Work Breakdown Structure

1. **Project Management**
    - 1.1. Jira Project Management Tool
    - 1.2. Work Breakdown Structure (WBS)
    - 1.3. Roles & Responsibility Matrix
    - 1.4. Change Control System
    - 1.5. Meeting minutes and Progress report
2. **Reports / Documentation**
    - 2.1.Team Members and Project Proposal
    - 2.2. Project Proposal Document
        - 2.2.1. Opportunity and Stakeholders
        - 2.2.2. Challenges Goals and Objectives
        - 2.2.3. Solution Overview diagram
        - 2.2.4. Report Outline
    - 2.3.Literature / Market Survey
        - 2.3.1. Domain Expert Interview Findings
        - 2.3.2. Questionnaire for Technical Feasibility and Risk Assessment
        - 2.3.3. Brainstorming diagram
        - 2.3.4. Academic Research Review
        - 2.3.5. Gap analysis summary
        - 2.3.6. Technology Landscape
            - 2.3.6.1. SWOT analysis
        - 2.3.7. Questionnaire for Selecting tools and techniques
        - 2.3.8. Specialization - 4 courses series from Coursera
    - 2.4. Requirement Analysis
        - 2.4.1. Problem Scenarios
        - 2.4.2. Requirement Elicitation
        - 2.4.3. Questionnaire for gathering requirements
        - 2.4.4. Functional Requirements
        - 2.4.5. Non-Functional Requirement
        - 2.4.6. Inspection Report

2.4.7. Software requirement specification artifact

2.5. System Design

2.5.1. Architecture Diagram

2.5.2. Use Case Diagram

2.5.3. Detail Use Cases

2.5.4. Activity Diagrams

2.5.5. System Sequence Diagram

2.6. Implementation

2.6.1. Components and Libraries

2.7. Testing and Performance Evaluation

2.7.1. Test Scenarios

2.8.Conclusion & Outlook

2.8.1. Future Recommendations

2.9.Progress Presentation

2.9.1. Slides outlining project progress

2.9.2. Updated Artifacts of part 1

2.9.2.1.Appendix-A: Software Requirements Specifications (SRS)

2.9.2.2.Appendix-B: Design Documents

2.9.2.3.Appendix-C: Coding Standards/Conventions

2.9.2.4.Appendix-D: Test Scenarios

2.9.2.5.Appendix-E: Work Breakdown Structure

2.9.2.6.Appendix-F: Roles & Responsibility Matrix

2.9.3. Answers to potential questions report

2.10. Final Presentation part 2

2.10.1. Comprehensive Slides for presentation

2.10.2. Working software system (Complete)

2.10.3. Updated Artifacts (Complete)

2.10.3.1. Appendix-A: Software Requirements Specifications (SRS)

2.10.3.2. Appendix-B: Design Documents

2.10.3.3. Appendix-C: Coding Standards/Conventions

2.10.3.4. Appendix-D: Test Scenarios

2.10.3.5. Appendix-E: Work Breakdown Structure

2.10.3.6. Appendix-F: Roles & Responsibility Matrix

2.10.4. Final Report

3. System

3.1. Development Environment

3.1.1. IDE

3.1.1.1. Visual Studio Code

3.1.1.2. PyCharm

3.1.2. Version Control

3.1.2.1.Git Hub

3.1.3. Environment Management

3.1.3.1. Anaconda Distribution

3.2.Simulation Environment Setup

3.2.1. CARLA Simulator

3.2.1.1. Carlaviz for CARLA Visualization

3.2.2. ROS Noetic Configured

3.2.3. CARLA-ROS Bridge Integrated

3.2.4. Vehicle spawn module

3.2.5. Sensor spawn module

3.2.6. Destroy Vehicle module

3.3. Path Planning component

3.3.1. Map Reading module

3.3.2. Graph of Roads

3.3.3. Graph of Lanes

3.3.4. List of Driving Lanes within map

3.3.5. Route Calculation module

3.3.6. Algorithm implementation module

3.3.7. Global route planner module

3.3.8. Axis Translation module

3.3.9. Local route planner module

3.3.10. Environment Analysis module

3.3.11. Trajectory Generation module

3.3.12. Junction handling module

3.4. Path Following component

3.4.1. Trajectory Tracking module

3.4.2. Basic agent module

3.4.3. Behaviour agent module

3.4.4. Algorithm implementation module

3.4.5. Controller module

3.4.6. Custom Destination module

3.5. Vehicle Control component

3.5.1. Throttle Control module

3.5.2. Braking Control module

3.5.3. Acceleration Control module

3.5.4. Steering Control module

3.5.5. Longitudinal Control module

3.5.6. Lateral Control module

3.5.7. Lane changing module

3.5.8. Jerkiness Control algorithm modules

3.5.9. Rotation and Translation module

3.6. Sensor Integration module

3.6.1. IMU integration sub-module

3.6.2. GPS integration sub-module

3.6.3. Radar integration sub-module

3.6.4. Lidar integration sub-module

3.7. Obstacle Detection

3.7.1. Sensor Fusion module

3.7.1.1. Lidar-Radar Fusion sub-module

3.7.1.2.Multi-sensor Data synchronization sub-module

3.7.2. Sensor Data Processing module

3.7.3. Obstacle Detection module

3.7.3.1. ML based detection sub-module

3.7.4. Distance Estimation module

3.7.5. Object Classification module

3.8. Obstacle Avoidance

3.8.1. Dynamic Obstacle handling module

3.8.2. Static Obstacle handling module

3.8.3. Path Adjustment module

3.8.3.1. Map based planning sub-module

3.8.3.2. Graph based planning sub-module

3.8.4. Trajectory Estimation module

3.8.5. Maneuver Planning module

3.8.5.1. Environmental evaluation sub- module

3.8.5.2. Lane changes sub-module

3.8.5.3. Decelerate sub-module

3.8.5.4. Emergency Stop sub-module

3.8.6. Real-time Response module

3.8.7. Tracking module

3.8.7.1. Kalman filter sub-module

3.8.7.2. Particle filter sub-module

4. Open House

1.1 Event Part 1

4.1.1. Standee Design

4.1.2. Printed Standee

4.1.3. Printed Broachers

4.1.4. Pre-recorded Demo video

4.2. Event Part 2

4.2.1. Standee Design

4.2.2. Printed Standee

4.2.3. Printed Broachers

4.2.4. Full Working Software