Gesture Detection Project

Approach: Vision-Based

We will be using a vision-based approach. This approach consist of using a camera to capture gestures. This involves image processing and machine learning.

Outputs

“A”

Tools and Libraries

Programming Language: Python

Libraries:

- OpenCV: A key library for image processing and computer vision
- MediaPipe: A useful tool for real-time hand tracking and gesture recognition
- Tensorflow/Sklearn: For building and training machine learning models (if needed)
- Numpy: For numerical computations

Environment

We will try to do everything in google colab, but I feel like colab may have some restrictions when it comes to the camera so I would have VScode with python installed as a backup just incase.

Tutorial on downloading VScode w/ python:

https://www.youtube.com/watch?v=9o4gDQvVkLU&ab_channel=KennyYipCoding

Data Collection and Preprocessing

Since we are doing a vision-based approach, we are going to collect images and videos of gestures. If possible we could use an existing dataset that is already on the internet but if worse comes to worse we might have to dedicate a day using our own pictures/videos until our model gets something it recognizes.

I would start by looking at kaggle for datasets and sending a link over to discord in the #resources channel. The more pictures/videos the better results!

Implementation of Gesture Detection

- OpenCV will be used to capture video frames
- MediaPipe for hand landmark detection

Building a model vs Importing a model

Ideally I would like for us to build our own model rather than importing a model form HuggingFace just so we can make this unique to us (train our own dataset, get our own “correctness score”) and just completely call this our own AI.

HuggingFace does not get rid of our credibility, but it is using something someone already created, so if we are running tight on time we will have to import something from HuggingFace.

Conclusion

That is the basics of our project, If we finish early we could always make a website out of it or add more gestures but we will get to that once we finish everything.