Sean Hayden

11/29/2023

To detect a seizure with mediapipe, the first step is to get the coordinates from the landmarks. The landmarks for the left and right shoulder are 11 and 12 respectively, and landmarks 0 – 10 are on the face. For the purposes of this application, the landmarks we care about are 0 for the nose, 2 and 5 for the left and right eye, and 9 and 10 for the left and right mouth. The y coordinates of the shoulders are used for detection, as well as the x values for the head.

Next, we record the values of these coordinates over 11 frames, giving us 10 samples of displacement and speed data. For displacement, we take the difference between the minimum and maximum values to differentiate actual movement from random noise. For the speed, we take the sum up the raw distance values between frames and take the average distance, then convert this to a speed with the frames per second. The formula is as follows:

(distance1 + distance 2 + … + distance 10) / (10 \* fps-1)

With these values, we can detect rapid movement of shoulders and head, so the next step is to detect rapid movement over a prolonged period. If the speed and displacement of the shoulders or head exceed a threshold (speed threshold is .5, displacement threshold is .03), a fixed value is added to a respective warning level variable, otherwise a value is subtracted from it If the warning level is above 80, then a warning is displayed for the shoulders or head. If both values are above 80, then a seizure is considered to have started, and the duration is tracked.