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ECE 153B Project Proposal: ***Automatic Pet Feeder***

Overview:

Our goal is to use an SPI Display and a STEP motor to create an automatic pet feeder with an interface, using UART / Bluetooth to automatically feed the pet at specific time intervals and that can be configured through a UI interface on the phone.

Website:

<https://sites.google.com/view/ece-153b-final-project/home>

Peripherals:

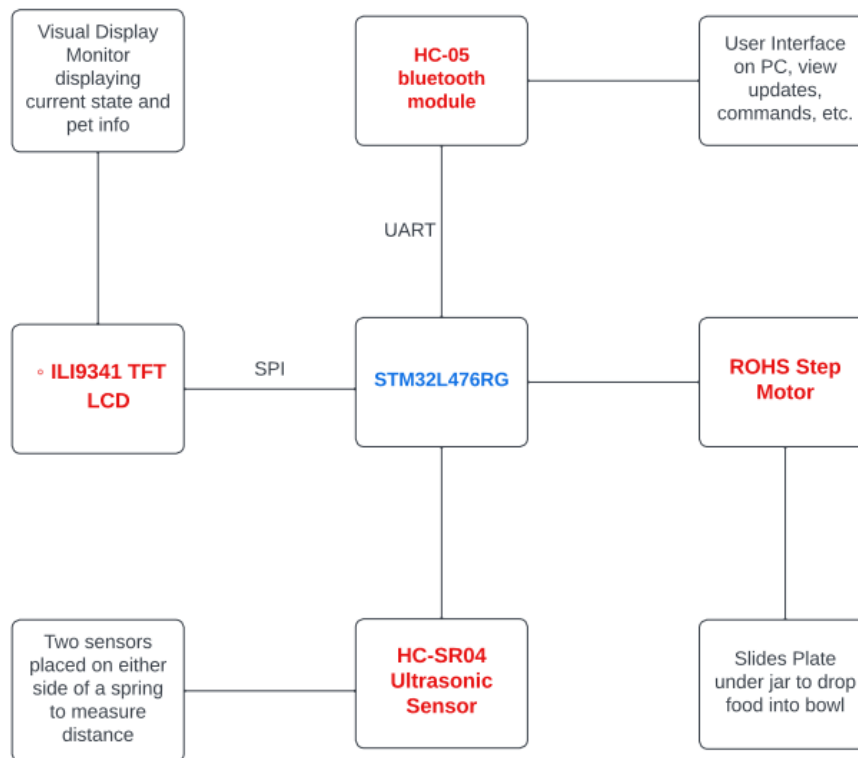
- **HC-05 Bluetooth Module**
 - The Bluetooth module will allow users to interface with the pet feeder, view details of when the pet was last fed, automatically empty the food container, etc. through their device.

- **ILI9341 TFT LCD**
 - External LCD Display will serve as a graphical user interface to view details such as the last time the pet was fed, if the pet eats too quickly, etc.

- **ROHS Step Motor**
 - Slide the bottom of the jar sideways as an opening to drop pet food into the bowl.

- **HC-SR04 Ultrasonic Sensor**
 - To determine if both bowl or food jar are empty, 2 sensors will be needed

Block Diagram



Serial interface Protocols:

- UART
 - HC-05 Bluetooth Module
- SPI
 - ILI9341 TFT LCD

Software Structure:

- We will configure the microcontroller to generate interrupts, triggering UART communication with the HC-05 module. Through the Bluetooth connection, the user interface will be connected to the user's phone and the user will be able to control the pet feeder.

Project Responsibilities:

Cheryl:

- Setting SPI port, RCC / GPIO setup, LCD test to make sure it works properly
- Test to make sure data sends via SPI
- Connect Display for SPI
- Implement the ILI9341 TFT LCD configuring it to display using SPI from the STM32 board
- Implement distance sensor

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- Implement USART with Bluetooth module
- Initialize SPI Peripheral
- Programming Display SPI
- Set software code for interface
- implement step motor
- Combine everything

Helpful Links:

- SPI Step by Step STM to ILI934
 - <https://vivonomicon.com/2018/06/17/drawing-to-a-small-tft-display-the-ili9341-an-d-stm32/>
- SPI display Amazon link
 - <https://www.amazon.com/HiLetgo-240X320-Resolution-Display-ILI9341/dp/B073R7BH1B>
- STM32 pin and function
 - https://gauchospace.ucsb.edu/courses/pluginfile.php/10412832/mod_resource/content/9/STM32L476RG_NUCLEO_Pins.pdf
- STM32, RM0351 Reference manual
 - https://gauchospace.ucsb.edu/courses/pluginfile.php/10412783/mod_resource/content/9/STM32L476VGT6%20Reference%20manual.pdf
- STM32, bluetooth to serial port module
 - https://gauchospace.ucsb.edu/courses/pluginfile.php/10412909/mod_resource/content/5/HC05.pdf
- HC-SR04 Ultrasonic Sensor
 - https://gauchospace.ucsb.edu/courses/pluginfile.php/10412895/mod_resource/content/3/hcsr04.pdf