CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34716

Project Title

Three Dimensional Tracking Interface

Abstract

Objectives/Goals

The purpose of the project is to figure out a cheaper way of short distance three dimensional tracking through the use of programming in addition to observing the effects of resistance on the sensitivity of the tracking apparatus.

Methods/Materials

The base of the project consist of the sensor made of three cardboard plates that have aluminum foil attached to each side, a microprocessor, and a computer for programming. Each board acts as a capacitor and represents an axis on the digital grid (x,y,z). The user places his or her hand in the apparatus and the computer tracks the movement of the hand.

Results

At higher resistance the values, the tracking apparatus becomes less responsive to the user's hand. It was determined that 10K ohms is the best resistance value for the sensor to function accurately.

Conclusions/Discussion

The user's hand acts as the dielectric which provides a voltage drop in the circuit that is read by the microprocessor and interpreted by the program as a value of distance. This process is used to estimate the distance between the board and the hand. The combination of all three boards provide data to the computer which allows it to track the user's hand in three-dimensional space. Since each input pin is regulated through resistors, varying the resistance can change the sensitivity of the program and how fast it can track the user's hand because the time needed for the capacitor to charge is increased as resistance increases.

Summary Statement

Capacitive sensing and its applications in three dimensional tracking.

Help Received