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COMP3000 Computing Project
2023/2024

Project Title
Predictive Analytics for Space Mission Operations

Links
Source code: https://github.com/JMY22/COMP3000

Project Vision
For Researchers in the field of space mission operations and satellite systems.

Whose need would be to predict and analyse space mission outcomes and optimise satellite resources ensuring successful missions.

The “SpaceOps Predictive analytics system”

Is a machine learning software solution

That uses historical mission data and satellite imagery to do the following:

- Predict satellite orbits and collisions.
- Optimise resource allocation for different missions.
- Monitor satellite health and detect anomalies.
- Forecasting weather events for mission planning.

Risk Plan
Potential risks include:

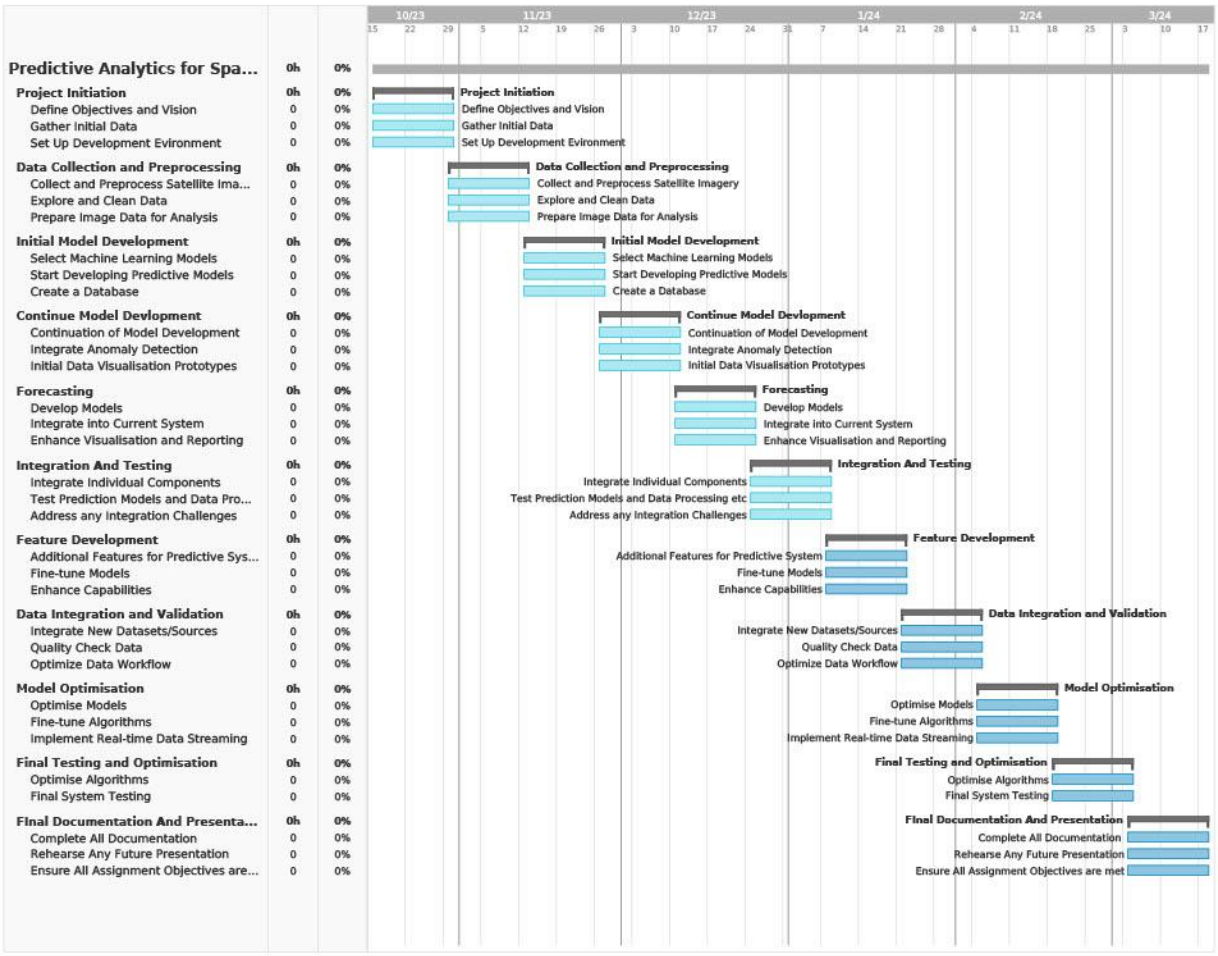
Data Availability: Insufficient or unreliable data for predictive analytics.
Solution: Obtain open data from reliable sources, collaborate with agencies, utilise simulations if the data is limited.

Technical Challenges: Complex machine learning models and image processing.
Solution: Extensive research, consultation with knowledgeable lecturers/experts, consistent code review.

Integration Challenge: The challenge of integrating predictive learning models into mission operations.
Solution: Ongoing and consistent testing (iteration testing) ensuring I make small gradual changes based on the insights I get.

Uncontrolled Project Scope: Expanding the project beyond the initial objectives I set myself.
Solution: Adhere to my project objectives and gant chart strictly and continuously review my progress to ensure I stick to what I am focusing upon.

Proposed Gantt chart *(Please Zoom in)*



Keywords

Satellite systems, Predictive Analytics, Machine Learning, Forecasting, Optimization, Anomaly Detection, Space Mission operations, Satellite Monitoring. Orbit Prediction and Collision Avoidance.

Software/Languages to be used:
Python, Jupyter Notebook, MySQL, ML frameworks (e.g. PyTorch), MATLAB, Jetbrains toolbox (has pycharm etc...) Data Visualisation tools, GITHUB, Trello and TeamGantt for project management.