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# FACEMASK RECOGNITION IN PANDEMIC CAUSES MULTIPLE HEAD CRUCIAL PROBLEM CLASSIFICATION

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**Abstract**—A chronicle respiratory system condition like Breathing issues to Asthma patients after covering his/her mouth and nose make a tough challenge. Mainly the physical barrier are to take breath in oxygen, it also pack CO<sub>2</sub> which the person exhale. A mask can feel high suffocation and add a compromised Head crucial problem stratification is in general used for the fore handling ahead of the facial acknowledgement & facial several inclination issues and only for this reason an algorithm like recognition of front facial expressions as a input images. However pretentious by Corona virus epidemic, public put on face masks to safe ourselves safety, for that face will protected by mask. However this research paper set up a proposed method in this research paper of combining the face portrait with the High speed - channel of the Hue Saturation Value color channel and grayscale image, and train the Convolution Neural Networks to enhance applications that is HGL method. In line portrait we have to generate the image insert it into Convolution Neural Networks for training. Without any processing insert the original picture of the Red Green Blue color space into the Convolution Neural Networks. Fine grained Net Structured Aggregation: FSA – NET stand for Fine grained Structured Aggregation. It is the method to use to remember the structure of a single Red Green Blue color space image. Since the output of this network is the Euler angle of the head pose, we have chosen a set of thresholds that are most effective for pose classification. The way to solve this issue is to provide help for the study of multi-angle problems. In practically, we can practice for a face detection algorithm that differentiate between wearing a mask or demask. If the facial image with masks, we can recommend this method proposed in this paper, and if it is a normal facial image, we can recommend Fine grained Structured Aggregation or Line Portrait

algorithm, etc. The very first step of this algorithm to resolve the expression of face & get 70 to 99 attribute spikes of that images. And second one is ‘Perspective-N-Point in network used.

**Keywords**—head pose classification, color texture analysis, convolution neural network, face with masks

## I. INTRODUCTION

In today’s current scenario we have to face second phase/mode of Corona virus pandemic in the year 2021 in all over the world which is announced by World Health Organization. In This situations which we have to face lots of problems regarding facial information under the cover of mask. As we know that this pandemic pay us only losses in every area but at the same time we follow discipline. It is very effective and needful research regarding awareness as well as full of expression presentation in the pandemic situation. Analysis or exploration of Faces poses are very important to know. And this research paper will help to resolve many more obstacles related to this. We have to face problem like express our face expression in different- different situations and mask covered our whole work under it. By the help of Convolution Neural Network to evaluate all features. Our decisive examination of the literature both point up the conservative effects of certain types of face masks in defined risk groups, and highlight their potential risks. We put forward a new way to solve the Multiple Head crucial problem with masks during the COVID-19 pandemic. The examination of dataset shows that our method is comfortable in comparison to other methods. The way to solve this issue is to provides help for the study of multi-angle problems. In practically, we can practice for a face detection algorithm that differentiate between wearing a mask or demask.

II. WORK-RELATED

After go through of all related research paper it is concluded that today's disaster situation is not comparison with any other research papers because second phase of Pandemic comes in this year first time. And we have to alert before our conditions going worst. Here some papers [10] are related to "Head Pose issues" which is used as referenced paper. Some Paper [8] are related to masking or non masking of face. Some research paper [5] are related with "Convolution Neural Network of face alignment". [4] discussed regarding pattern recognisatio & computer Vision.

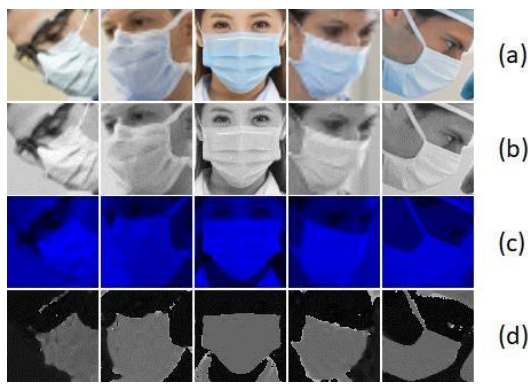


Figure No. 2 a> different angle of face pictures  
 b> The Bearer- channel pictures having Red Green Blue clour space  
 c> The High speed- Channel pictures in High Saturation Value colour space

The conversion of the Red Green Blue color space to the High Speed- Channel in the Hue Saturation Value coolur space are explained as follows-

Maximum value of Channel,  $C_{max} = \text{Max. value of (Red, Green, Blue)}$   
 Similarly, Minimum value of Channel,  $C_{min} = \text{Min. value of (Red, Green, Blue)}$  i.e.  $R'G'B'$

where

$$R = R / (0+255)$$

$$G = G / (0+255)$$

$$B = B / (0+255)$$

RGB represent pixel values of R-channel, G-channel and B-channel respectively in Red Green Blue colour space. The Ranges of all three colours are in Matrix form that is [0,1]. Now, the difference b/w maximum values & minimum values of  $R'G'B'$ .

$$\Delta = C_{max} - C_{min} \tag{6}$$

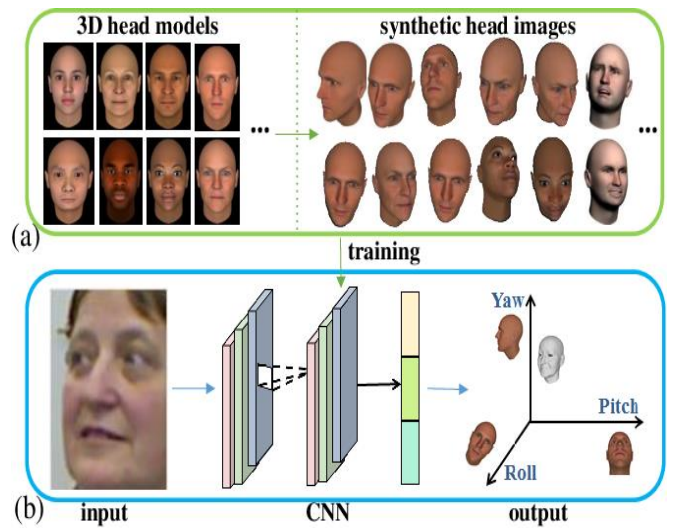


Figure No.3. a> Head Models b> High speed-Channel head images c>Processed head images

The above Figure No.3 shows that the High speed-channel images in which mean filtering and binarization perform on it. Here we use three different method of Gaussian Model in same time period in which we get the data of facial features & contour to withdraw the problem of main lines of picture/images. And these three Models are also help in to visual system of human being. This can help to abstract the facial contour which can remove out many interference of information.

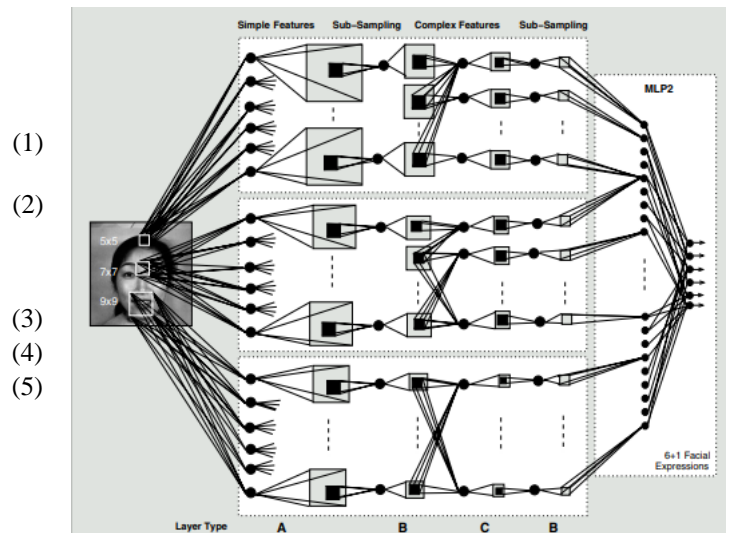


Figure No. 4 Facial Expression Recognition having Convolution Neural Network a> Simple features b> Sub-sampling c> Complex features d> Sub- Sampling



At last, all these Processed Line images, gray-scale & High speed-channel images are take as input and then extricate features through Convolution Neural Networks. This Convolution Neural Networks has to deduct the prolonged Algorithmic value.

### III. EXPERIMENT

#### A. Datasets

From the dataset analysis, it contains approximate thirty thousand eight hundred images from internet in which many of are masked images. Further images can be classified into two parts that is training and testing.

Faces have been marked in every portion, and the marked Allocates specified positions of faces which includes each and every angle like locations of faces, landmarks of the eye, location of masks, head pose, degree of occlusion, etc. Further head pose can be differentiate into 5 classes i.e. right frontward, left frontward, frontward, right side direction & left side direction.

Here, the selected dataset of Masked Faces encompass many facial pictures having no mask / or its masking method. By this datasets we get total around 24k pictures and in that pictures/ images around twenty thousand pictures are in training set & rest pictures are comes under testing set. The Headpose is used as a ideal or reference at the same time. And the reference can be further classisified into two poses that is first one is Side pose label and another is second pose label. Now, those facial picture/ images poses whose label is “3” are comes in front Pose label. And rest are comes under side pose label like (“1” / “2 ”/ “4”) in the dataset.

Finally in the above experiment we get an ERROR in some of the facial expression poses image.

#### Data Preparation & Data Enhancement

This experiment is put through out on the MAsked FAcEs dataset, due to datasets of many faces with masks having not any head pose data. Because of the analysis data provided by the Masked FAcEs dataset are not enough, so it is compulsory for this experiment to elaborate the data’s. Firstly, we usage the fact that of face expression location contributed by the dataset by image cropping. In this process, we increase the size of the facial frame to one and half times the ideal size for cropping, and normalizing these face images to  $n \times n$ . Then after extracting the H-channel in the Hue Saturation Value of color space of that image, and then normalize the image in

pixel data within the range of 0 to 255. We have to use the Threshold to binarize images before extracting it in  $n \times n$  kernel to mean. Lastly, the mage that we got after processing the image, it is combine with portrait image & gray- scale images which we have provide in input noted that only expanded value of frame is one and half times with respect to its original test images.

#### Comparison of Algorithm

The main motive of this algorithm is to get exact accuracy of head categorization of image of face in mask. In this demonstration, usually we have to go along with the test protocol of the MAsked FAcEs database & we have to compare the algorithm w.r.to recent methods. So, we compare the methods along with this algorithm. The four evaluations are as follows:

I. **HGL:** The proposed method in this research paper of combining the face portrait with the High speed -channel of the Hue Saturation Value color channel and grayscale image, and train the Convolutional Neural Networks to enhance applications for its type;

II. **Line:** In line portrait we have to generate the image insert it into Convolution Neural Networks for training;

III. **Red Green Blue:** Without any processing Insert the original picture of the Red Green Blue color space into the Convolution Neural Networks;

IV. **Fine grained Net Structured Aggregation:** FSA – NET stand for Fine grained Structured Aggregation. It is the method to use to remember the structure of a single Red Green Blue color space image. Since the output of this network is the Euler angle of the head pose, we have chosen a set of thresholds that are most effective for pose classification;

Experiment 2 and Experiment 3 used the same net in the training process as Experiment 1.

TABLE I. MAsked FAcEs DATASET (approximately)

Methods	Accuracy (side)	Accuracy (Front)
Line	85.89%	93.67%
FSA-Net	75.10%	757%
RGB	82%	93%
<b>HGL</b>	<b>87.20%</b>	<b>94%</b>

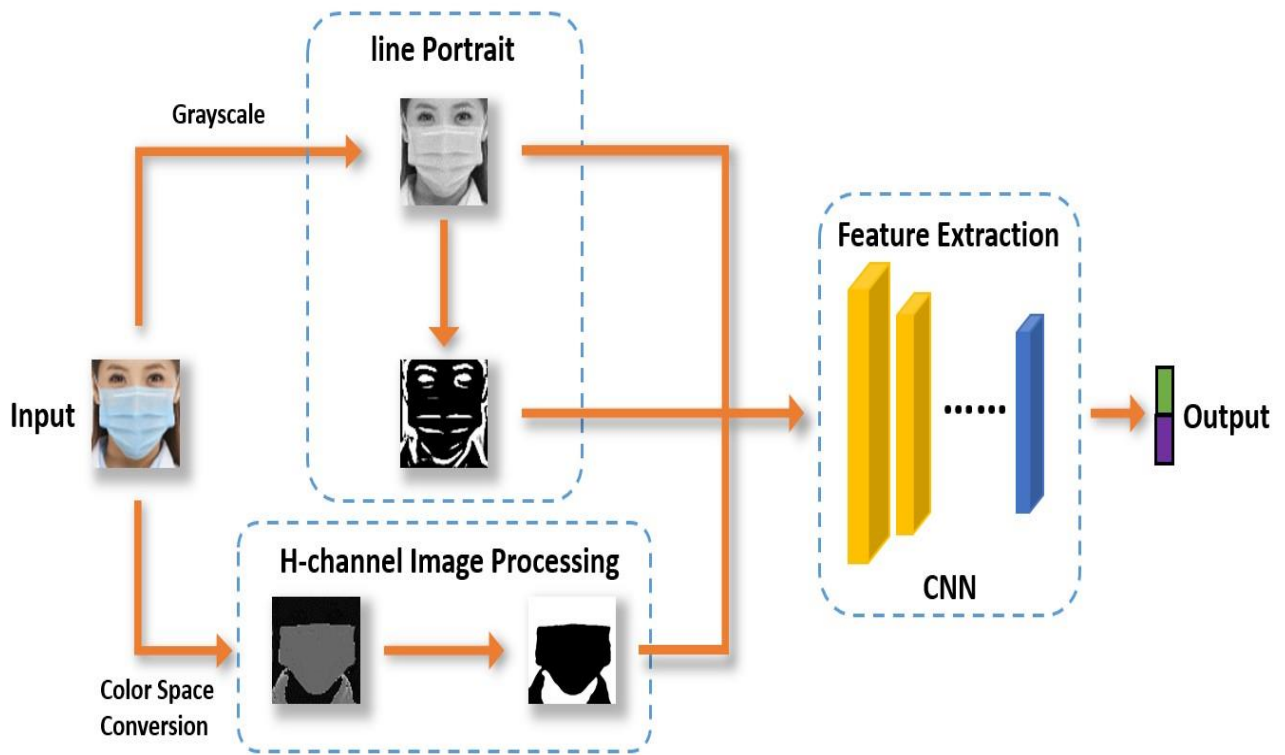


Figure No.5. Overview of the proposed HGL.

## V. PROPOSED OUTCOMES & DISCUSSIONS

In Table I, we see the comparison algorithmic values of four different methods. We compared our algorithm with the four methods mentioned above for head pose classification. The performance of different methods on the test set of facial image with masks is shown in Table 1. Among them, Front accuracy is the classification accuracy of the images with positive head pose, and Side accuracy is the classification accuracy of the images with the head pose as the side in the test set.

The MAsked FAcEs outcomes convey that the method proposed in this research paper has better performance with respect to another algorithms in the front accuracy as well as side accuracy both. For this reason or phenomenon, the High Speed-channel images are processed & that can provide focused net information. This step can take no notice of the impact of mask & the information of the face itself is high pointed. Then this combination of the contour information of face in the structured Aggregation with the pixel contrast information in the grayscale image for getting superior proper of the classified tasks.

## VI. CONCLUSION

In this paper, Epidemiologists currently conclude that after wearing covering mouth and nose will effectively barge in airborne infections in the environment. Our Council Administration and the political leaders run into approved these one and used them to both instruct and, in certain cases, compulsion the general public mass to wear this in public places. This results help to find that there are some clinically relevant scenarios where the use of covering mouth and nose necessitates more defined recommendations. Our decisive examination of the literature both point up the conservative effects of certain types of face masks in defined risk groups, and highlight their potential risks. We put forward a new way to solve the Multiple Head crucial problem with masks during the COVID-19 pandemic. The examination of dataset shows that our method is comfortable in comparison to other methods. The way to solve this issue is to provides help for the study of multi-angle problems. In practically, we can practice for a face detection algorithm that differentiate between wearing a mask or demask. If the facial image with masks, we can recommend this method proposed in this paper, and if it is a normal facial image, we can recommend Fine grained



Structured Aggregation or Line Portrait algorithm, etc.

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