Aryan Kashem

akashem@uwaterloo.ca
github.com/Akashem06

Education

University of Waterloo – BASc in Electrical and Computer Engineering – GPA: 3.8 Sep 2023 – May 2028

Experience

Firmware Engineering Intern (Solar Car) – Midnight Sun – Waterloo, ON Jan 2024 – Apr 2024

- A
- B
- C
- D
- E
- F

Firmware Developer – Waterloo Aerial Robotics – Waterloo, ON Sep 2023 – Present

- Engineered 80% accurate tracking antenna using Arduino and C++ drivers to control yaw and pitch motion
- Collected IMU and U-Center NEO8 GPS data using C++ libraries with UART and I2C communication
- Implemented radio communication to Drone by programming RFD900 and XBee to extract MavLink data
- Developed a motor controller using SPI between a potentiometer, ADC and STM32 to adjust the PWM voltage
- Configured STM32 and Arduino Mega boards by researching electrical schematics and using appropriate libraries

Robotics Developer – FIRST Robotics – Calgary, AB Jan 2022 – June 2023

- Implemented colour and object detection by using OpenCV in C++ to increase points scored by 40%
- Designed tri-wheel drive system using PWM responsive motors and multi-directional algorithm for omni wheels
- Engineered servo-powered claw to maximize cone stability by 90% by using Fusion360 to create mechanical design
- Constructed gear-box lift using 2 continuous servos with a 4.5:1 gear ratio, improving performance by 150%

Projects

Automated Robotic Arm (WIP) | *Raspberry Pi, ROS2, Fusion360, OpenCV, Python, C* Nov 2023 - Present

- Engineered 4-axis rotation, mechanical framework, stepper motor joints, and servo gripper, by using Fusion360
- Implemented object detection using OpenCV and YOLOv8 to sort items based on shape, colour, and type
- Experimenting with ROS2 environment to simulate OpenCV detection and responsive motor and servo motion
- Designing manual control system using potentiometers on a miniature model to generate PWM for stepper motors

AirLink Medical Device | *STM32, C* (GitHub) Sep 2023 – Nov 2023

- Developed environmental regulator with 95% accuracy for 5+ private clients using C and STM32 HAL
- Programmed DHT22 sensor and SEN0132 CO sensor to update an LCD display with I2C communication
- Configured PWM of warning LEDs, and piezoelectric buzzers to interact with 90% of the target demographic

Skills

Software: C, C++, Python, RTOS, Linux, Simulink/MATLAB, CMake, Git, Java, SQL, JavaScript, HTML, CSS
Libraries: OpenCV, Flask, SQLite, ReactJS, Redux, Node.js, Express
Technologies: ARM (STM32, TI, NXP), Robot Operating Systems (ROS2), Raspberry Pi, Altium, Fusion360
Protocols: SPI, I2C, UART, CAN

Portfolio

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Robotic Arm

PCB Design Project

Portfolio

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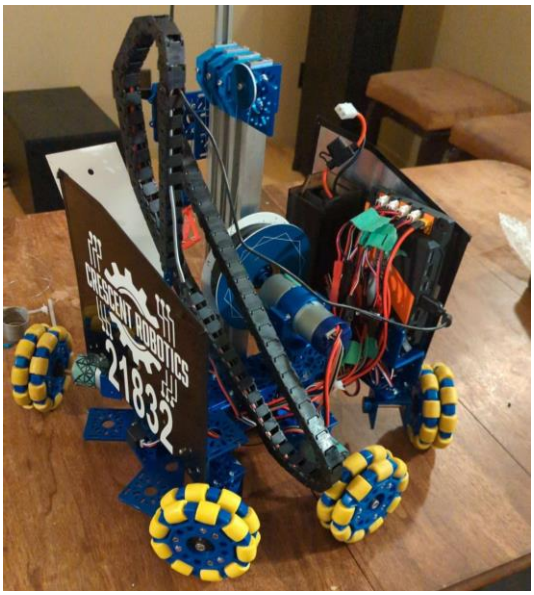
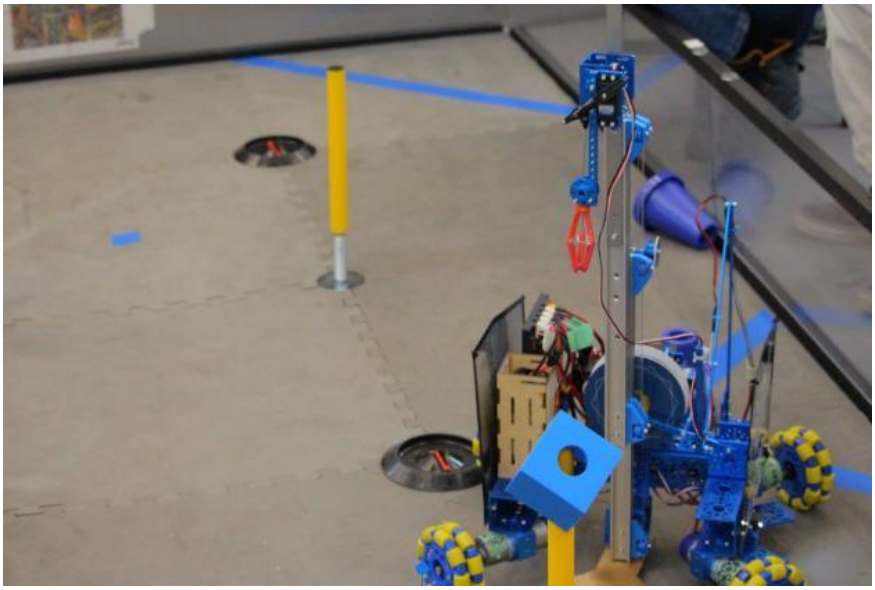
Solar Car Electrical Mock-up

FIRST Robotics (Tracking Antenna?)



3 Motor Drive



Claw System

- A
- B
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- E

Portfolio

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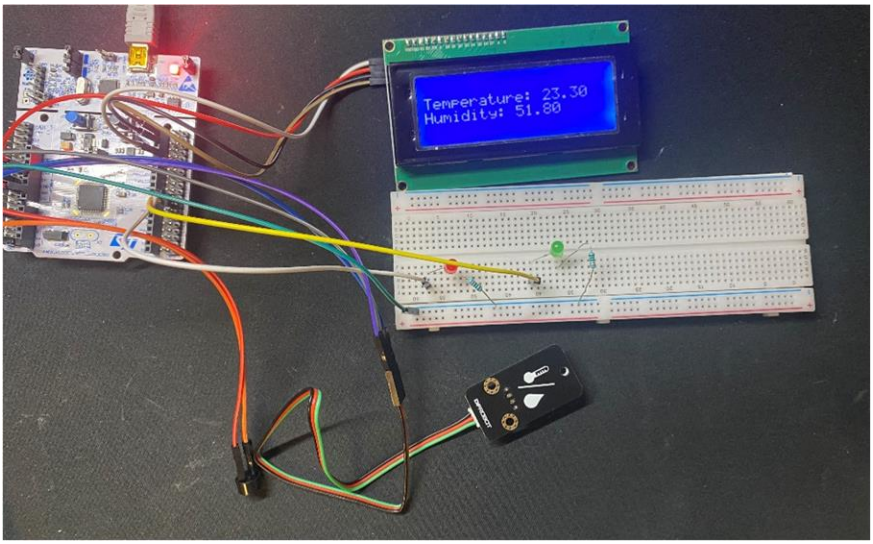
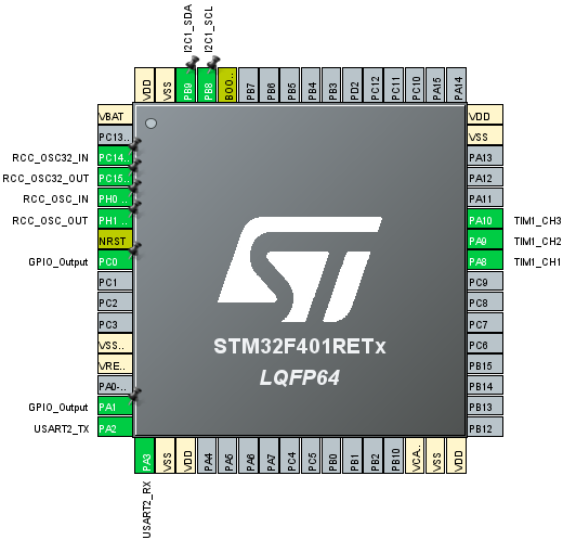
AirLink Medical Device



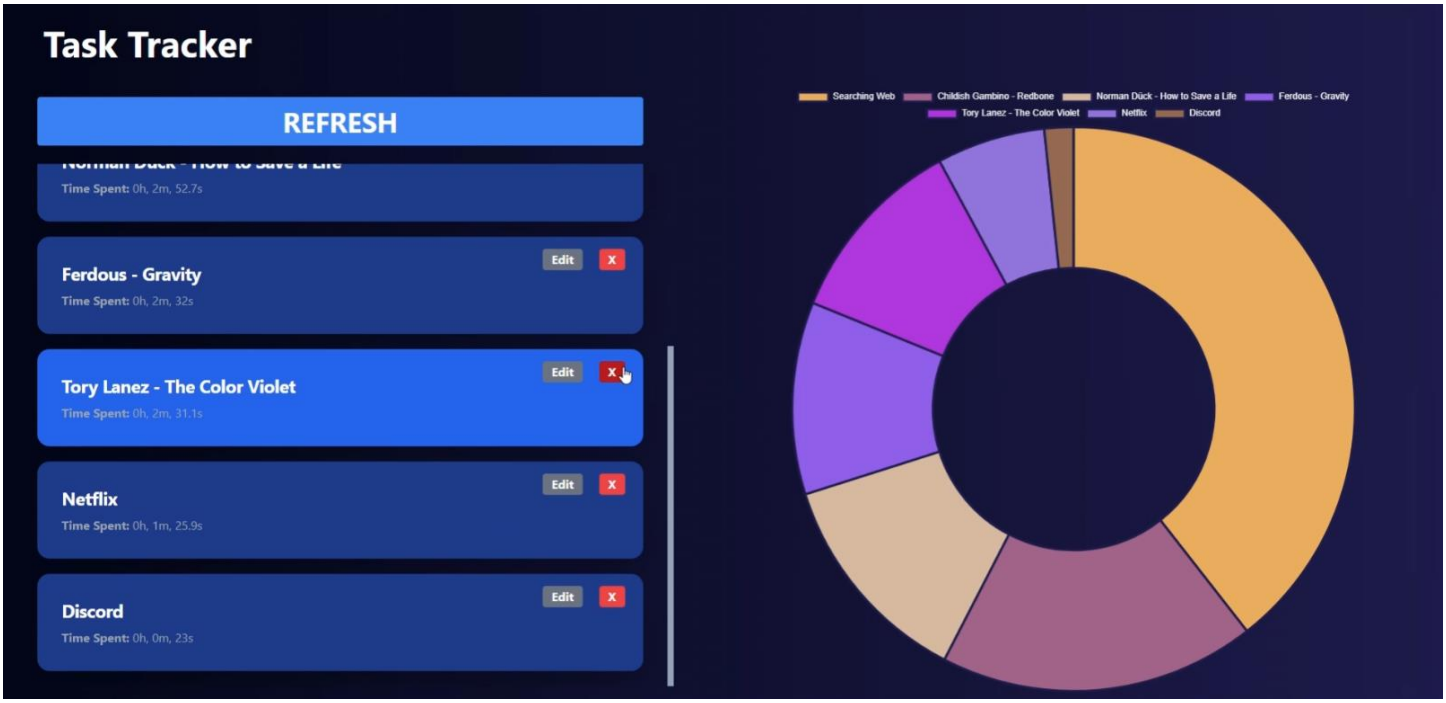
Breadboard Prototype



STM32 Pin Diagram

- A
- B
- C
- D

Time Tracker Application



Data Analysis Page

- A
- B