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**School Name: Los Alamos High School**  
**Project Title: Facial Recognition with Deep Face Library**

**Problem Definition:**

In just 2023, there have been 82 school shootings in the United States. This is slightly more than one school shooting every school week — Monday through Friday. Additionally, the rise of campus threats has had a general upward trend over the past decade<sup>[1]</sup>, making it of utmost importance to find effective measures of preventing casualties and ensuring the safety of school students and faculty.

**Problem Solution:**

To address this problem, I am currently working on a live face recognition and weapon detection model that would be capable of identifying threats on campus and alerting authorities. Using a library called Deepface and OpenCV, I am working on creating a system that is able to achieve these things. Deepface is able to bring precise analysis of a wide range of facial features, making it highly effective in diverse campus environments. I aim to make my program work in tandem with other security measures in place and, in terms of implication, I place a heavy emphasis on privacy by making the system optimized to work with pictures of students and faculty being limited to professional ones — such as school pictures.

**Progress to Date:**

At this point, much progress has been made on the facial recognition aspect of my project. I have developed a deeper understanding of how neural networks work by creating simple networks myself in order to get a better grasp of how the more complex libraries and modules that Deepface and OpenCV introduce function. I have also created a simple face detection model, able to detect faces from a live camera feed. I was able to pair this model (that only uses OpenCV) with Deepface to create a system that can recognize and therefore verify faces detected based on a single reference image (in the case of this program being adapted to use on campus cameras, school pictures would be a resourceful way to smoothly integrate this security measure into schools). Furthermore, I have experimented with age prediction, and how it might possibly provide additional insight to the situation.

**Expected Results:**

When finalizing my project, I expect to have made a system that is able to accurately, and effectively, detect threats or unauthorized personnel from a live camera feed. This would include not only face recognition, but also weapon detection. I also aim to make the system optimal for implementation in schools by tuning it to be powerful at recognizing from just a singular reference image rather than an extensive library of pictures.

References

OpenCV: <https://opencv.org/>

Face Detection using openCV: <https://www.datacamp.com/tutorial/face-detection-python-opencv>

Deepface introduction: <https://viso.ai/computer-vision/deepface/>

School shooting statistics:

<https://www.cnn.com/2023/09/22/us/school-shootings-fast-facts-dg/index.html>

Deepface recognition: <https://pypi.org/project/deepface/>

[1]: Exception to the trend is in 2020 when virtual school was largely used and the number of school shootings dropped, then spiked again in 2021.