For this final project, I want to be able to emulate a music conductor based on computer vision and real-time hand detection. I chose this topic because I grew up playing and listening to classical music. I took a one-time conducting class; however, I was unable to actually conduct the orchestra due to lack of time. I hope to learn more about hand detection and using real-time hand gesture recognition to control different resources. I also want to learn more about neural networking.

What to Accomplish	**Date**
Download and install all equipment and resources	11/12
Initialize models and read frames from webcam	11/19
Detect hand keypoints and recognize hand gestures	11/28
Set up functions to modify audio (speeding up, louder, softer, etc.)	11/28
Combine hand gestures with audio played	12/03
Write paper and collect results	12/10

The method can be tested by changing the hand motion and seeing if the audio being played is modified or changed. A successful outcome would be if the tempo, volume, or start and end of an audio clip is changed due to a hand motion. As a challenge, the code could play and overlay different sounds based on the location of the hand.

Resources

- Python
- OpenCV
- MediaPipe (hand detection)
- Tensorflow (gesture detection)
- Webcam
- Numpy
- Pydub or Pygame (audio)

All of the resources are available for download and can be installed. Some resources can also be installed using Pip. A webcam from the computer is sufficient for tracking hands.