Hybrid CNN-SVM model for face mask detector to protect from a seasonal allergy

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Abstract - Masks used to avoid the spread of the infection to be used especially in closed and crowded environments, the people should continue wearing face mask which can protect from seasonal allergies. It reduces the symptoms associated with seasonal allergies. A dataset consisting of images of people with masks or without mask is created and used in this study. The images were collected in total 7553 from Kaggle and own since a dataset that relates to faces has many privacy issues attached it. We converted image size into 128 *128 and transformed into RGB. The study considers an approach that aggregates Convolution Neural Networks (CNN) deep learning techniques and classical ML classifiers. To classify images into masked and unmasked own architecture on CNN was used to extract unique features, then Support Vector Machine (SVM) used to classify the image. Purpose of the hybrid modelling on CNN, it recognizes these advanced features from the sample data, thus reducing the workload of developing a new feature extractor for such problem and when the number of data is small, CNN do not work well. In order to sort out that issue we bring SVM algorithm also here which can be possessing high accuracy even with less data. The problem for our proposed model is to learn the interpretation of various features in images and classify accordingly. By analysing various architectures on CNN, own model created in leveraging the spatial information in images. With this concept, the own architecture designed because some of existing architectures are complex, some pertinent information may be lost there during feature extraction phase and the computation time is considerable. The pervious Custom CNN architecture Model training accuracy reached 94% and Validation accuracy 96%. When the CNN was used as a feature extractor, the SVM classifier was demonstrated to be the best combining counterpart, providing the best synergy effect in terms of accuracy. This indicated that the proposed fusion achieved superior recognition accuracy of 97.35 % compared to the previous approach. We used 1511 data for testing from that 10% used for validation.

Keywords: *Convolutional Neural Networks, Face Mask, Feature Extraction, Support Vector Machines, Seasonal Allergies*