Title: Racecar Agent Development Log

1. Agent Overview

The project involved creating a rule-based agent (MyAgent.py) to autonomously drive a simulated racecar using LIDAR sensor data and velocity readings. The agent uses a simple, heuristic-driven decision strategy to choose among discrete actions.

2. Logic Explanation

Direction Logic:

If the front path is obstructed (front < 0.7), the agent turns toward the side with more space.

If the side distances (fleft, fright) are low, it performs side-based avoidance.

If one side (left or right) is significantly more open than the other (by > 0.5), it favors that direction.

Otherwise, it continues straight

Motion Logic:

If the car is too close to any obstacle in front or front-diagonal -> brake

If velocity is low and there is space ahead (front > 1.0) -> accelerate

Otherwise -> coast

3. Testing Results

Ran on all 8 tracks provided.

Track 1:-123.77

Track 2:-123.70

Track 3:-123.52

Track 4:-123.34

Track 5:-125.3

Track 6:- 123.9

Track 7:-123.67

Track 8:-123.26

Best accuracy achieved: 123

Max speed ~0.200, average speed ~0.185.

Stable on most tracks without crashing.

4. Iteration Summary

Version	Change Made	Result
V1	Basic turning with no braking logic	Frequent Crashes
V2	Added motion control (brake/accelerate)	Became stable, accuracy ~90+
V3	Tuned LIDAR thresholds + velocity logic	Reached 123 accuracy
V4+	Over-tuned margin thresholds (>0.5)	Accuracy dropped
Final	Balanced turning (+-0.5), motion tuned	Best overall performance (123)

5. Future Improvements

Dynamic Thresholding: Adjust LIDAR thresholds based on speed or lap number.

Smarter Decision Making: Replace rule-based logic with a Q-learning agent.

Map Awareness: Use pre-learned features per track to improve decisions.

6. File Structure

MyAgent.py | Final rule-based agent implementation

Development.pdf | Design log with logic, test results, and tuning summary

No MyData used | Not a learning agent, no training data required

7. Final Submission

Push the following files to your GitHub repo:

MyAgent.py

Development.pdf