So-Lo
Team 12

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Presentation Overview

- Project overview
- FPR Deliverables
- Demo
What is So-Lo

- Automatic Video and Audio recorder used for meetings and conferences
- Real-time sound locator
- Effective in small to medium sized rooms.
How Does So-Lo Work?

- 3 Electret Microphones are used to detect sound
- the location of a speaker is calculated with Time Difference of Arrival (TDOA)
- A camera is mounted onto a motor turns to the speaker
- Video and audio is stored on an SD card on the Raspberry Pi.
Addition to the System

- **Teensy 3.5**
  - replaces the RPi to handle microphones interrupt system.
  - Fixes the delay problem that affected angle calculation.

- **Optical interrupter switch**
  - Allows to have a home position.
Power Supply Block Diagram

Triple Output Power Supply

Outlet → 120 VAC → AC - DC Converters →

+15VDC → Comparators

-15VDC → Amplifiers

+5VDC →

Microphones
Motor Driver
Encoder
Home Sensor
Motor
System Requirements

- Find source of sound based on time differences between microphones located at a known position.

- Microphone Array
  - Detect sounds from 3 feet away
  - Amplify voice and filter out noise.
System Requirements

- Raspberry Pi
  - Use microphone array outputs to calculate sound source location

- Motor
  - Turns to the angle given by the Angle Calculation Code

- Camera
  - Record video and audio with the camera and save data on an SD card.
FPR Deliverables

- Full System Integration
- Accurately point to the source of sound (speaker)
- Microphones assembled on acrylic 1 foot away from each other
- Filter, Comparator, and Amplifier assembled on PCB
- Triple output Power Supply
# Project Cost

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty</th>
<th>Price Per Unit</th>
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<tbody>
<tr>
<td>Electret Microphone</td>
<td>3</td>
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<tr>
<td>Raspberry Pi Model 3</td>
<td>1</td>
<td>$35</td>
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<td>Teensy 3.5</td>
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<td>$25</td>
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<td>USB Webcam</td>
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<td>$15</td>
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<td>Triple output Power Supply</td>
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<td>$16</td>
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<tr>
<td>DC Motor</td>
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<td>Optical Interrupter switch</td>
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<td>Optical Encoder</td>
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<td>Motor Driver</td>
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<tr>
<td>Comparator</td>
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<td><strong>TOTAL</strong></td>
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Questions
Demo Video Back-up