessary to clean it and place it in a well-formatted manner. However, we are doing this with pre-processing tasks. Here I have taken two class Mask = 0 and No Mask = 1. I leveled the pictures with a mask and no mask. Then, we apply data augmentation to increase the generalizability of the model. It is the process of spreading the length of the training dataset by correcting the images in the dataset. This increases the accuracy of the model. Here, we use on-the-fly data augmentation to create great models.

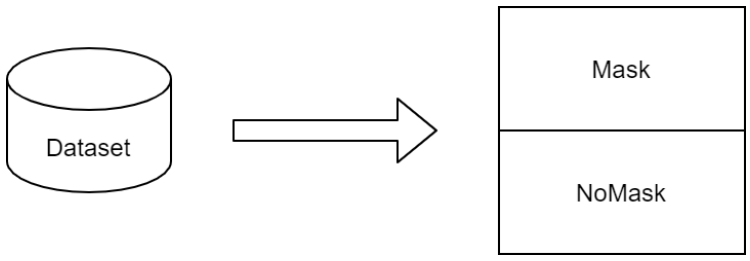

Figure 3: Data Extraction

Then, to improve the model's generalizability, we use data augmentation. It is the process of correcting the photos in the training dataset to distribute the length of the dataset. This improves the model's accuracy. To generate amazing models, we leverage on-the-fly data augmentation.

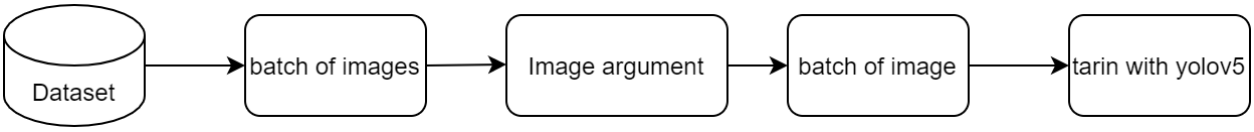

Figure 4: Data Augmentation

3.3 INTRODUCTION TO CNN

Convolutional Neural Networks are a type of neural network that is subdivided. It is present in all aspects of neural networks. CNN, on the other hand, is designed specifically for the processing of input images. Their structure is more distinct. There are two main blocks that make up this structure. As a feature extractor, the first block generates this form of neural network. It uses convolution filtering actions to match the template. The network's first layer filters the image using several convolutional kernels to produce feature maps. The feature maps were then normalized using an activation function. This technique can be repeated multiple times. We filter the maps of the new kernels' features, which gives us a map of the new characteristics to generalize and scale. We may then apply a filter, and the final feature map values are connected as a vector. This vector represents the output of the first block, which is the input of the network's second block. The second chunk does not belong to CNN. It is utilized at the end of all neural networks for

categorization. The output vectors (which include numerous linear combinations and activation functions) are created by converting the input vector values to new vectors. Many of the elements of their classes are incorporated into this final vector. Element I displayed the likelihood of an image belonging to class i.

As a result, each element has a value between 0 and 1. These probabilities are determined using a logistic function (binary classification) or an activation function (multiclass classification) called SoftMax.

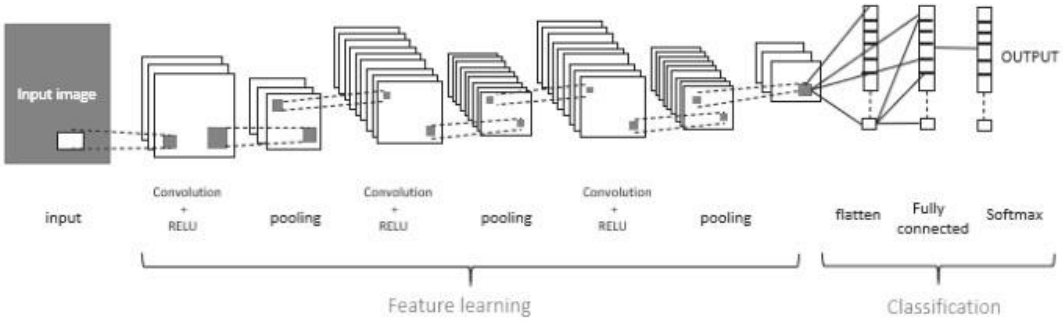

Figure 5: CNN Architecture

3.4 CONVOLUTION LAYER

The first level, convolution, extracts properties from an input image. The link between pixels is critical, and it is maintained via learning visual features that respond to little input data. This is a two-input mathematical function. One is a filter or kernel, and the other is an image matrix.

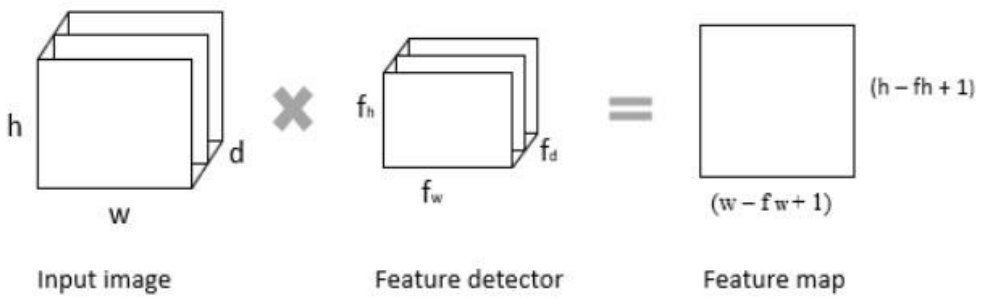

Figure 6: Feature Map

The dimensions of a matrix are (h * w * d), a filter is (fh * wh * dh), and volume dimension outputs are (h - fh + 1) * (w - wh + 1) * 1. A feature map is an image matrix multiplied by a filter matrix.

3.5 RELU

The Rectified Linear Unit is abbreviated as ReLU. It's employed in nonlinear activities.f(x) = max is the mathematical function (0, x). ReLU's goal is to identify nonlinearity in our convolution. We will raise the non-linearity of an image using this function because the images are higher non-linear than them. Another nonlinear function that can be used instead of ReLU is Tanh or sigmoid. Most data scientists prefer ReLU because performance-based ReLUs are superior than the other two.

3.6 POOLING LAYER

When photos are too huge, pooling layers reduces the number of parameters. Spatial pooling, also known as sub mapping or down sampling, reduces the size of each map while preserving a lot of information. Max pooling, Average pooling, and Sum pooling are the three types of pooling. The largest component from the changed feature map is received by max pooling. The

largest elements can also be captured by average pooling. Sum pooling is the process of combining all elements in a feature map.

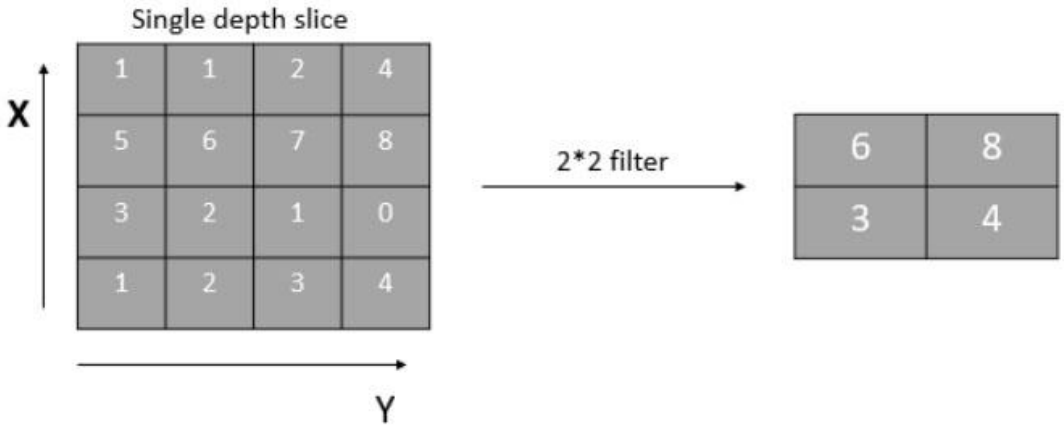

Figure 6: Pooling

3.7 FULLY CONNECTED LAYER

Fully connected layer as known as the FC layer. FC layer is fixed in the last layer of neural networks. This type of layer can receive an input vector and return a new vector. The last FC layer of the network categorizes the image which as an input to the network. After that, it retires a vector of size N, where N is the number of classes. Each element of the vector categorizes the input image based on their classes.

3.8 YOLOV5 ARCHITECHTURE

Alexey Bochkovsky acknowledged Glenn Jocher as the originator of the Mosaic data augmentation in the YOLOv4 publication (Bochkovskiy, et al., 2020). [12] On the other hand, his YOLOv5 modelThe name, on the other hand, provoked a lot of controversy in the computer vision

community.design. The technique of applying an algorithm to a picture in order to forecast the class of one item Mask and No Mask is known as image classification. Object localization not only anticipates an object's class, but also its position by drawing a bounding box around it. Object detection identifies numerous items and classes and requires both categorization and location. As previously stated, the YOLOv5 architecture, like the YOLOv4 architecture, has included the most recent advances, therefore there aren't many significant differences in theory. Instead of publishing a lengthy paper, the author developed a Github repository and periodically updates it with new features. [18]The YOLOv5 author brings forth an interesting issue about an engineering difference. In YOLOv2, Joseph Redmon presented the anchor box structure as well as a method for picking anchor boxes that are similar in size and form to the ground truth bounding boxes in the training set. Despite the fact that it was launched a month after YOLOv4, the beginning of YOLOv4 and YOLOv5 is the same. The research period) was fairly short. Glenn coined the phrase "YOLO" to describe his rendition of the phrase. To avoid a collision, use YOLOv5. As a result, both researchers used state-of-the-art advancements in the field of computer vision at the time. As a result, the structure of the Many users are unsatisfied with the moniker YOLOv5 (5th generation of YOLO) because it does not contain many significant improvements over the previous version YOLOv4. Glenn has failed to publish any papers for YOLOv5, generating further doubts about the project. In terms of engineering, though, YOLOv5 had the upper hand. Unlike prior versions, YOLOv5 is written in Python rather than C. This makes IoT device installation and integration much easier. In addition, the PyTorch community is growing. PyTorch's community is larger than the Darknet's, suggesting that it will get more contributions and have more future development potential. It's impossible to compare the performance of YOLOv4 and YOLOv5 because they're written in two separate languages and run on two distinct frameworks. The first is cspDarknet53,

a kind of Convolutional Neural Network. PanNet is used to improve accuracy. Then it moves on to the yolo layer and extracts its output.

3.9 EXPERIMENT

With 200 epochs, our developed model based on YoloV5 employs the optimizer to minimize the validation and cost-effectiveness. The presented framework of the developed YoloV5 model was divided into two parts in this paper: the training model and the face mask detection model. 130 images from the face mask dataset were used in the training model. I used 100 images for train my dataset and 30 image for validation. The YoloV5 face mask detection model used original images from the face mask dataset as inputs, processing a prediction score of three classes: "Mask," "No Mask," and then providing the output images with their predicted classes and detection scores.There are three stages to learning features. From the input pictures, the Convolution level retrieves the high-level characteristics of each image. We apply a ReLU (non-Linear the rectified unit) to each convolution layer after removing the high-level characteristics from the input pictures (Quality and summary only according to the material). We use max pooling after ReLU. The max pooling layer chooses the best features from the convolutional layer's starting features. The best characteristics of multidimensional arrays are provided by max pooling. Instead of using the stochastic gradient descent function for backpropagation and distribution of pictures, we utilized the stochastic gradient descent function, which is considerably more efficient and decreases compilation time for long-term training. Fully connected layers produce an N-dimensional vector, where N is the number of classes from which the computer must pick. Each of these N-dimensional vectors represents a different set of possibilities.

CHAPTER 5

RESULTS AND DISCUSSION

4.1 INTRODUCTION

We described the Mask detection model's construction process in this section. The overall preparation for the demonstration is divided into several steps, including dataset collection, level generation, data resizing, proposed model portrayal, and finally model preparation strategy.

4.2 ANALYSIS TECHNIQUE

We introduced a technology based on Google Collaboratory before introducing Google Colaboratory. The described language, library, and visualization tools are all integrated into Colaboratory, an open-source and browser-based application. Colaboratory can be used on-premises or in the cloud. Each document is made up of numerous cells, each of which contains the script or markdown code language and is embedded in the final content. Text, tables, charts, and images are all common outputs. This technology makes it easy to exchange and copy scientific works because tests and results are presented in a self-contained format. The Google Colaboratory (also known as Colab) is a project focused at encouraging machine learning research and education. Colaboratory notebooks work like a Google Docs object based on Jupyter: they can be shared and users can work on the same notebook at the same time. TensorFlow, Matplotlib, and Keras are among the preset machine learning and artificial intelligence libraries available in the collaborative Python 2 and 3 runtimes. The virtual machine goes dormant after a period of time under runtime (VM), and all user data and configuration is lost. The notebook, on the other hand, is secure, and files can be transferred from the VM hard disk to the user's Google Drive

account.Finally, this Google service offers a GPU-accelerated runtime that is fully integrated with the previously described technologies. The Google Cloud Platform hosts the Google Colaboratory Infrastructure.

4.3 LABELS GENARATION

We have divided the images in our dataset into two parts and we worked on two labels for Mask and No Mask. Labels instance Figure given below:

Labels Graf:

From here we get the information of our dataset. Here we have about 350 levels for Mask and 300 No Mask labels. The maximum height of the label is more than 0.7 and the width is around 1.0. Where its maximum value is 1.0.

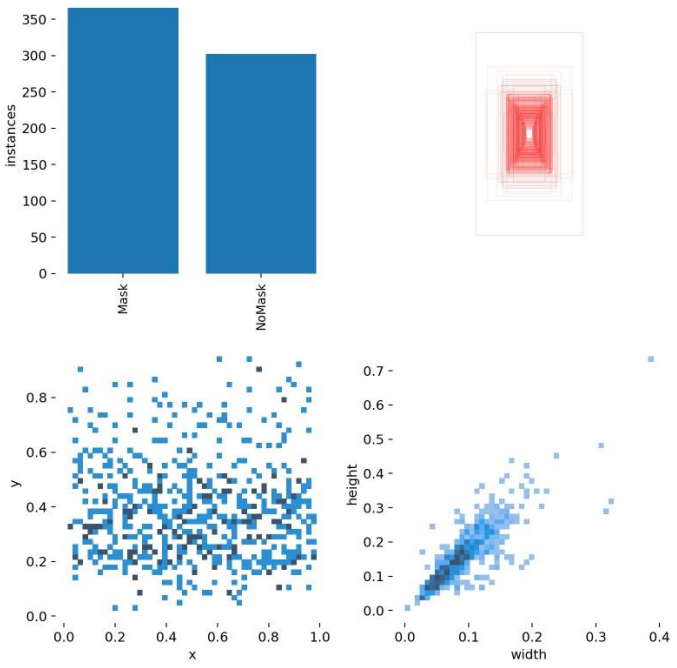

Figure 7: labels Graf

Labels Correlogram:

Here is all the information presented in the dataset. Here are all of them. Here are the value data status of x and y. From the data loss diagram, we see that 0.2 percent of the data is of no use.

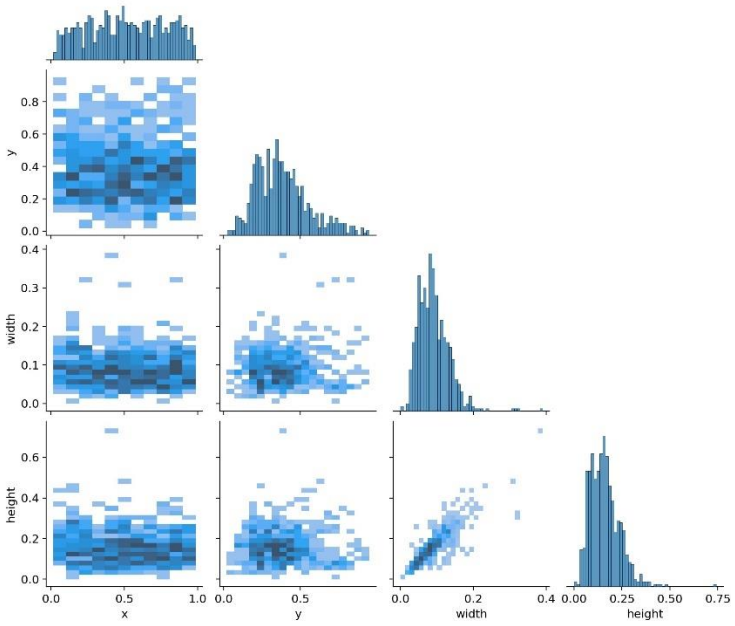

Figure 7: labels Correlogram

4.4 TRAINING PROCESS

For training and testing, we divided the dataset into 70 percent and 30 percent, respectively. Training progress during a span of more than 200 epochs.

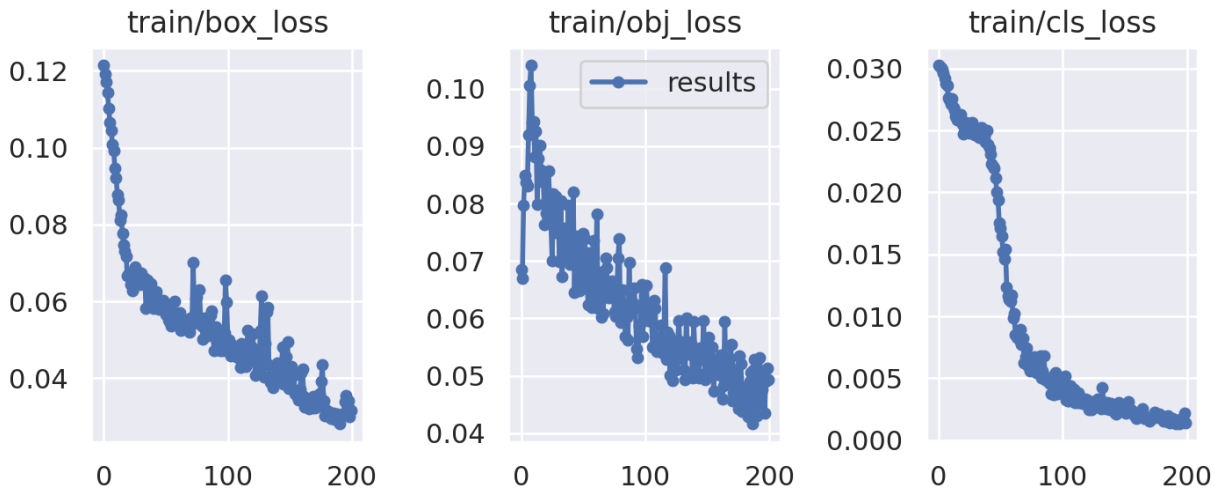

Figure 8: Train /box loss ,obj loss, class loss

Train /box loss ,obj loss, class loss:

In train box loss in 0 epoch it value was 0.12 after train 200 epoch reduce box loss 0.04.In Obj loss it start with 0.10 after 200 epoch it reduce to 0.04.In train class loss it start with 0.030 after train 200 epoch it reduce to 0 .

Figure 9: Train Batch Image

Accuracy/mAP :

In this section 1.0 is the best value and 0 is the lowest value. In this matrix it start with 0.2 after train 200 epoch its output is 0.8.

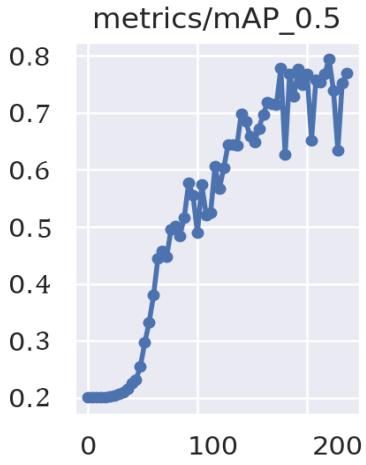

Figure 8: Accuracy/ mAP

4.5 EVALUATION METRICS

Because the relationship between classifier output and facts can be observed, Confusion Matrix is a useful alternative for reporting results on M-class classification issues. The model's accuracy is calculated by comparing the actual and projected values. When it comes to tackling classification difficulties, the confusion matrix is a prominent tool. It can be used to solve multi-class classification issues as well as binary classification problems. It essentially aids in the visual analysis of your model's performance. In actuality, it isn't quite as perplexing as it appears.

1. True Positive: Correctly classified or identified.

2. False Positive: Incorrect classification or identification. It depicts the type of mistake we make.

3. False Negative: Rejected incorrectly..

4. True negative: Properly rejected.

4.6 PRECISION

The term precision refers to the close proximity of two or more measurement values. Because of observation inaccuracies, the value of accuracy varies. Used to determine whether precise measurements are consistent or repeatable. Precision is defined as a set of consistent and significant statistical numbers. The upshot of high-precision measurement is the discovery of consistent or recurring text values. Lower precision indicates that the measurement's value varies. This highly detailed wording, on the other hand, is not required to produce accurate results. This matrix provides an answer to the question, "Was the positive detection ratio accurate?"

$$Precision = \frac{TP}{(TP+FP)}$$

4.7 RECALL

The fraction of the entire number of relevant episodes of real recovery that can be recalled is called recall. Our model conveys how real positive Recall is by classifying it as real (positive). We know that if False Negative has a large cost, we'll use the Recall model metric to choose our best model.The question "Was the ratio of actual positives correctly identified?" is answered by this matrix.

$$\text{Recall} = \frac{TP}{(TP+FN)}$$

4.8 F1-SCORE

The F1 rankings and the weight rankings are identical. All false positives and false negatives are factored into the score. F1 is less intuitive than precision, but it is usually more successful than accuracy, especially if your class distribution is inconsistent.

$$\text{F1 Score} = 2 * \frac{Recall * Preacision}{Recall + Precision}$$

4.9 PERFORMANCE EVALUTION

The YoloV5 model evaluations reveal interclass commonalities and differences. The confusion matrix for those classes is presented by Graf. Mask and NoMask are inter-classes that are comparable.

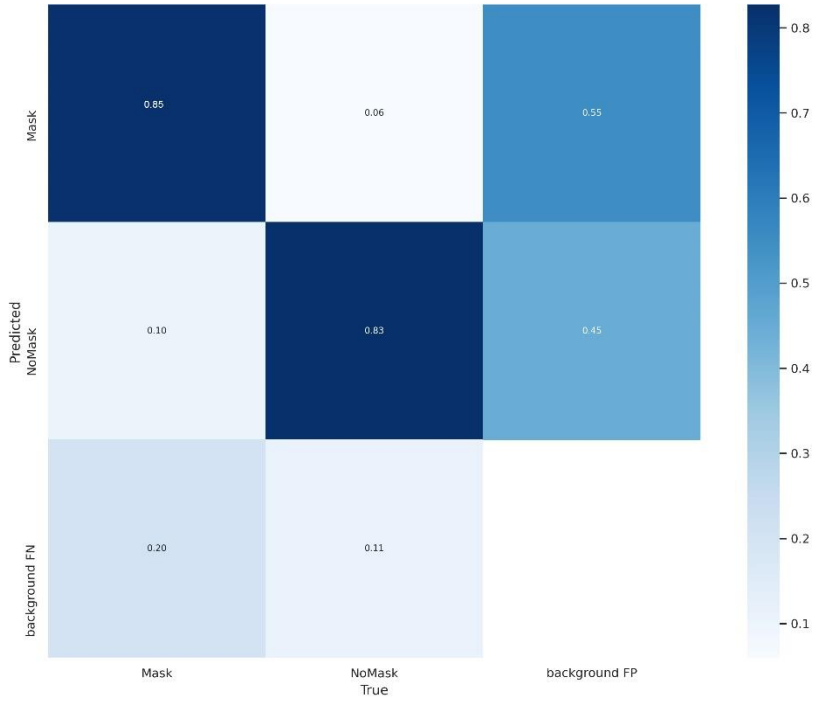

Figure 8: Confusion Matrix

This report evaluates Precision, Recall, and F1 score for each class to determine the quality of the prediction.

```
     Epoch   gpu_mem       box       obj       cls    labels  img_size
   199/199        0G   0.03168    0.0493  0.001424        37       640: 100% 7/7 [02:59<00:00, 25.62s/it]
                Class     Images     Labels          P          R     mAP@.5 mAP@.5:.95: 100% 2/2 [00:16<00:00,  8.11s/it]
                  all         37        298      0.832      0.638       0.80      0.364
                 Mask         37        182      0.873       0.66      0.766      0.381
               NoMask         37        116      0.791      0.716      0.844      0.346

200 epochs completed in 10.772 hours.
```

Figure 9: Final Result

I used YoloV5 for this in Facemask detection. With this method you can work with pictures and videos at the same time. It supports about 140fps. The result in my model is about 76% for mask and about 84% for no mask and it is able to give about 80% results on average. Which gave better results than the above method

4.10 CLASSIFICATION PREDICTION RESULT

After training of our model, we tested on our test data set.

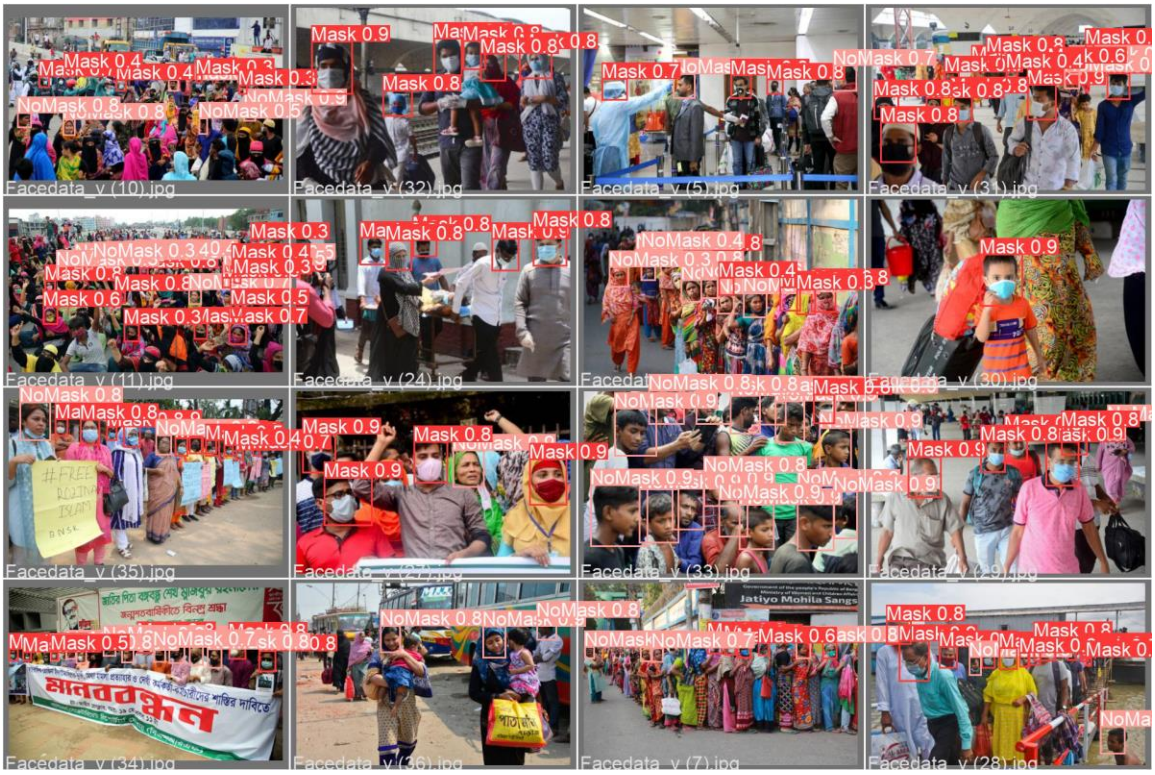

Figure 10: Prediction result.

Example Prediction of newspaper image:

Figure 10: Prediction Face Mask From Newspaper Images.

Example Prediction of newspaper Video

Figure 11: Prediction Face Mask From NewsChannel Videos

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

5.1 CONCLUSION

In this research, Deep learning technology was applied to Face Mask detection. Based on YOLOv5, a high-precision Face Mask detection method was proposed. First, a Facemask dataset containing two types of Mask and No Mask was collected. It has no doubt that there are lots of research works on identifying face Mask. But there are few people work with newspaper data for identify face mask. My dataset was relatively small but it was still able to give fair results. My system can detect Facemask even in crowded places. There are no cc cameras everywhere in Bangladesh. But we get pictures of all places on paper. On the news channel we get videos of people gathering in different places. From the pictures and videos of these different places we can get an idea about that place. How many people wear Mask and how many people don't wear mask.

5.2 FUTURE WORK

In the future, we will continue to optimize YOLOv5-Ours and use pruning technology to optimize the model. At the same time, we will continue to increase the research on more Face Mask varieties and increase the scope of application. I will collect much more big data in the future and I will try to increase the accuracy of my model.

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