Name(s)	Project Number
Kemal Ficici	**J0909**

Project Title

The Relationship between Distance and Capacitance

Abstract

Objectives/Goals

The objective of the project was to identify the relationship between the distance of the hand and the time it takes for a capacitive sensor to charge/discharge. I created a capacitive sensor, which I connected to an arduino UNO.

Methods/Materials

My preliminary design was a capacitive sensor constructed with aluminum foil, connected to an Arduino UNO. I had programmed the Arduino to measure the time it takes for the sensor to charge and discharge. I separated my hand from the sensor by putting paper sheets in between my hand and the sensor. I measured different distances, and took a few thousand trials by keeping my hand there for a few seconds.

Results

The relationship from the distance and the capacitance was inversely proportional by a factor of h^2. In a range of 2 cm, the capacitance of the sensor fluctuated at even intervals.

Conclusions/Discussion

My results supported my hypothesis, as my hand drew closer to the sensor, the time it took for the sensor to charge/discharge increased, due to the higher capacity of electricity. In the range of 2 cm, the capacitance of the sensor started fluctuating at even intervals, this might have been due to the fluctuations of the electrostatic field my heart rate generated. This could lead to advanced heart rate and blood pressure sensors and monitors.The data collected form this experiment could be used to calibrate capacitive proximity sensors. Further research could lead to nonmetal detection and identification(which could be used to detect and identify materials and objects such as restricted items at airports, drugs, tumors, and plastic weapons), better EMG sensors, and NMR scanners

Summary Statement

This project was made to identify the relationship between the distance of the hand and the amount of time a capacitive sensor takes to charge/discharge

Help Received

The Arduino Forum advised and recommended tips for improving, optimizing, and troubleshooting my code.