



## Mask Detection Using Image Processing

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**Abstract.** In early 2020, the epidemic of a new type of pneumonia led by Wuhan, Hubei shocked the world, and then spread rapidly to more than 190 countries and regions. This outbreak is named Coronavirus Disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The spread of this disease has widespread social and economic impacts. Therefore, during the current COVID-19 pandemic, regulations are enacted in which everyone is required to wear a mask and perform physical distancing when leaving the house in Indonesia to reduce the spread of COVID-19. The purpose of this study is to be able to create a detect the use of masks using deep learning methods with Alex net network type. The results showed that the development masks can be applied at the entrance of a mall or hospital by installing a detection device in front of the entrance. It can also be seen the results of the detection on a computer that has been integrated with the detection system. This research is useful to make it easier for people to wear masks or not and detect it automatically without having to do it manually by officers.

**Keywords:** Mask Detection, Image Processing, Alex net

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### 1. Introduction

A new type of pneumonia epidemic that emerged in Wuhan, Hubei shocked the world, and then quickly spread to more than 190 countries and regions. This outbreak is named Coronavirus Disease 2019 (COVID-19) caused by Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The spread of this disease has widespread social and economic impacts [1]. Therefore, to minimize the transmission of Covid-19 Indonesia among the Indonesian people by making regulations for the use of masks, where the detection of the use

of masks is still done manually. For the detection of masks in real-time, a system is needed to detect them automatically [2].

A study on technology intended to detect masks for moving objects was conducted by Mingjie Jiang, Xinqi Fan, and Hong Yan, in which in their research it was stated that the detection can be done with a webcam camera [3]. on the detection of masks that have been carried out by Isa and Abdalhameed can create a system that can detect the use of masks by using a Neural network, Image processing, and Computer vision which are part of the detection of masks by training from 1000 images of people who use masks and do not use them, who are trained to use neural convolutional [4]. and in the research conducted by Lambarcing, designing the system using a Raspberry Pi as the main brain, by adding a camera module and also a PIR sensor, which will detect whether the person is wearing a mask or not [5]. Therefore, from these studies, we can see that technology can play an important role in this pandemic period.

The purpose of this research is to design a system that can detect the use of masks automatically to make it easier to check the use of masks during this pandemic, to minimize the spread of covid-19. the method used in this study is deep learning in MATLAB for the introduction of the use of masks and not using masks.

## 2. Method

Image is a representation, resemblance, or imitation of an object. In general, digital image processing refers to processing a two-dimensional image using a computer. An image can be defined as a function  $(x, y)$  measuring row and column, with  $x$  and  $y$  is the spatial coordinate, and the amplitude at the coordinate point  $(x, y)$  is called the intensity or Gray level of the image at that point. The research method used in this research is Deep learning using Alex net as the algorithm [6]. in system design we use MATLAB as an application that will run the program that has been made so that the webcam can detect the use of masks. In MATLAB using deep learning which is a branch of machine learning that can teach computers to do work like humans, just like computers can learn from the training process [7]. The artificial neural network method is pattern recognition by carrying out a learning process or training of features on each input and then the recognition process is carried out [8]. Alex net method for a MATLAB-connected mask recognition system is shown in Figure 1.

There are two stages to detect masks in real time, the first stage is with training which is a process where you train the data that has been prepared in the database after that Alex net will recognize which one is using a mask and not in the next stage when you have got a face model that uses a mask [9]. Labelling will be carried out where the labelling process enters the second stage which is carried out in real time where the image obtained by the camera by testing will be matched with the labelling that was obtained earlier. The next step can be identified the results obtained and then will appear in MATLAB [10].

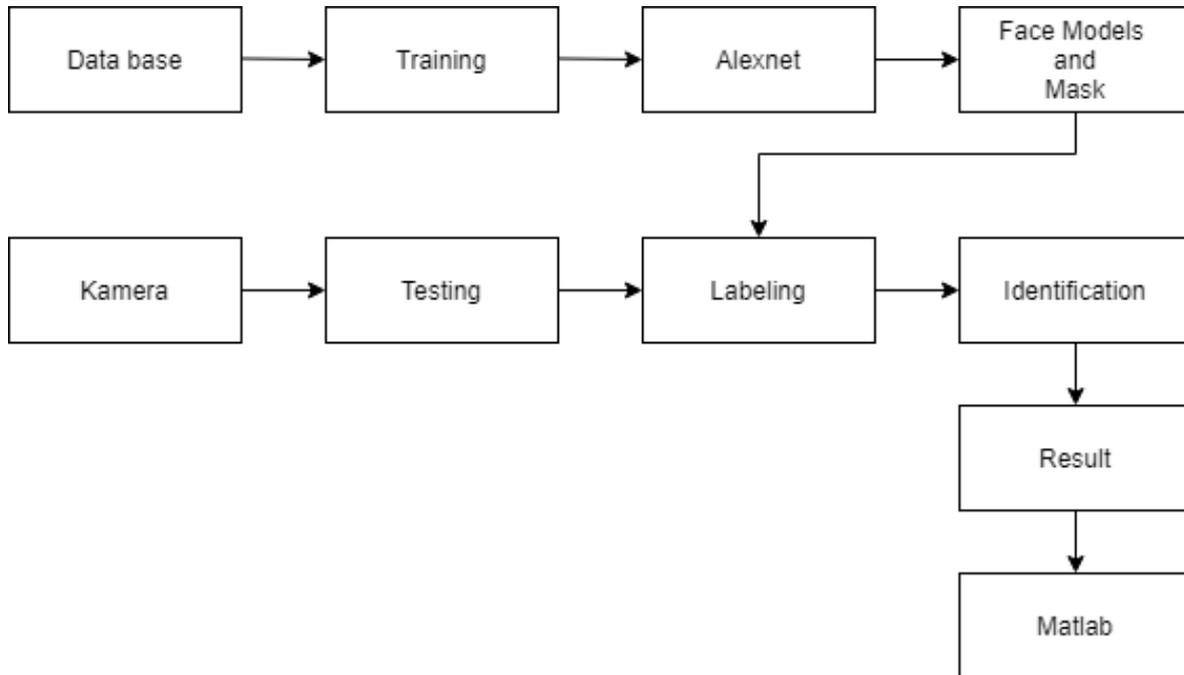


Figure 1. Show the recognition process

### 3. Results and Discussion

#### 3.1 Identifying Requirement

This detection system is designed to identify mask users and not during the COVID-19 pandemic. Simple research was carried out to map out what was needed for mask detection according to health protocols. the menu display structure in MATLAB which will display some information is shown in Figure 2.

Mask detection starts with an active camera where the camera function is to capture facial images to recognize the use of masks or not on the face on mask detection using a webcam camera using MATLAB which is programmed to recognize the use of masks using Alex net as an algorithm in the deep learning method [11-12]. After clarifying the facial image obtained using MATLAB, if you don't use a mask, you will return to the mask detection process shown in Figure 3.

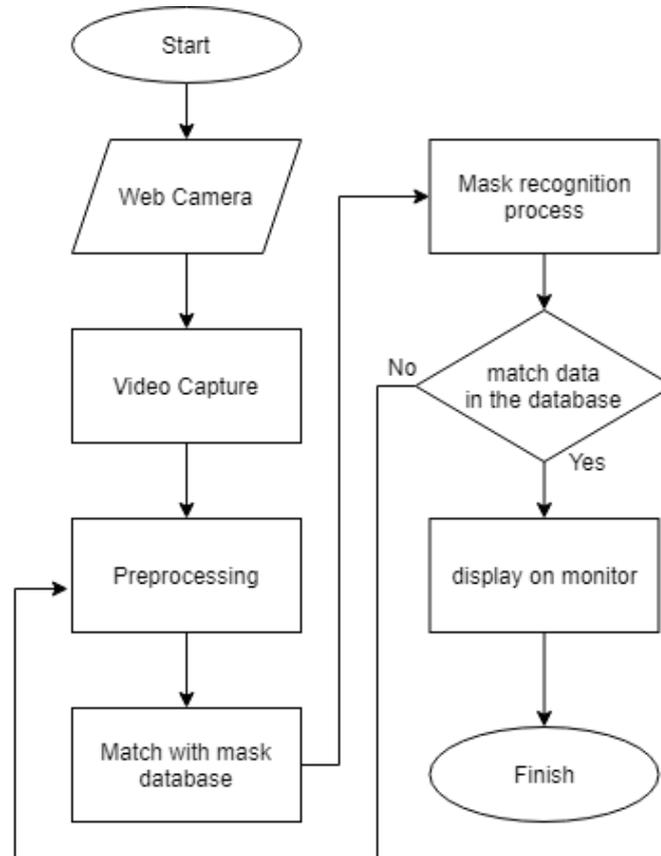


Figure 2. Mask Detection Flow Chart



Figure 3. Mask Detection Flow Chart

Figure 3 shows the display design when the system is running where there is information in the form of testing time, a number of faces and masks detected and if not using a mask, the bounding box will turn red and provide information that the detected object is not wearing a

mask. and if you use a mask, the bounding box will turn green with a description of using a mask. and in Figure 4 will display objects detected using masks.



**Figure 4.** Mask Detection Flow Chart

#### 4. Conclusion

Mask Detection Using Image Processing to Minimize the Spread of Covid-19 is designed to be a model for the community system during a pandemic. In this system there is information and detection to prevent the spread of infection, including wearing a really good mask. If it exceeds the detected person not wearing a mask the predetermined, the alarm will fire indicating that the person does not have the requirements to enter the centre or educational institution.

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