MicroCART Mini

Project Planning

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Ryan Lowe, Daniel Zaucha, Yi Hang Ang, Jonah Upah

Project Overview

MicroCART: Microprocessor Controlled Aerial Robotics Team

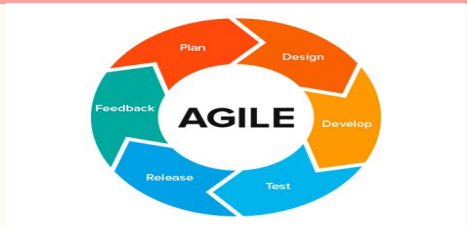
- Design mini quadcopter platform to be used in CPRE 488 and for Controls & Embedded Systems researchers
- Develop mini quadcopter printed circuit board (PCB), containing a Microcontroller, RF, IMU, and Wi-fi chip
- Develop software to stabilize and communicate movements
- Develop base-station to communicate with quadcopter
- Create documentation and video tutorials for future teams

Our Goals

- Design a compact, user-friendly quadcopter platform with integrated hardware and software to be used for hands-on learning in CPRE 488.
- Ensure both remote accessibility and usability for future users through documentation and tutorials

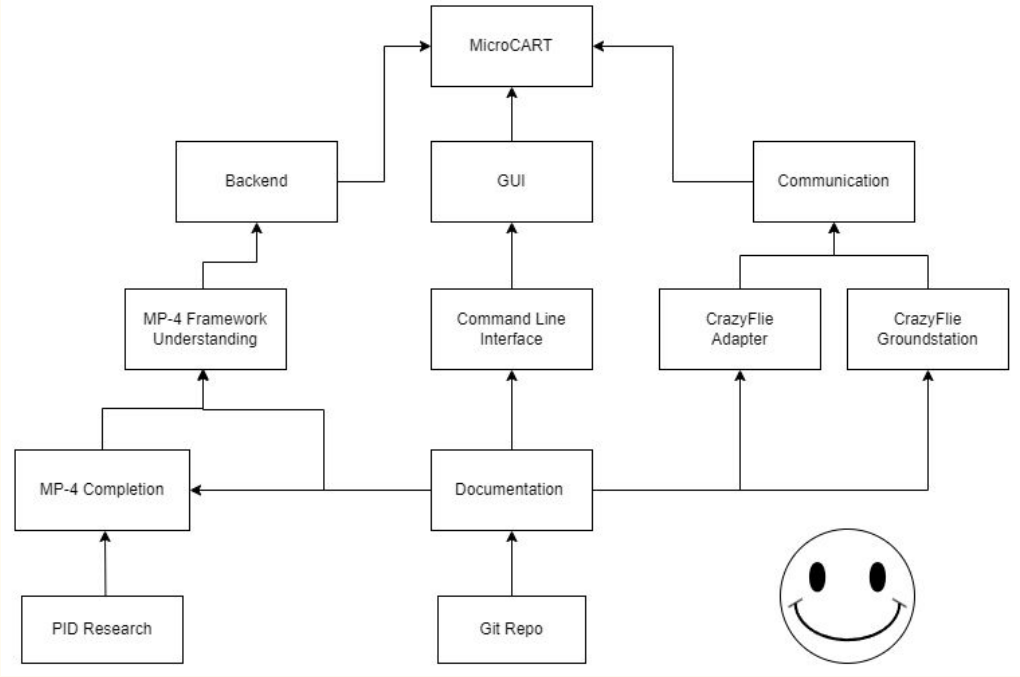
Project Management Style: Waterfall & AGILE

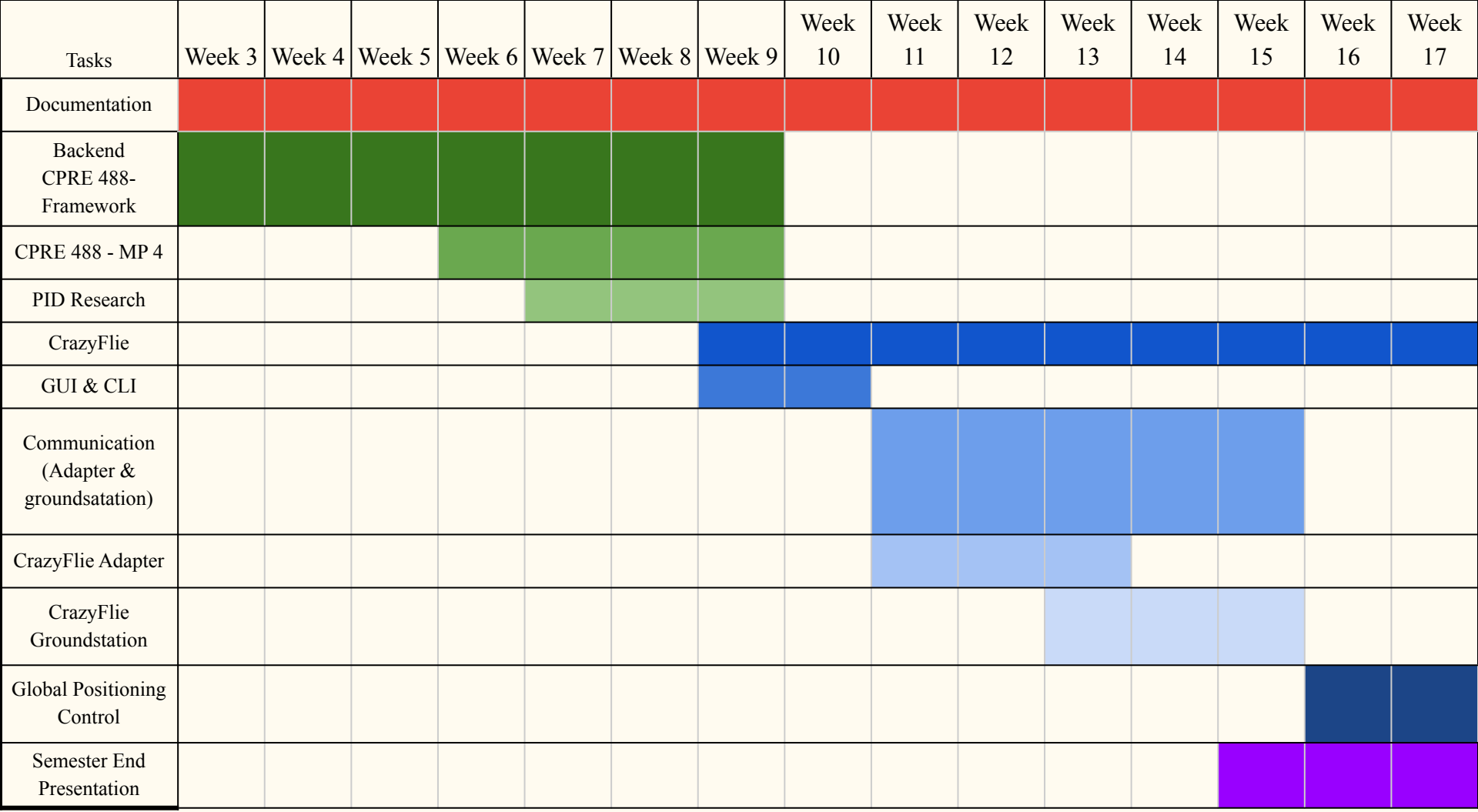
- Waterfall: Breaking down project into different phases to guide the general path of rest of the project
  - MP4
  - Backend
  - Frontend
- AGILE: Style we utilize to work on the different phases



Task Breakdown

- Documentation
- Backend
  - Framework
  - Ground Station
  - Adapter
- Frontend
  - Command-Line Interface
  - GUI

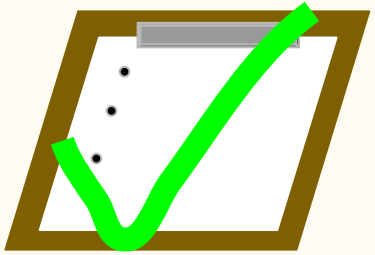



Tasks
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Week 13
Week 14
Week 15
Week 16
Week 17
Documentation
Backend CPRE 488- Framework
CPRE 488 - MP 4
PID Research
CrazyFlie
GUI & CLI
Communication (Adapter & groundsatation)
CrazyFlie Adapter
CrazyFlie Groundstation
Global Positioning Control
Semester End Presentation

Milestones

- MP4 - A CPR E 488 Lab that utilizes mini quadcopters known as CrazyFlies
- CrazyFlie
  - GUI and CLI (Graphical User Interface and Command Line Interface)
  - Adapter & Groundstation cooperation
  - Global Positioning Control

Evaluation Criteria



- No major issues occur with the hardware or software of CrazyFlies during CPRE 488 MP4 labs.
- Students should be able to complete the labs effortlessly with the new tutorials and documentations.
- Documentation should concisely and clearly describe the situation for different user groups as needed. Information should be organized such that when there are questions, it will be known where to look for answers.

Key Risks

- CrazyFlie quadcopters unable to be utilized as lab equipment when CPRE 488 MP4 starts
- Software contains bugs that can crash while drone in use

Mitigation Strategies

- Create a CrazyFlie status spreadsheet to keep track of the health conditions of each quadcopter
- Make sure to test all quadcopters to ensure health conditions are updated before CPR E 488's labs begin
- Go through extensive testing of software to find bugs or errors
- Utilize past FAQs to prevent or solve issues, and record new issues inside an FAQ for future students and groups

Conclusions

- We have to create the lab materials for next years CPRE 488 class
- Keep documentation and quadcopter statuses up to date to ensure CPRE 488 have a good experience with the MP-4 lab
- Perform extensive testing of software with the drones to find any bugs

Works Cited

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