Applying OpenCV and Machine Learning to the Enforcement of COVID-19 Prevention Guidelines

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The COVID-19 pandemic has affected the lives of millions of people since it started. Because SARS-CoV-2 is present in droplets, its spread can be prevented by practicing social distancing and wearing face masks. As years passed, people became less cautious in public spaces, including queues. The researcher noticed that a computer vision project could be used to detect if people are following COVID-19 prevention guidelines in queues and hypothesized that he could apply machine learning to detect if people are wearing masks and practicing social distancing. In this project, the researcher used OpenCV to read recorded video footage, and used MediaPipe's "Face Detection" and the "MobileNetV3-Large" detection models to calculate the distance between people and detect the use of face masks. The code displays the placements of the people not distancing and the faces of the people that are not wearing face masks in a new window. The researcher collected data surrounding the accuracy of the models and the speed at which the code ran using videos that featured himself on a simulated background. The code successfully detected the correct amount of people in all simulations and ran at an average of 15 frames per second but faced problems detecting faces when those were of smaller resolution. Since the project could detect face masks and social distancing, his hypothesis was accepted. Using better detection models or higher resolution footage could yield better accuracy. This project can be applied to distancing in traffic and the use of face masks in laboratories.

Awards Won: