CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

Christopher Hartanto; Naomi Nguyen; Katherine Robertson

Project Number

J1099

Project Title

Electronic Posture Monitor

Abstract

Objectives/Goals

Many people have bad posture, and bad posture can lead to health problems later in life. Our group's goal was to create a light, easy to use, effective and inexpensive posture monitor to solve the need for proper posture.

Methods/Materials

First prototype, main components include Arduino Nano, 1.5-3v motor, L298N motor driver, 9v battery, flex sensor, and rocker switch. The flex sensor's resistance value was read by the Arduino. If the value was greater than a certain amount, the motor activated. The user could feel or hear a vibration whenever they slouched. The flex sensor was secured against the back using an elastic and nylon harness. Second prototype used the same electronics, but replaced the harness with Rock Tape. In the third prototype we replaced the L298N motor driver with the L9110 motor driver, the 9v battery with two CR2450s in series, and the bulky 1.5-3v motor with a small 3v vibration motor. In the fourth prototype we replaced the Arduino Nano with an ATtiny85, the L9110 motor driver with the L293D chip, and the rocker switch with a smaller slide switch. Also added a switch that allows the user to set their target position by pressing it. We added a new feature that allows the user to change the length of the wire to fit their needs. The independent variable was whether we used the posture monitor or not. The dependent variable was the time the user slouched. The control was the test where our user sat down, worked on the computer, and wore the posture monitor; the posture monitor measured the time slouching without notifying the user if they were slouching. After we completed the control, we performed the same test (same user, testing time, activity, etc.), but this time the posture monitor measured the user's time slouching and notified them when they were.

Results

On average, we discovered the second prototype decreased the time slouching by 76%. On average, the third prototype decreased the time spent slouching by 74%. The fourth prototype was not tested. The tests for the other prototypes proved we obtained our objective because our posture monitor significantly reduced the user's time slouching.

Conclusions/Discussion

Our results showed we reached our objective: to create an electronic posture monitor that decreases the user's time slouching. The project uses common electronic components to create a usable device that can help prevent posture problems.

Summary Statement

We created an electronic posture monitor that senses when the user is slouching and notifies them when they are slouching.

Help Received

We designed and built all of the devices. Using STL files that our team provided, our technology teacher 3D-printed cases for our electronic posture monitor.