

Title: Sound follower

Team Name: TexMen

Team Members:

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4. Manoj Kumar

Implementation:

To locate the position of source of sound, MUSIC (Multiple signal classification) algorithm will be used. An array of sound detectors (microphones) note the delay in time in receiving the sound waves to calculate the angle of incidence.

Before this extensive noise removal and peak detection is carried out after performing ADC (Analog to digital conversion). This will use MATLAB.

NOTE: IF THE DATA COMMUNICATION FROM BOT TO MATLAB GIVES RISE TO MUCH COMPLICATIONS AND TIME CONSUMPTION, WE MIGHT CONSIDER PLACING THE LAPTOP ON TOP OF THE BOT ITSELF OR DEPENDING ON THE FEASIBILITY AND TIME AVAILABLE, WIRED TRANSMISSION OF DATA IS ALSO A POSSIBILITY.

The detectors will be mounted on a moving bot (differential mechanism) which will sense the direction of the sound source. In response, the bot will shoot at the sound source with a mechanical gun mounted on top of it.

Timeline:

Week 1 - Learning to use Matlab, planning the course of action by developing a clear understanding of the algorithm involved.

Week 2 - Designing array of sensors and processing their output to calculate the angle

Week 3 – Assembling the body of bot and mechanical gun.

Week 4 – Synchronizing the differential mechanism for motion of bot with the calculated angle and the servo mechanism for aligning gun with the position of source

Week 5 – Integrating the two to form the complete sound follower

Week 6 – Working on aesthetics.

Components and cost:

Major components;

Microphones (three) – Rs.1500/-

2 servos – Rs.2000/-

Microcontrollers (two) – Rs.2000/-

Bot chassis, tires etc. – Rs.1000/- + misc. (ICs and circuitry)

Estimated total: Rs.7000/-

Learning Objectives:

Matlab, Arduino coding, signal processing, synchronized motion, mechanical design aspects, teamwork, meeting deadlines and time management.