

Development Plan

Mechatronics Engineering

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Table 1: Revision History

Date	Developer(s)	Change
26/Sep/2022	Michaela Schnull	Initial Release

Table 2: Acronyms

Acronym	Description
API	Application Programming Interface
CAD	Computer Aided Design
CI	Continuous Integration
LiDAR	Light Detection And Ranging
POC	Proof of Concept
ony PR	Pull Request
UI	User Interface
UX	User Experience

1 Introduction

3D scanning is a versatile technology that is used across many industries, but its uses are often limited by high cost and complexity. LiDart aims to build a low cost, simple to use 3D scanning robot. A software suite will process data obtained from the robot and provide a user interface. LiDart's end product will be a wheel based mobile robot with all required sensors on-board that can be connected to over WiFi.

2 Team Meeting Plan

Weekly meetings will take place in H.G. Thode Library of Science and Engineering. During in-person meetings, our group will review issues tracked on the GitHub project board and identify actions to be taken. The frequency of meetings is subject to change depending the needs of the project.

3 Team Communication Plan

The team will use instant messaging for items that require and urgent response. Communication will also occur through GitHub using issues. Users will be tagged in issues that require their attention. All team members members may schedule meetings to address specific issues.

4 Team Member Roles and Responsibilities

4.1 Jonathan Casella

- Development and implementation of computer vision algorithms
- Development and implementation of localization algorithms
- Creation of a user application that displays the scanning data

4.2 Kareem Elmokattaf

- Development of the controls software for the robot
- Development and implementation of localization algorithms
- Interfacing of hardware and software systems
- UI/UX design of a user application that displays the scanning data

4.3 Michaela Schnull

- Electrical design of the robot, including the creation of electrical schematics to document electrical design
- Interfacing of hardware and software systems
- Project management activities, including maintenance of the project board on GitHub, budgeting, scheduling, and acting as the team liaison

4.4 Neeraj Ahluwalia

- Mechanical design of the robot, including the creation of CAD models
- Interfacing of electrical components in the mechanical design
- Marketing activities, including logo design and video presentations

5 Workflow Plan

5.1 GitHub Development Workflow

The workflow depicted in Figure 1 will be followed throughout the development process. This workflow supports CI and issue tracking through GitHub. Commits should be frequent and have descriptive messages.

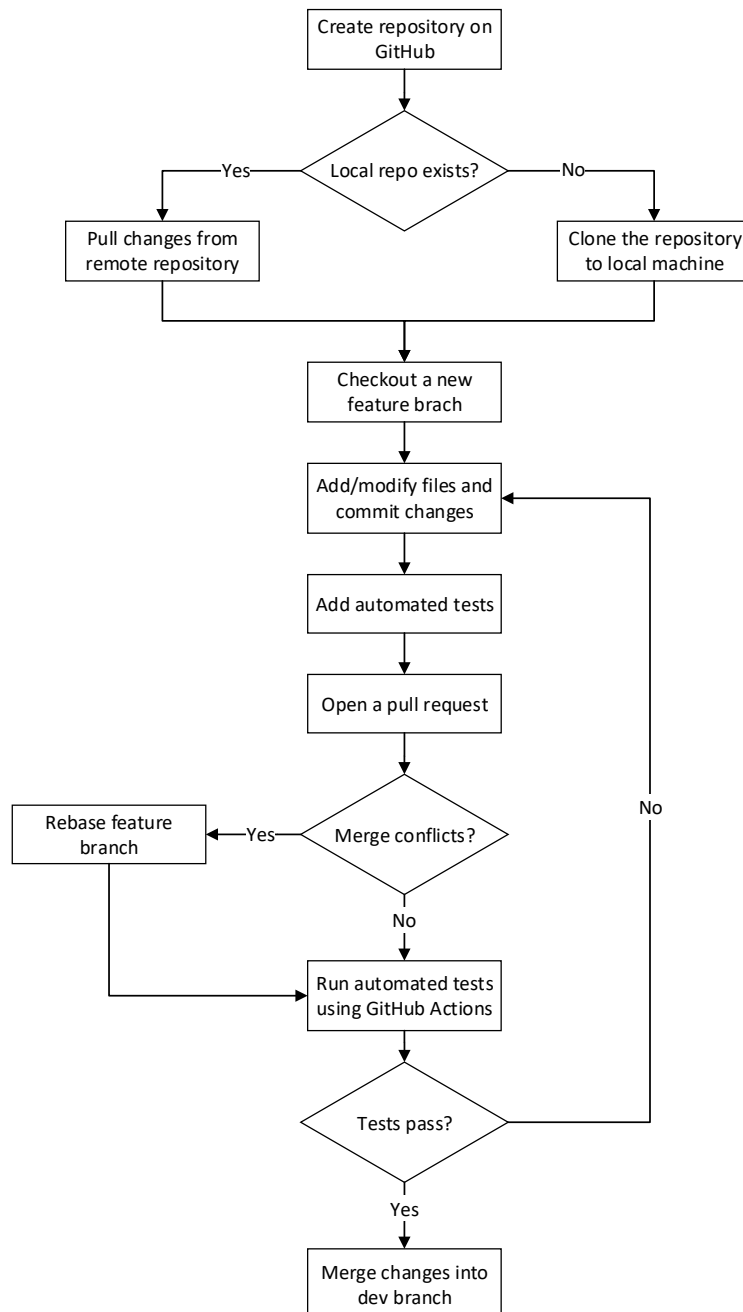


Figure 1: GitHub Development Workflow

7 Technology

- Autodesk Inventor: CAD tool used to develop and model the mechanical design of the robot
- AutoCAD Electrical: CAD tool used to create electrical schematics
- Autodesk EAGLE: CAD tool used to design printed circuit boards
- Rust: High performance, low-level programming language ideal for embedded systems with built-in unit-testing
- Rustfmt: Lint tool designed for the Rust programming language
- OpenGL: API used to render scanning data
- OpenCV: Real-time computer vision library
- AprilTags: Visual marker system designed for use in robotics and camera calibration
- GitHub: Version control software with tools for CI and project management

8 Coding Standard

The *Rust Style Guide* will be used as a coding standard.

9 Project Scheduling

A Gantt chart will be used for scheduling. Additional tasks will be added as the project progresses.

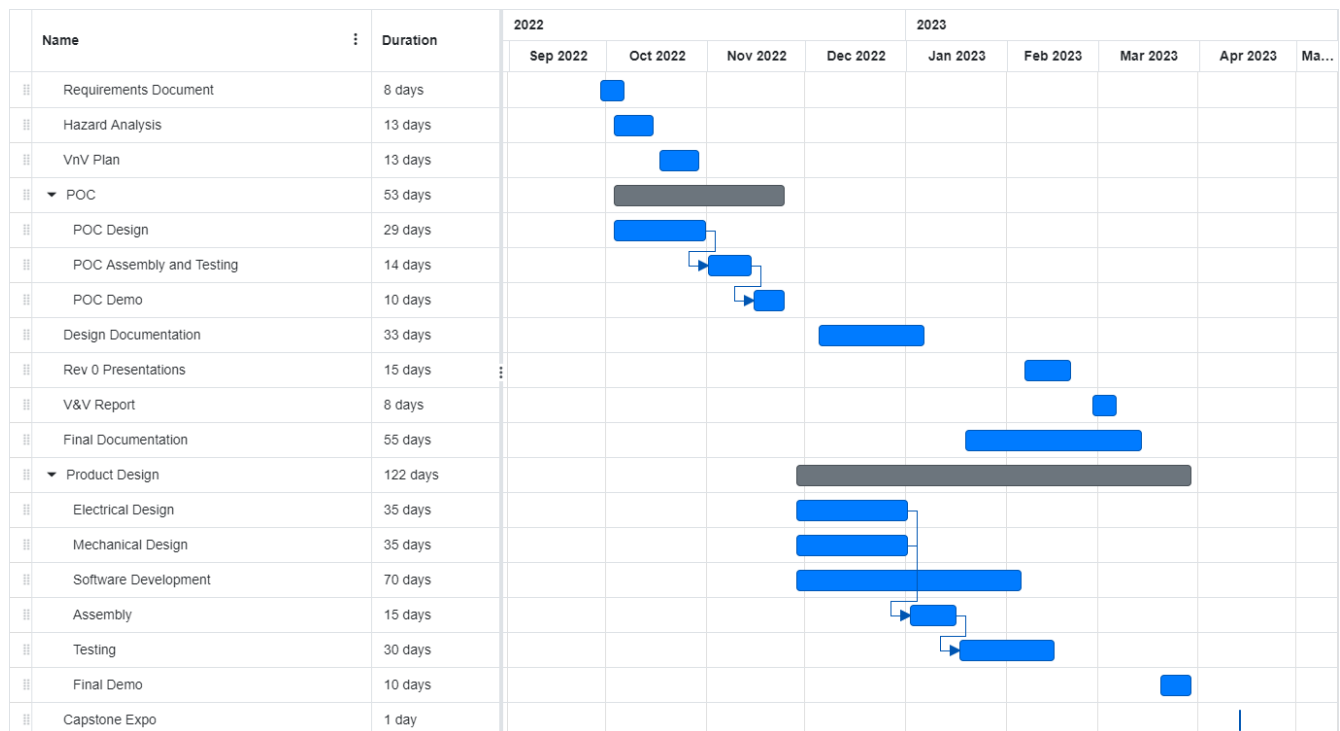


Figure 3: Project Schedule