California State Polytechnic University, Pomona

College of Engineering

Electrical and Computer Engineering Department

Senior Project 2019-2020

**SODAR Device**

**Report**

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**Sound Detection and Ranging**

A close up of a logo

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Sodar or Sound Detection and Ranging can be best described as a system that transmits a sound and then uses the echoes detected to locate an object. It essentially works in the same way as a radar system does but sends out ultrasonic sound waves instead of radio signals, for detection. SODAR is commonly used for contactless distance measurement however they can also be used to identify and track sound-reflective objects. The benefit of such a system is that it is much more cost efficient than RADAR at a much lower power consumption.

A circuit board

Description automatically generatedOur first Arduino with our ultrasonic sensor and receiver will be mounted on our rotating platform and fitted with an one HC-12 (fig. 2 )which will send information to our second Arduino which will receive the data via another HC-12 and then put its on our ESP8226 which will act as our server and will communicate with our laptop and UI via Port forwarding (fig1). And our user interface will employ via LabVIEW to do our position calculations and display objects detected by the SODAR device.

Figure

Figure -Connection Between Arduino & HC-12t

**Team Organization**

As of now our group contributions/ roles are split evenly, Yohannes Teclemariam will be serving as our Project Lead, and will also be in charge of, research, costs, team management, battery management, integration testing. Lorenzo Chen will focus on Hardware development and testing, PSPICE modeling, research, meeting minutes, charts, and reports. Josiah Ebreo will work on Communication Systems, Software development, integration and tests. And I will be working on the User Interface (UI), LabVIEW testing, research, research paper writing, and Presentation creation and formatting.(fig3)

A screenshot of a cell phone

Description automatically generated Figure 3- Team Structure

**Progress Update**

A screenshot of a cell phone

Description automatically generatedAt this moment we are a bit behind our earlier goal (Fig4.) As we were slowed by issues relating to receiving our components thus, we have not been able to build the physical components of our project however we’ve adjusted and we will be doing so over break. We also may need to look into battery solutions as we are learning that due to battery capacity and the amount is not recommended to drive stepper motors with a 9 volt battery as they drain quickly. A proposed solution included the addition of a 5v wall charger as a power source however we would still like our system to be portable and wireless.

Our group has worked as a cohesive unit for the most part. In terms of work distribution and communication we haven’t had any issues at all. There has not been any conflict within the group thus however I feel that if our group were subject to conflict it would be addressed and handled with a mutual respect for one another as well as the project. We all understand that we are seniors and we must work together to complete our project as well as our degrees thus any conflict would likely be to ensure that remains true for everyone.

I believe that our group is well balanced as everyone in the group has strengths and areas of specification that mesh well with the project as well as working with one another. Once we receive our parts and begin testing our system I believe our productivity will show a huge increase as right now we are kind of stuck, I believe we will be done in the Spring

As for weaknesses I feel that I personally was lacking in communication in the beginning as I was added to the group late. However I had communicated my understanding of the subject matter to the group and taken the time to fully bring myself to speed with their help. Now, looking towards the upcoming semester I am excited to begin physically working on our project and finding more efficient ways to parse locational data for our operators to understand.