Final Project

Partners:

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Idea Statement:

We want to convert hand gestures into real time mouse movements. So, for example, someone would be able to move their mouse left and down to click the start button using hand gestures.

Difficulties

Firstly, segmenting a hand from the background will be difficult since we need a fast enough approach so that we can execute commands in real time. Additionally, something like poor lighting can severely hinder our ability to extract a hand from the background.

Finally, another difficulty is recognizing hand gestures. We need to ensure that the gestures can be detected fast enough for real time, which may require significant optimization.

Plan of Attack: Resources

To ensure the uniqueness of our code we will stick to referencing papers to determine general methodology and then draw from our CSC420 knowledge the implement said methods.

One paper which seems important is the following student paper from Stanford, using concepts such as **Canny Edge Detection** and **Convex Hulls**:
https://web.stanford.edu/class/cs231a/prev_projects_2016/CS231A_Project_Final.pdf

Gesture recognition papers also present important information, and we will explore the following literature review to learn more about it:
https://www.researchgate.net/publication/291051102_Hand_Gesture_Recognition_A_Literature_Review

Plan of Attack: Rough Outline

We present a general outline based on cursory looks at papers:

1) *Connect a camera* to read hand movements in real time.
2) *Extract the hand* in the video from the background using segmentation. This needs to be fast enough to detect hands in real time and flexible to accommodate complex backgrounds.
3) *Understand hand gestures.* Papers suggest using Convex Hull method, however, we have yet to fully grasp the concept or its alternatives. Research in this area will be necessary.
4) *Execute commands* based on hand gesture.