UC-20 Analyzing Concentration Levels in Online Learning

INTRO/ABSTRACT

This project utilized eye and facial data to detect students' concentration. We began by making short recordings of ourselves being 'distracted' or 'focused', and then ran those through code that swapped our faces with that of celebrities. These videos were then run though software that could extract eye coordinates and facial feature data. Lastly, the data that we collected using this software was used to train machine learning models to detect concentration or distraction. Hopefully, this will give us a better understanding of how we can better help students learn in an online classroom environment.

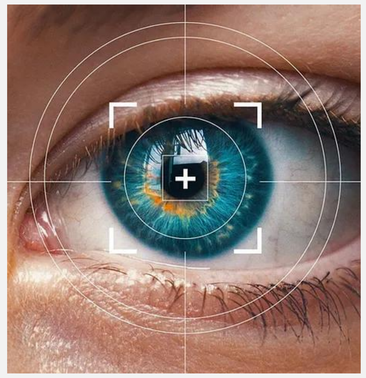
METHODS

For making the deepfake videos, we used the project sponsor's code along with other Github resources to help with the coding/processing of the videos.
For gathering the eye tracking data from the deepfake videos, Github along with the Gaze Tracking resource page was utilized.
For extracting the facial data, the project sponsors provided code that extracted it.
For the machine learning, models were provided by the sponsors that we then tweaked and optimized the parameters of and then trained using our collected eye and facial data.

RESULTS

After trying several different parameter combinations and a few different models, it became apparent that we were hovering around 60 - 70% accuracy. This meant the machine could accurately determine whether a data set represented someone who was distracted or concentrated over half of the time. Considering our reliance on open source tools and our own inexperience with machine learning, we think this is a promising result that encourages future research.

Can eye and facial data collected from webcams be used to determine whether a student is concentrated or distracted while learning online?



Project website QR

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