**Face Mask Detection**

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**Idea Description**

This project will use extracted features to tell whether there is a mask present on a person’s face. The feature extraction and analysis code-frame would first be used on images from an online database. As the project moves forward the program will be tested with images from a live camera. The program would directly output whether a mask is present or not, perhaps by a color that can simultaneously serve as an attention grabber for the person that is being assessed.

**Goals and Objectives**

The goal of this project is to encourage mask usage by bringing attention to whether a mask is present on the face or not. The program will report this information to those whom it may concern, which, for the purposes of this project, will only be the individual themselves.

**Motivation**

With the onset of the Covid-19 pandemic, face masks have become the norm and an integral part in reducing the spread of the virus. While vaccines and general crowd-thinking have dampened public enthusiasm for self-regulation, there are still public and private settings that require or otherwise, highly-recommend, wearing face masks. The aim of this project is to help with the regulation of mask usage by enlisting AI to detect whether an individual is wearing a face mask or not. This detection model can then be used to gather aggregate data, to give a warning, or to monitor and regulate mask usage. In our project scenario, we will be giving a warning to the individual in question.

**Significance**

Due to present circumstance, there is a significance in knowing and influencing mask usage. Bringing a state or situation into the forefront of our awareness influences our behavior regarding that situation. It is the same reason city officials put up 'Dynamic Speed Monitoring Displays’ along certain streets and risk zones [1]. When a vehicle approaches the sign, the driver is made aware of the speed at which they are going and is encouraged to slow down to comply with the speed limit if they are going too fast [2].

We hope to encourage mask usage in the areas where this system is put to use–particularly in the places where masks are mandatory.

**Literature Survey**

There are multiple implementations of face mask detection that are referenced in the literature. One literature is the “Review on Literature Survey of Human Recognition with Face Mask [3]”. This one turns its attention to recognizing faces while a face mask is present, however many of its methods for face and mask detection remain relevant to our project. It refers to multiple methods of evaluation/feature extraction such as sift and Hog, as well as some novel variants. It also contains references to other texts that take to a simple mask detection model.

**Objectives**

Objectives in code implementation include:

1. Identifying the faces within the image.
2. Assessing if the face is wearing a mask.
3. Assessing how the face mask is being worn (if time permits).
4. Giving a visual ‘warning’ or ‘okay’ to a screen, which, in practice, would be visible to the individual being assessed.

**Features**

Features that can be used for this program include but are not limited to: those attained via HOG and sift, spatial features, and features acquired through Gaber. These will be used to detect the face and analyze contours, alongside other needed processes.

**Expected Outcome**

We expect to have good outcomes in terms of overall detection; however, we do not yet know how sensitive we can make the model be to the ways in which a mask is on the face. For example, if a mask is on the face, but does not cover the nose, or if it is simply on the chin. We expect this to be a simple fix of identifying borders and evaluating them, but we will have to find out if that is true with the results and follow-up troubleshooting.

***(GitHub Link:*** [***https://github.com/trela47/Face-Mask-Detection.git***](https://github.com/trela47/Face-Mask-Detection.git)***)***

**References**

[1] W. Sandberg, T. Schoenecker, K. Sebastian, and D. Soler. “Long-Term Effectiveness of Dynamic Speed Monitoring Displays (DSMD) for Speed Management at Speed Limit Transitions.” 2006 ITE Annual Meeting and Exhibit Compendium of Technical Papers

[2] Casey, S. M. and A.K. Lund. “The Effects of Mobile Roadside Speedometers on Traffic Speeds.” Accident Analysis and Prevention, Vol. 25, 1993, pp. 627-634

[3] Dr. V. S. Bhat, A. D. Shambavi, K. Mainalli, K. M. Manushree, and S. V. Lakamapur. “Review on Literature Survey of Human Recognition with Face Mask.” International Journal of Engineering Research & Technology (IJERT), Vol. 10 Issue 01, 2021