RoboX
Fall 22

Embedded System
Team Plan:

Overview

Dear team members, this document is about the team plan for the fall 22 term. We will have training sessions and project sessions this semester. Basically, while we are waiting on the mechanic team to build the robot's frame, we will have training for 3 months. The training session will cover all the standard robot functions, which are designed to prepare you for writing systems for other robots. After the training, we will split into 4 groups and work on three different robots and supercapacitors The detailed plan is below.

Training Period

1. **Week1 (9/7-9/11): Light Up A LED**

   Learning Points: GPIO

   Goals: Know how to generate code with CubeMX and Keil. Using GPIO to light up LEDs on the A Board.

2. **Week2 (9/12-9/18): Print Out Message from Remote Controller**

   Learning Points: Dbus, how to debug, USART

   Goals: Receive Remote controller data and transfer to PC

3. **Week3 (9/19-9/25): Reading IMU Message From A Board**

   Learning Points: IIC, SPI

   Goals: Read data from Inertial measurement unit (IMU)

4. **Week4 (9/26-10/2): Attitude Algorithm**

   Learning Points: Euler angle, Rotation matrix

   Goals: Convert data from IMU to angles.

5. **Week5 (10/3-10/9): No meetings since midterm**

6. **Week6 (10/10-10/16): Control Motors with CAN bus**

   Learning Points: CAN, PID control

   Goals: Control motors with microcontroller

7. **Week7 (10/17-10/23): Apply FreeRTOS**

   Learning Points: Operating System

   Goals: Use FreeRTOS control motors

8. **Week6 (10/24-10/30): Programming Chassis**

   Learning Points:

   Goals: Program a functionable Chassis

9. **Week7 (10/31-11/6): Programming Gimbal**

   Learning Points:

   Goals: Program a functionable Gimbal

10. **Week8 (11/7-11/13): No meetings since midterm**
11. **Week8 (11/14-11/20): Programming Ammo-Booster**

    Learning Points: PWM

    Goals: Program a functionable Ammo-Booster

12. **Week8 (11/21-11/27): Finish the Whole Robot**

    Learning Points: PWM

    Goals: Finish the whole Robot

Project Period

During the project period, we have four major tasks. The first three tasks are programming systems for the **standard robot**, the **hero robot**, and the **sentry robot**. The last task is to design a **supercapacitor**. In this way, we are going to split into four groups. Three of the groups are going to program systems for three robots. Another group is going to design the supercapacitor. Furthermore, there are some subtasks that we can do as well. I will put them below.

Major Tasks

1. **Standard Robot**
2. **Hero Robot**
3. **Sentry Robot**
4. **Supercapacitor**

Sub Tasks

1. **Better Motor Control Algorithm**
2. **Design a more efficient Central Board**
3. **Find a way to overclock the motor**