

ABSTRACT

Due to the increasingly widespread transmission of the Covid-19 virus which can be transmitted through droplets from the respiratory tract through coughing and sneezing, WHO (World Health Organization) urges governments in every country to encourage their citizens to use masks in every public activity to suppress the spread of the virus. Masks are considered personal protective equipment that can protect the nose and mouth from viruses exposure. People entering a room in a public will likely gather and might not be aware of the health condition of other people they meet. Thus, they must be ensured to have worn a mask before entering the room. A tool is necessary to ensure each person wearing a mask in a public place.

In this study, a tool is designed to classify the use of masks on a person's face based on two conditions that is wearing a mask and not wearing it. The classification is achieved using digital image processing, assisted with a convolutional neural network (CNN) method. The CNN is part of deep learning that imitates the intelligence of human brain by extracting features in the input image for classifications. The extraction process of the CNN is carried out through the convolutional layer, ReLU activation layer, and maxpooling layers, each of which consists of five layers. Further, the classification layers are two layers at the end. The input image is obtained using Raspberry Pi camera module that is connected to the Raspberry Pi as microcomputer for main data processing. The output of the designed system is the sound produced by the speakers based on the detected classification result. The dimension of the designed tool is 15 cm × 12 cm × 21 cm.

Several experiments were carried out to evaluate the performance using four different types of masks over eleven subjects. The result indicated that the percentage of success of training accuracy is 98.85% , the training loss is 12.49%. whereas the validation accuracy is 98.88% and of validation loss is 9.35%. The detection time obtained in real-time testing is in the range of 1.31 seconds to 1.96 seconds.

Key words : Masks, Convolutional Neural Network, Google Colaboratory