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Assignment-This

Part One

Analog Sensors

Sensor One (Chosen): Accelerometer (SENS-33 ADXL335 analog accelerometer module)

Our chosen analog sensor is an accelerometer, which provides detection while measuring tilt, acceleration, vibration and shock. The accelerometer can be plugged directly into the breadboard or through wires, for our design purposes we are using wires for movability. The G-force rating on our senor is ±3, which means that the smaller the rating, the more sensitive the readings will be.

The voltage requirements for this sensor is 3.3V-5V, although 3.3 is recommended as performance may be affected. There is no resistor explicitly needed to be attached to the sensor, however, along with a capacitor, a 100-ohm resistor can be used to remove noise values. During stress tests, the accelerometer can be functional within the parameters of -40 Celsius to +85 Celsius, however this may damage the sensor. A range of 0.5 Hz to 1600 Hz for the X and Y axes, and a range of 0.5 Hz to 550 Hz for the Z axis.

The optimal temperature for the usage of the sensor is+25 Celsius. The sensor measures .7*.7”, which does not require much space, however usage may vary for each project. Accelerometers are used for detecting changes in acceleration, rotation or movement, therefore certain projects will require allotted space for movement.

The accelerometer may be plugged directly into the Arduino, with the X, Y, Z axis pins being outputted as a pin number for the Arduino code, while the power and ground are connected to their respective parts.

No special parts or libraries are required to assemble and work with the accelerometer.

Sensor Two: Arduino KY-013 Temperature Sensor Module

Voltage Requirements

5V.

Sensor Type:

NTC Thermistor

Resistance

Built in 10KΩ resistor. Resistance lowers as temperature increases.

Range

-55°C to 125°C

Arduino

Works with Arduino code.

Sensor Three: Analog Alcohol Sensor (MQ3)

A sensor used in breathalyzers which has a sensitivity to Benzine but primarily alcohol.

Voltage Requirements

5V.

Resistance

200KΩ

Sensing Resistance

1MΩ- 8 MΩ (0.4mg/L alcohol)

Arduino

Works with Arduino code, no libraries or extra's needed.

Part Two

Design Brainstorm

Our sensor object initially entails the idea of mapping sound to location. We wanted to create a way to represent how music or sound can be played via movement. We decided to incorporate sound, which is produced by a speaker, with an accelerometer, which we convert the rotation of the accelerometer to the speaker's tone. Our end result provided us with a composition of music through movement.

Delving into the real world of sound, music and movement, we researched various ways of incorporating these three themes. We looked at dancing, where people react and move their bodies based on the music and beat being played. We researched installations where different sounds may be played based on the user's location on a field, we also looked at playing instruments, where you incorporate bodily movements to produce sounds. Lastly, we settled on one who does not produce movement, but through their movements, music is produced. Our project is based off of a conductor in a symphony, where by moving their baton, the other band members will play their respective notes, each producing a melody.

Inspired by the sixth human drive, the desire to create and a conductor orchestrating a band, we intended to give off the feeling of acting like an instructor while creating your own melodies. "The problem is, not everyone with rock-star ambitions has the musical talent to be the next Axel Rose. Learning a new instrument is intimidating and frustrating—for the first hundred hours, at least" (David Rose, 87). Much like guitar hero, where the intent of the game is to get the feeling of playing a guitar without the practice or mastery, the intent of the The Maestron is not to master the usage of developing melodies and sounds, but to enjoy the process of creating melodies and to explore different ways of moving the baton.

"Another inherent aspect of enchanted objects is that we instinctively, naturally know how to interact with them" (Rose, 106). The Maestron is essentially an easy to use and maneuver device, the user will pick up the object and notice that it will play sounds, by rotating the object in certain directions, more sounds will follow.

The intended personality of this design is to be playful, the user is meant to pick the object up and have a moment of happiness. The user may have fun with the object, where

This design is intended to have a playful personality, where the intention is for the user to pick the object up and have fun creating music. The user can use the object casually to see how different movement patterns can produce different types of sound. A friendly and playful approach is incorporated to give the object a higher sense of usability so that anyone can use the object without the fear of not knowing how it works.

Coupled with speakers and a series of set tones, the accelerometer tracks the movement of the baton via rotation and acceleration. Through the acceleration and rotation, we then map these variables to certain sounds, whereby moving the baton in certain ways, different sounds will play.

The personality of the design is not related to the physical manifestation, which if it was, would have added greatly to the personality of the object. The personality is not manifested through the actual look of the object but through usage. The object would not scare away any users, there is no wrong way to use it.

The emotions that our object intends to convey are mainly associated with play and music. While using the baton, the user is not supposed to feel stressed or anxious, but playful, excited or happy. The user may feel these emotions upon the realization of melodic patterns or throughout the random sounds produced through random movements.

Design and Build

Our object is essentially a conductor's baton, where instead of the conductor orchestrating a symphony, the user is the conductor who creates the symphony. On a smaller scale than an actual symphony, we incorporated a design where melodies are mapped to the conductor's baton, where the movement of the baton produces various sounds. The changes in this system are auditive and motive, where sound changed based on various factors of movement.

High Level Description

We first declare the three axis in the code, where we will be using the X, Y and Z axis to produce sounds. Since the accelerometer is highly sensitive, we filter out noise to remove any unnecessary peaks in frequency using a weighted averages method. It is imperative to remove the noise as this noise may affect the sound produced.

We also create arrays of notes to be stored and held for future use, for when the accelerometer moves, we will access the array to produce sound.

Written Evaluation of Sebastian

We essentially split the tasks down the middle, we both worked on each part of the project, from coding, designing the circuits to the written parts, we aimed to be as equal as possible in dividing workloads and helping each other out where we could have.

Written Evaluation of Chris

We both have agreed to work on both aspects of the project. From the documentation up to the final project, we discussed every idea and all was very smooth.

Sources

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