We required a computer in order to run the facial recognition program, the camera, and to communicate with Atmega, so the raspberry pi 4. It has a four core CPU which allows us to thread our program. Due to the lack of GPIO pins on the raspberry pi, we needed something to controller the motor, read in accelerometer data, and read in keypad data. We chose the Atmega328p because we were familiar with it. For our camera, we initially tested the facial recognition with a Logitech 720p webcam. We later used a raspberry camera which is 1080p. With a higher quality camera, the facial recognition program was more accurate.

Our advisor recommended FaceNet for our CNN. There are different CNN models, and each are designed for a specific input. Initially, we were going use a generic CNN not specialized in facial recognition. It was not very accurate. When we asked our advisor, Dr. Morris, he recommended FaceNet. We chose the FaceNet model, since it specializes in facial recognition. It unique in the fact that it is two CNNs connected. One CNN to optimize facial embeddings, while the other CNN extracts information from the facial embeddings. The only problem with FaceNet is that it puts a heavy load on the CPU. We tried another CNN called OpenFace. OpenFace is less CPU intensive than FaceNet, but it is not as accurate. We care more about accuracy, so we use FaceNet for our project.