Angel Bajracharya
Topics in CS
Professor Monteleone
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Final Project Document

Project Idea:
My project is named Gesture-Controlled PDF Page Turner. My goal with this project is to develop an application that uses hand gesture recognition to control the flipping through of a PDF. User interaction with the program will be provided through hand gestures such as thumbs up or thumbs down which will be used to control the flipping of the page to the next one or the previous one respectively. The topic that I want to adopt from our course is Module 3: Touch and Touchless Interactive Technology. My project demonstrates how we can create applications with computer vision and touchless interactive technology. The program will run as an executable with the line " python project.py " in the terminal.

Uses/Applications:
The use case I have provided is a children's picture book. The flipping through of a picture book using touchless interaction will make reading more accessible and interactive for both the children and adults around them (i.e. teachers, parents). However, this interaction is not just limited to children's books as this application can be used for any sort of PDF. Additional applications could be:

- Helping people with physical disabilities and limited mobility access digital content easily
- Flipping through recipe books while cooking, keeping your hands free and clean
- Interactive presentations where speakers can use hand gestures to navigate slides and even facilitate the use of more interactive graphics

Technologies:

- OpenCV (one window for webcam and another window for displaying the PDF)
- Mediapipe (hand tracking and landmarking)

Implementation:

1. Initialize webcam using OpenCV to receive user input (i.e. hand gestures)
2. Use Mediapipe framework/utilities for hand tracking and defining hand landmarks
3. Write the logic to determine whether certain gestures are shown (i.e. thumbs up, thumbs down)
4. Use OpenCV to display the PDF
5. Integrate hand gesture logic with PDF window so that the corresponding gesture flips through the pages of the PDF