

CpE/EEE Senior Design

Team 2

Weekly Progress Report

9/26/2023

Team Members:

Xavier Howell

Ahmad Saeed

Dev Gohil

Eric Zizumbo

Group Meeting Minutes: 20 minutes

Summary of Team Tasks Assigned:

1. Create a new model for the project. The previous model, a ball that attaches to the end of the cane, is too small to house all the parts we require. For the next model, it should be less fancy and be big enough to contain all the parts we need.
2. Android App development path finalizing and securing the accurate Api to be integrated.

Summary of Team Accomplishments:

1. The 3D design for the bottom part of the cane is finished. It should be a decent size, but it definitely fits the cane we will be using.
2. Created the outline for app development with all available steps required for a basic app able to store user information and able to request the server for updates to the information from multiple devices.

Please include supporting documentation

Tasks Assigned for Next reporting period:

1. Model the handle for the project. The bottom piece of the project has been modeled, so all that is left is the handle. Unlike the bottom piece, this model should definitely replace the handle of the cane. The handle is easily removed and is simple enough to swap for our new piece.
2. Creating and presenting the API that provides information of the user to any one submitting the request for it.

Issues:

1. The 3D model must take into account how the parts will fit into the shell itself. It's a rough model, but it is a good idea to figure out how the parts fit into the shell.
2. Presenting the API would require not only stimulating android but the ability to request the information has to be made from a computer currently using HTTP request format need to update it to be able to request information from the App from another device

Individual Summary (cont.)Name: Xavier Howell

This week we continued to work on the microcontroller and HC-SR04 sensor. The STM32 IDE has a lot of features and controls so trying to understand everything is time consuming. I've been focused on the F303K8 pin readouts and checking that power and data is going across the pins. The IDE has a Live expression control that allows us to read the values for our ultrasonic sensor without needing a physical display. It currently shows 0 for our values and throws an error..

Accomplishments this reporting period:

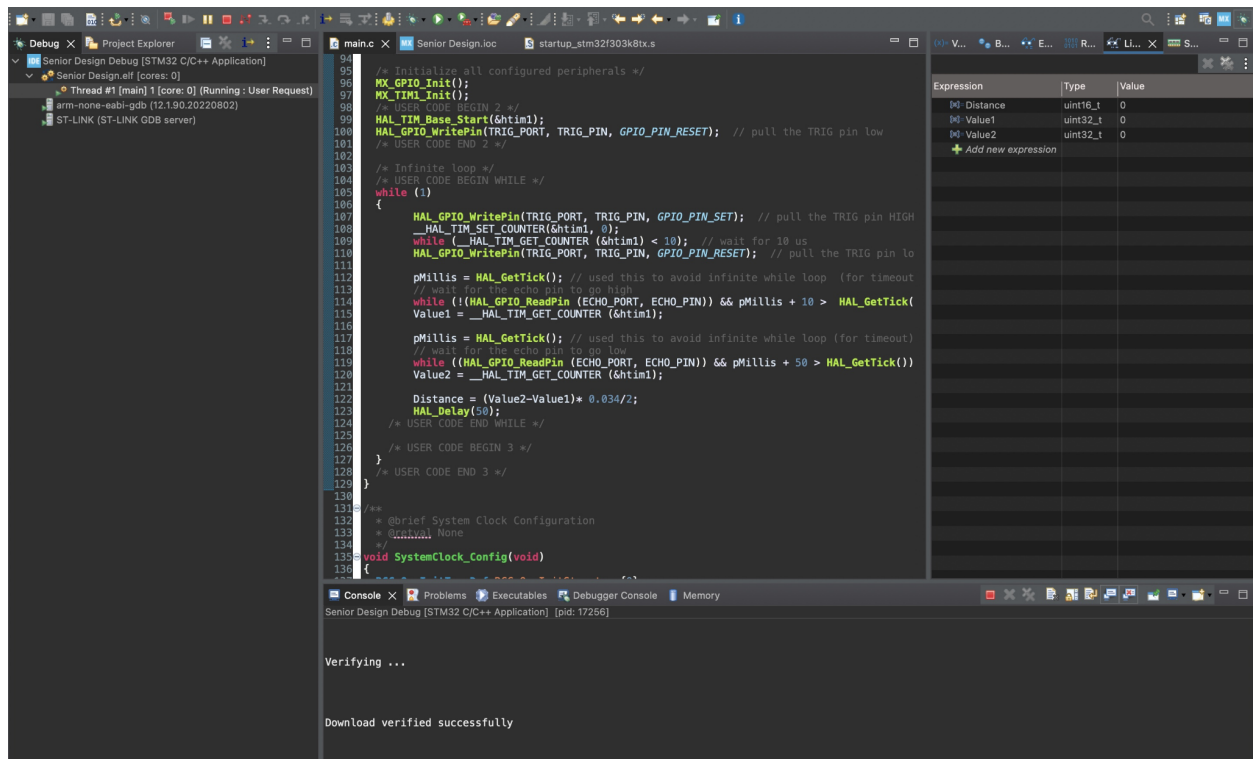
1. STM32 Code generated for HC-SR04 use
2. Debugging code to run with no errors

Issues:

1. ST-Link debug generating error for live expression.

Tasks Assigned for Next reporting period:

1. Get Live Expressions working
2. Add audio, visual, or haptic feedback



Please include supporting documentation

Individual Summary (cont.)

Name: Ahmad Saeed

Accomplishments this reporting period:

1. Programmed the STM32-L432KC board with the ultrasonic sensor to detect objects at 100 centimeters. Things to note: max is 400 cm and has a cone-like radius of 30 degrees.
2. Ordered from amazon small vibration motors : 3V 12000rpm flat coin button

Issues:

1. None so far, just took a good amount of time setting of the IDE

Tasks Assigned for Next reporting period:

1. Brushing up on more C language for programming
2. Programming motor when it arrives

Individual Summary (cont.)

Name: Dev Gohil

Tasks assigned this week:

Companion App development Api integration: I took the task of creating the companion app for our smart cane that would provide essential feedback to anyone who requests it and later transition to location and notification access.

Accomplishments this reporting period:

1. Created the following app development outline using the Android App developer guidelines to create a server to store and manage user data and making the app process HTTP requests to interact with the server.

Reference link : [Developer guides | Android Developer](#)

2. Path of development:

- a) Server Setup: Set up a server with a database to store user information. You can use technologies like Node.js with Express, Django, Flask, or any other backend framework. And Create APIs for updating and retrieving user information
- b) Android App Setup: Creating an app using Android Studio and add necessary dependencies of HTTP requests using libraries like Retrofit, OkHttp or Volley
- c) User Interface (UI): Design the user interface to collect and display user information. You might need input fields for name, email, and other relevant data. Include buttons for updating and retrieving user information.
- d) HTTP Requests Creation: Also to set an instance class to handle HTTP requests and Setup API service
- e) User Data Model: Create a model class to represent user data. This class should match the structure of the data you send and receive from the server.
- f) API requests handling in activity
- g) Permissions and Network State: To request internet permissions in our AndroidManifest.xml. Check for network connectivity before making API requests.
- h) Error Handling: Implement proper error handling for network failures and server errors.
- i) Testing: Test the app on multiple devices and ensure that it works as expected.
- j) Security: Implement proper authentication and authorization mechanisms on the server to protect user data.

Issues:

1. Still the app development does not constitute the communication between the STM32 and sensors with the companion app to provide accurate notification for object detection. It needs to be done to provide users with proper assistance.

Please include supporting documentation

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Tasks Assigned for Next reporting period:

1. Presenting the APP of testing the UI and Information availability
2. Designing the communication link between the app and STM32 to be able to notify users with the existing features of a smartphone. For this I need to research the Developers guide to have the systems communicate with each other via bluetooth or wired connection. Will be using the Android's USB Host API to establish the initial development stage of wired communication and use Android's Notification API to trigger for the set predetermined cases of detection from the sensors

Please include supporting documentation

Individual Summary (cont.)

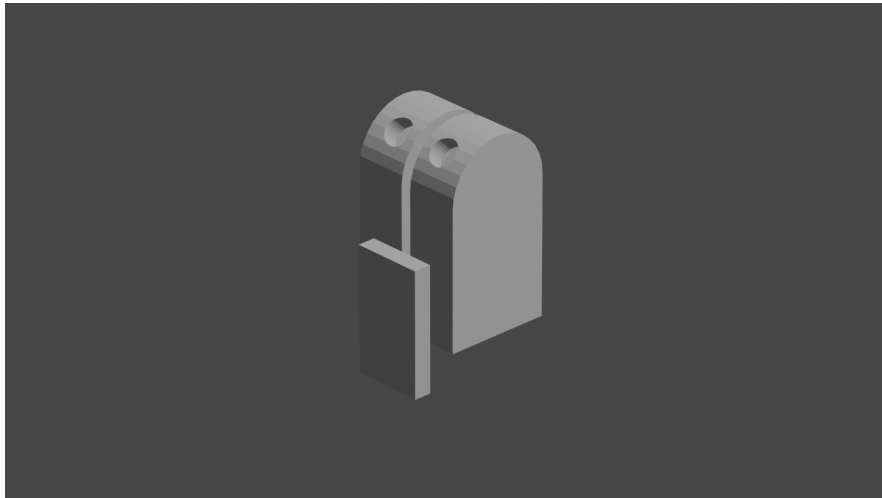
Name: Eric Zizumbo

Tasks Assigned for this reporting period:

1. For this week, I had to redesign the shell I presented previously. The last model was a ball that attaches to the end of the cane (the user had to replace the stump or ball from their cane). For this new model, I was asked to make a bigger design as the hardware required more power and parts than I realized.

Accomplishments this reporting period:

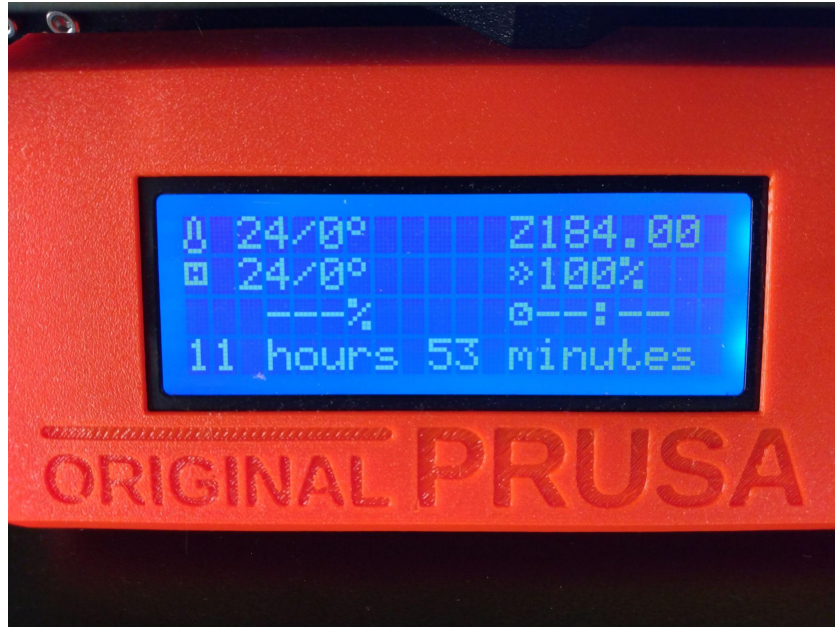
1. The new design was completed. I created a two-piece shell that, when combined, will cover the stump of the cane. I was not able to incorporate spaces for the parts, but it should give my teammates an idea of what the final product should look like.



Issues:

1. The 3D print took almost 12 hours. While I made a 1:1 model for this week's meeting, I fear that making an even larger model will take too much time during the manufacturing process. I can print both sides, if the Makerspace Studio does not mind.
 - a. 3D printing at the Makerspace Studio is free, but I heard about a person who was warned about creating large, complex models of dragons. I hope to not receive the same reputation.

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2. I only took photos and wrote notes to model the space for the sonar sensor. I need a real model for myself to properly integrate the part into the shell. For now the space I made is not proportioned right, so I need to make a proper space in time for testing.

Tasks Assigned for Next reporting period:

1. Regardless of feedback this week, I must alter the current model to properly support the sensor. Either I should further refine my notes, or find a 3D model of the device online (I had luck before).
2. For this week, I was not able to keep the bottom part closed together. For this week, I want to research ways of keeping two shell pieces closed, or I can copy the way easter eggs close.
3. The handle has to be finished and 3D printed. My other models are sharp, because I do not bother with smoothing edges, so I will make sure the user (me) will be comfortable with gripping the handle.
4. Now that I have a working model to work off on, I can begin testing the durability of the device for the new iteration. I will strap the shell onto my walking stick and try a few tests, such as testing out the durability, how well it washes, and how it holds in place.

Please include supporting documentation