

# Autonomous Racer

DSI-830 Capstone: Grant Moe

# Outline

Summary

Data

Models

Results

Analysis

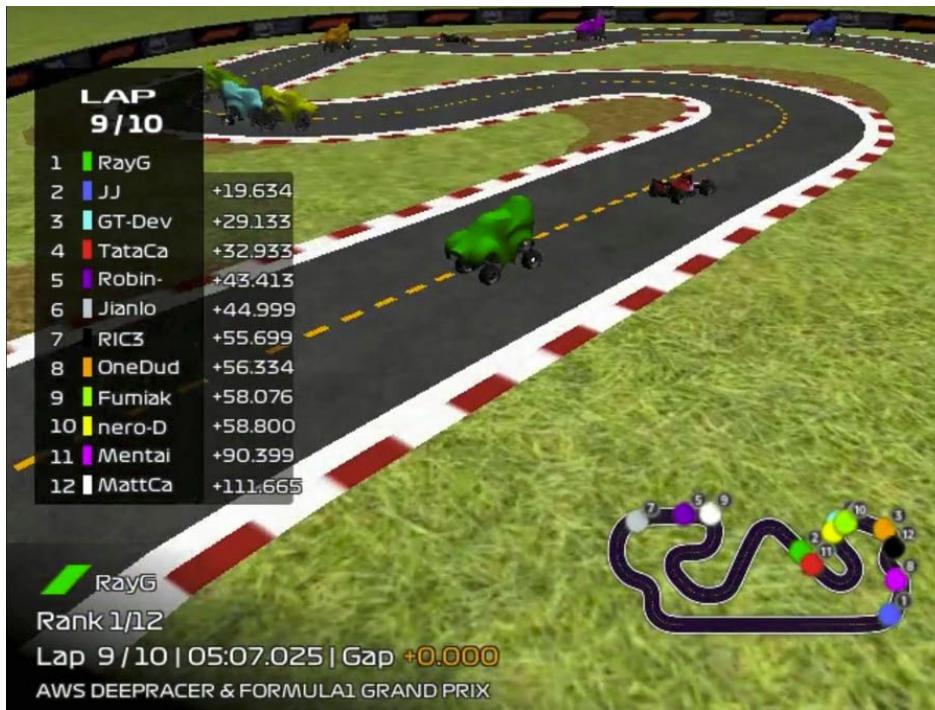
Conclusion/Recommendations

# Autonomous Races





# Autonomous Races - Online!



# Goals

(gotta go fast)

1. Racing model
2. Tuned model
3. Alternatives if time
4. Race online?

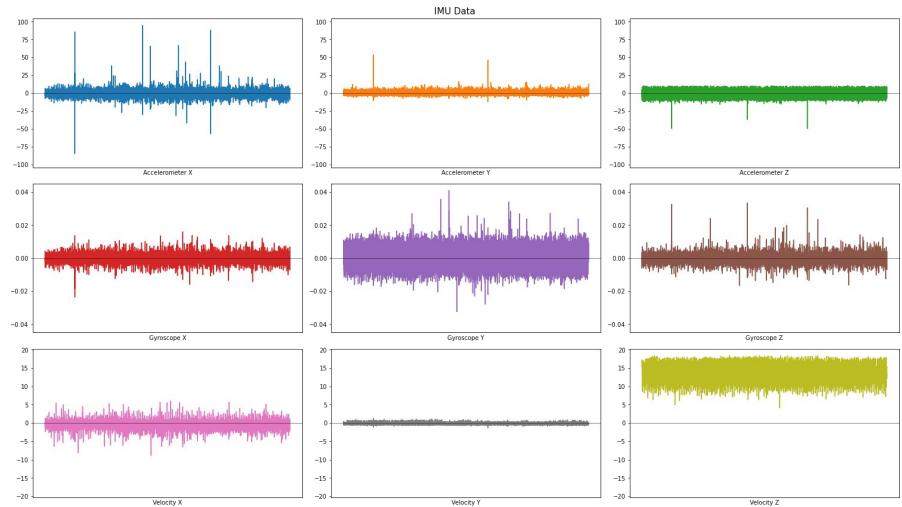
# Method

(go fast)

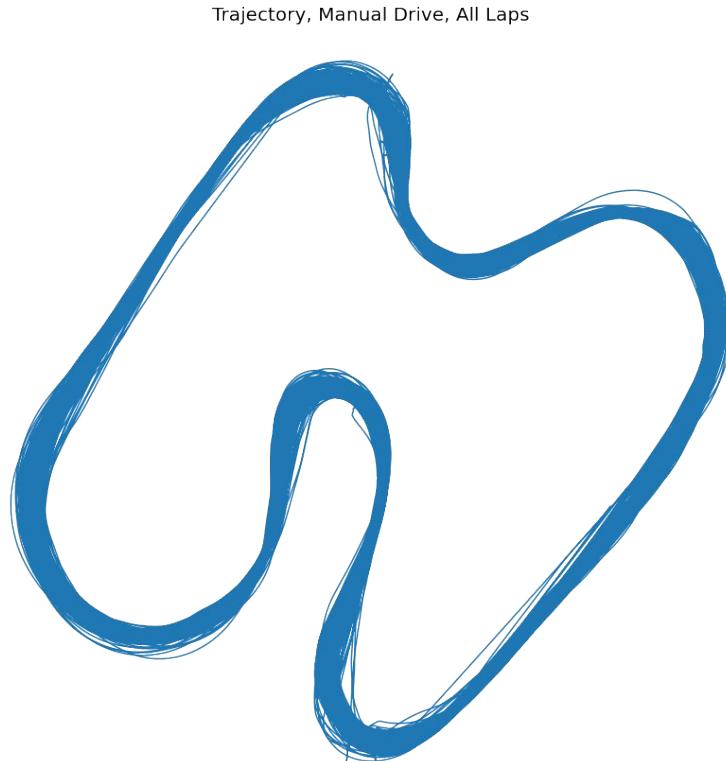
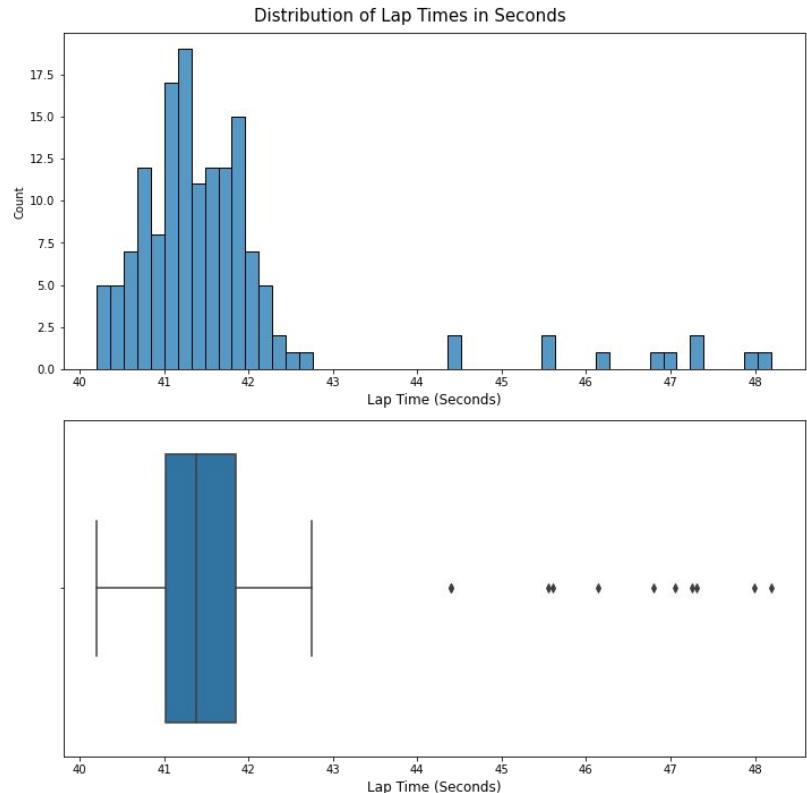
1. Record manual drive
2. Train model on data
3. Save model
4. Predict throttle/steer



# Data

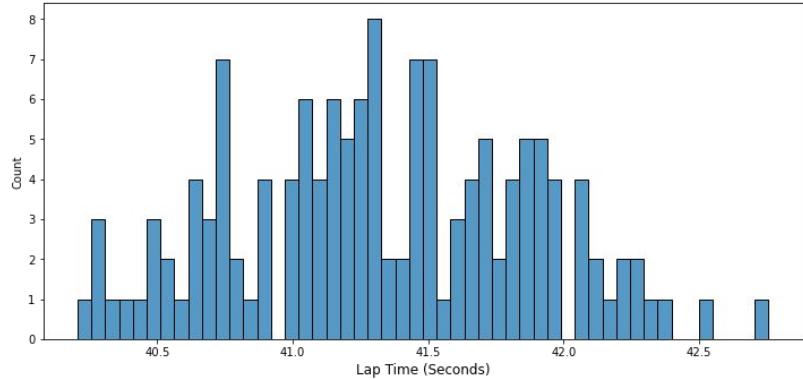


# Data Prep

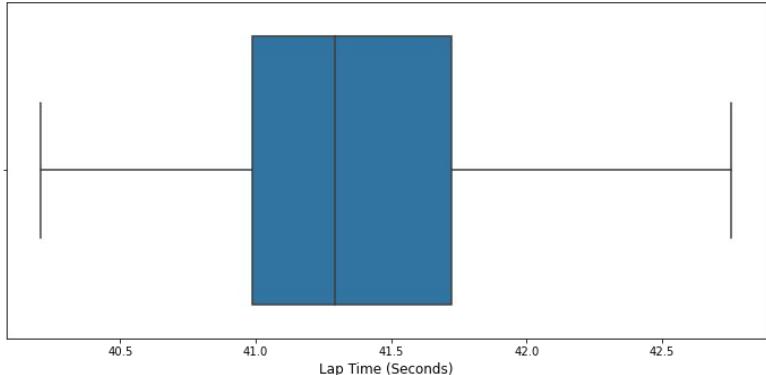
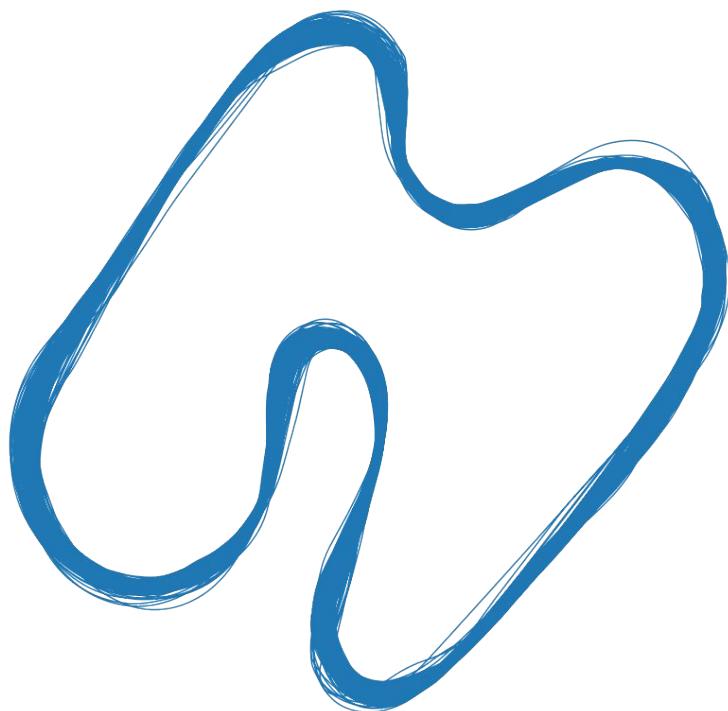


# Data Prep

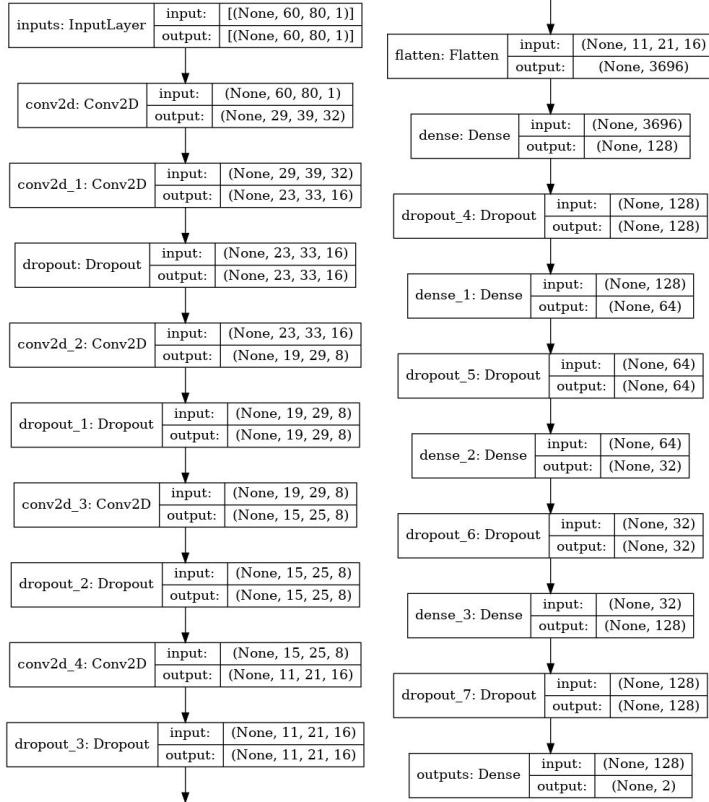
Distribution of Lap Times in Seconds



Trajectory, Manual Drive, Laps Under 43 Seconds



# My Model



# Donkey Model

StandardScaler, MinMaxScaler

Output layers: 1 vs 2 parallel

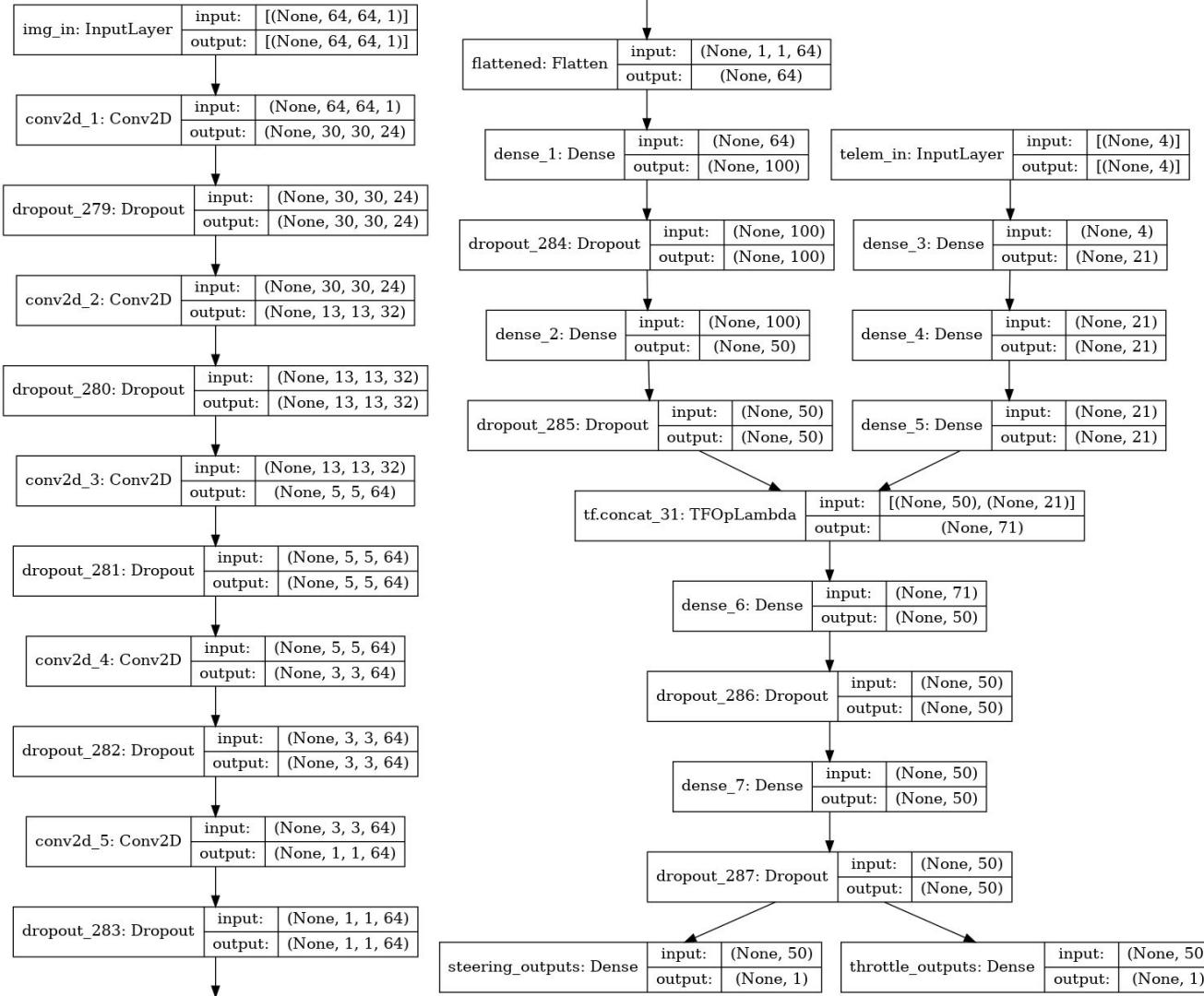
Batch size:

32, 64, 128, 256, 512, 1024, 2048

Telemetry:

Speed, Pitch, Yaw, Roll, Progress

Position X, Y



# Donkey Model

StandardScaler, MinMaxScaler

Output layers: 1 vs 2 parallel

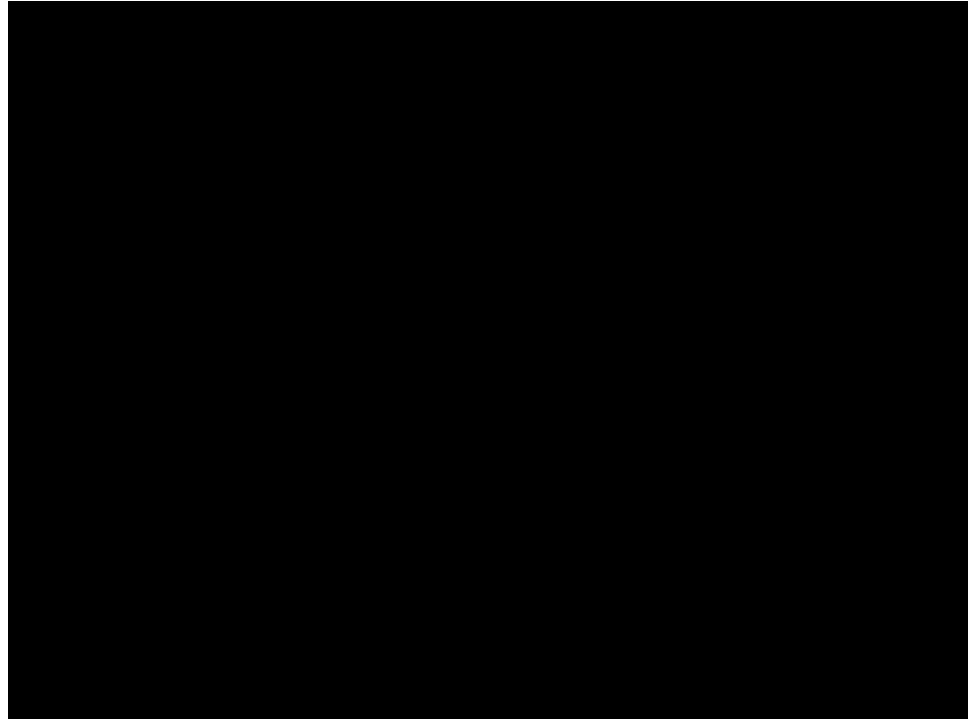
Batch size:

32, 64, 128, 256, 512, 1024, 2048

Telemetry:

Speed, Pitch, Yaw, Roll, Progress

Position X, Y



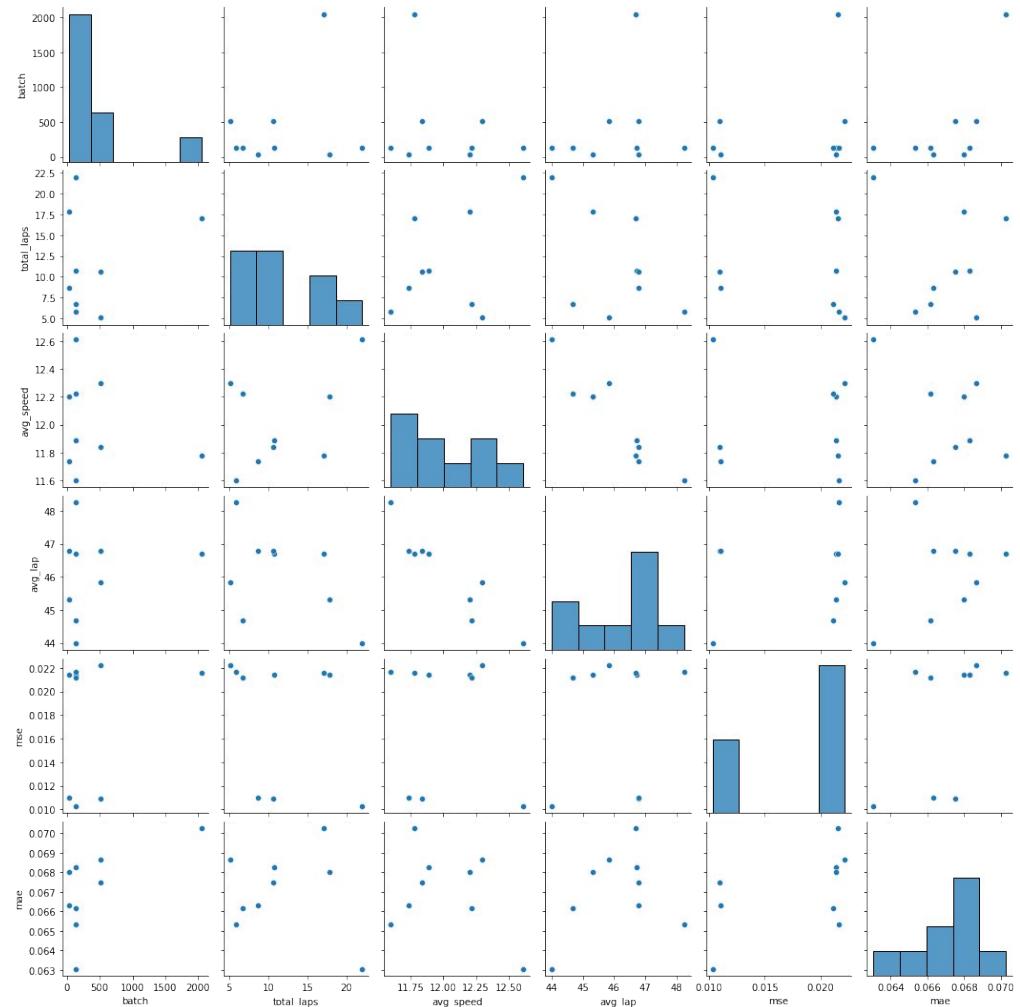
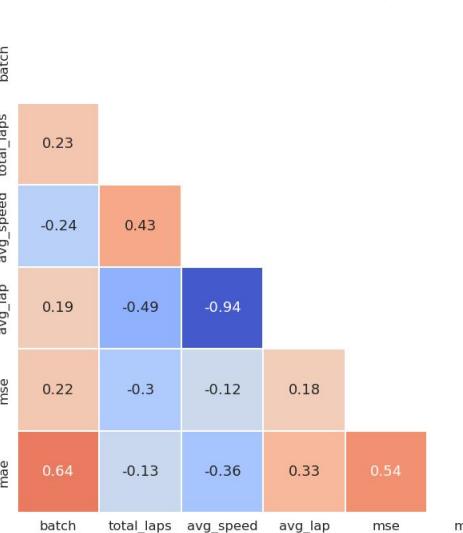
# Results

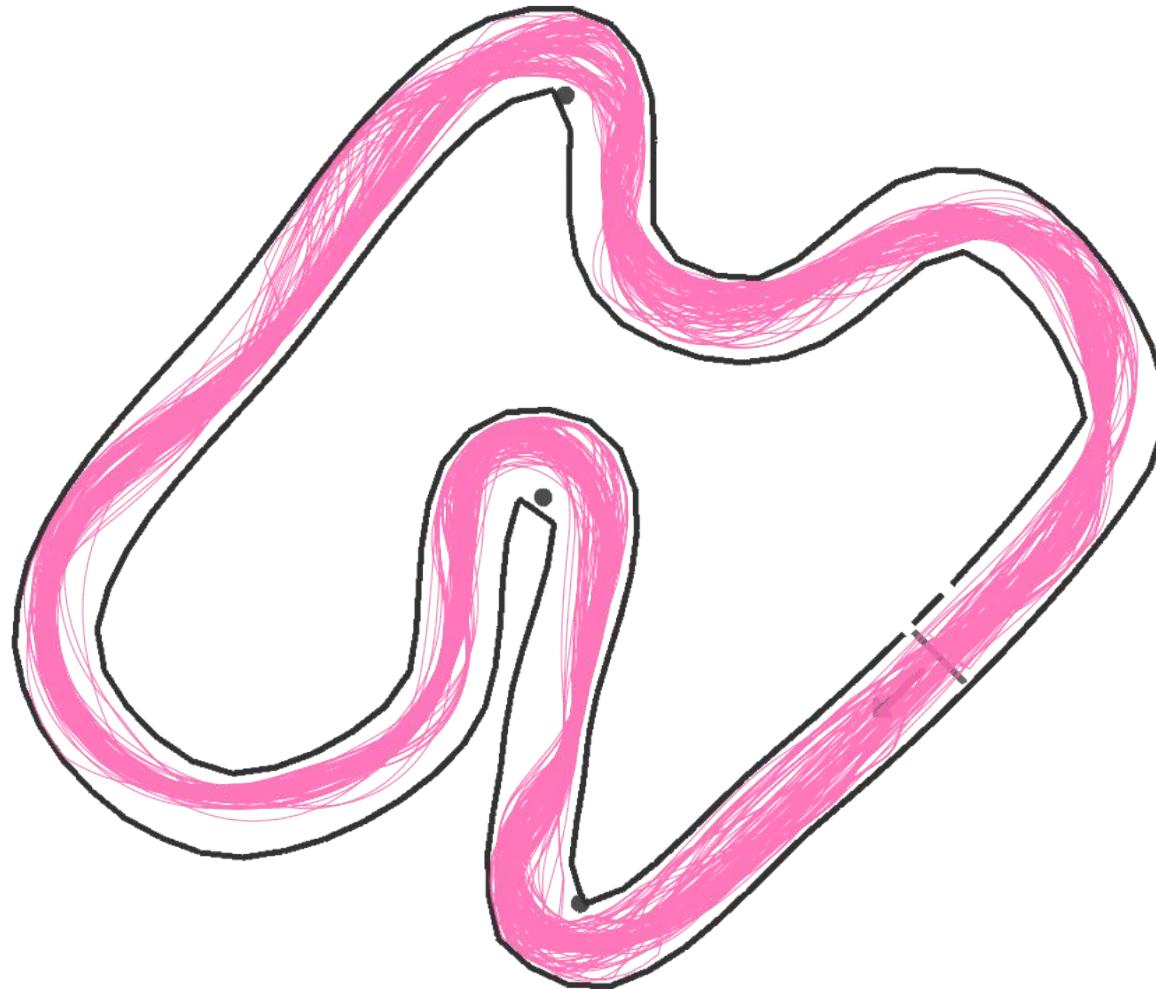
190 Models Trained

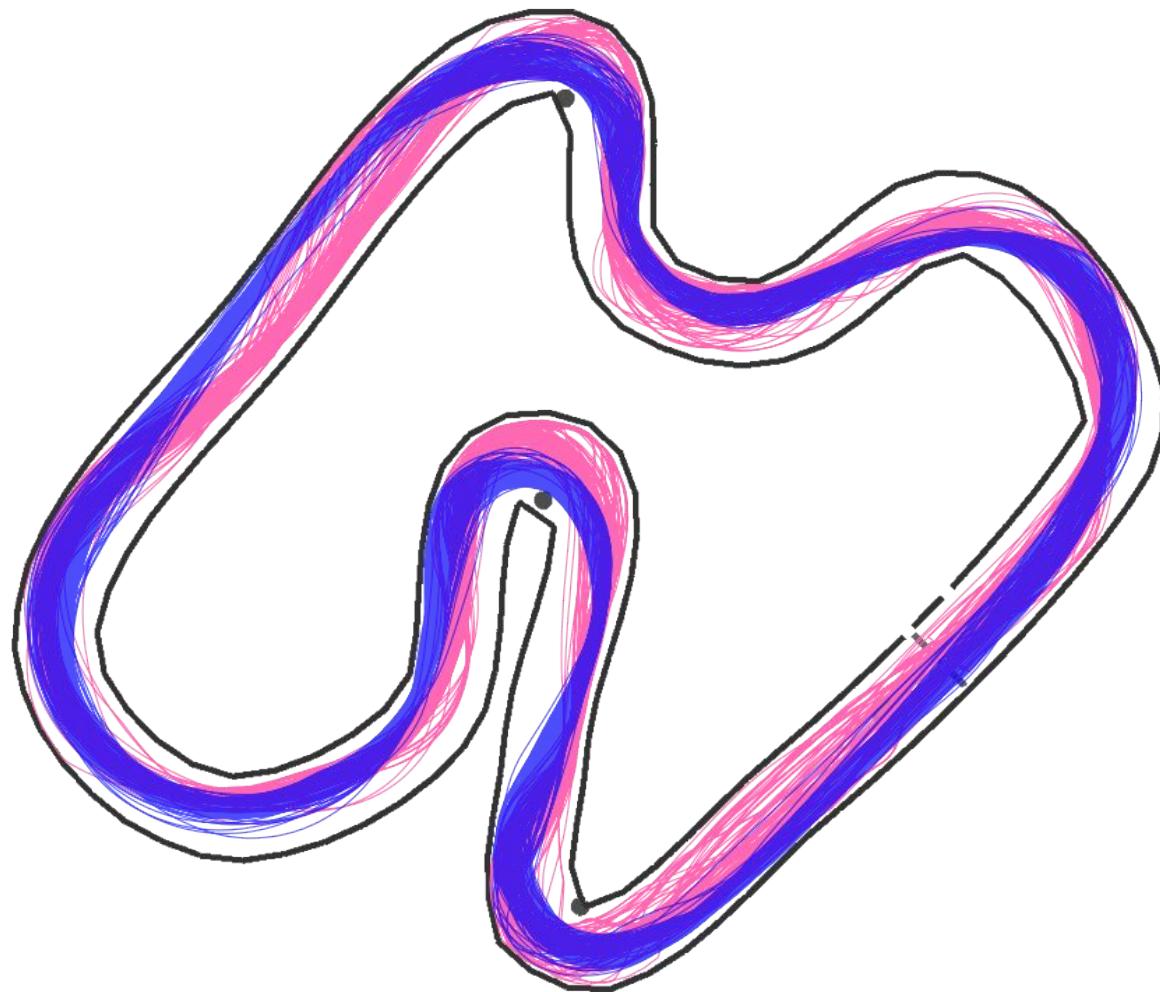
12 “Successful”

9 Successful, actually

Correlation Heatmap

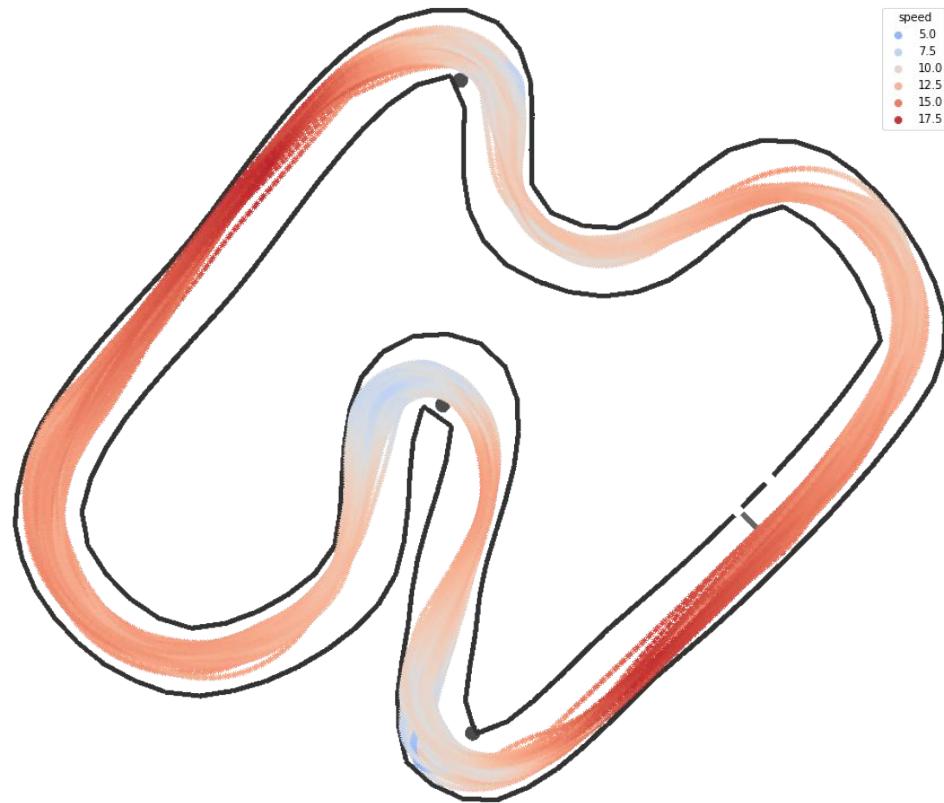
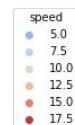




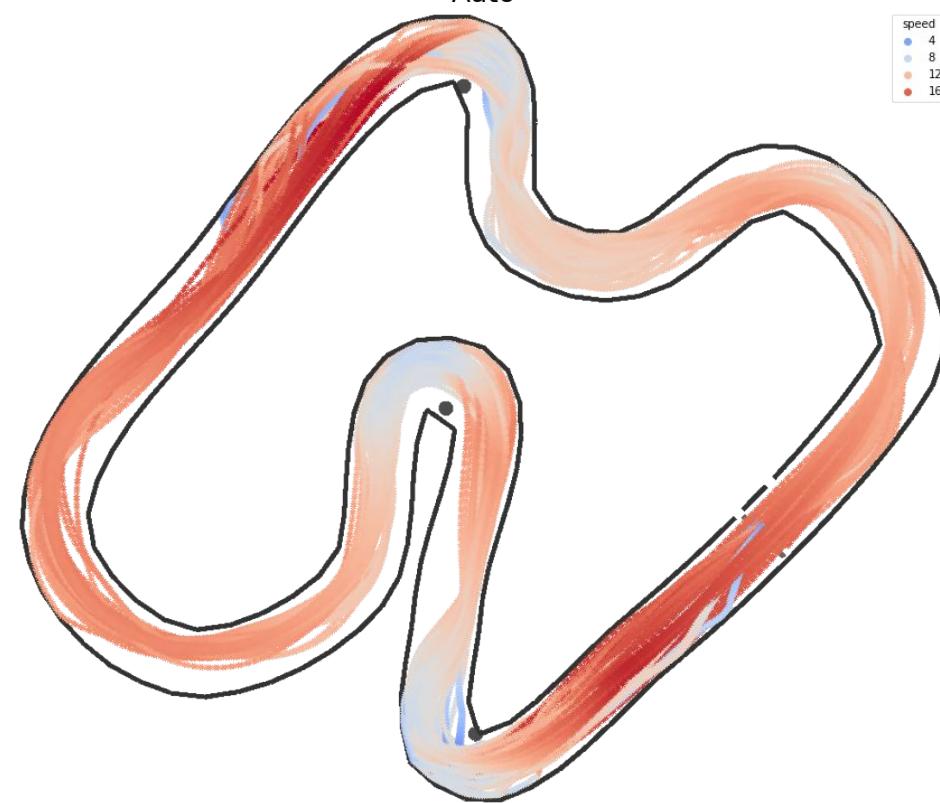


# Speed

Manual

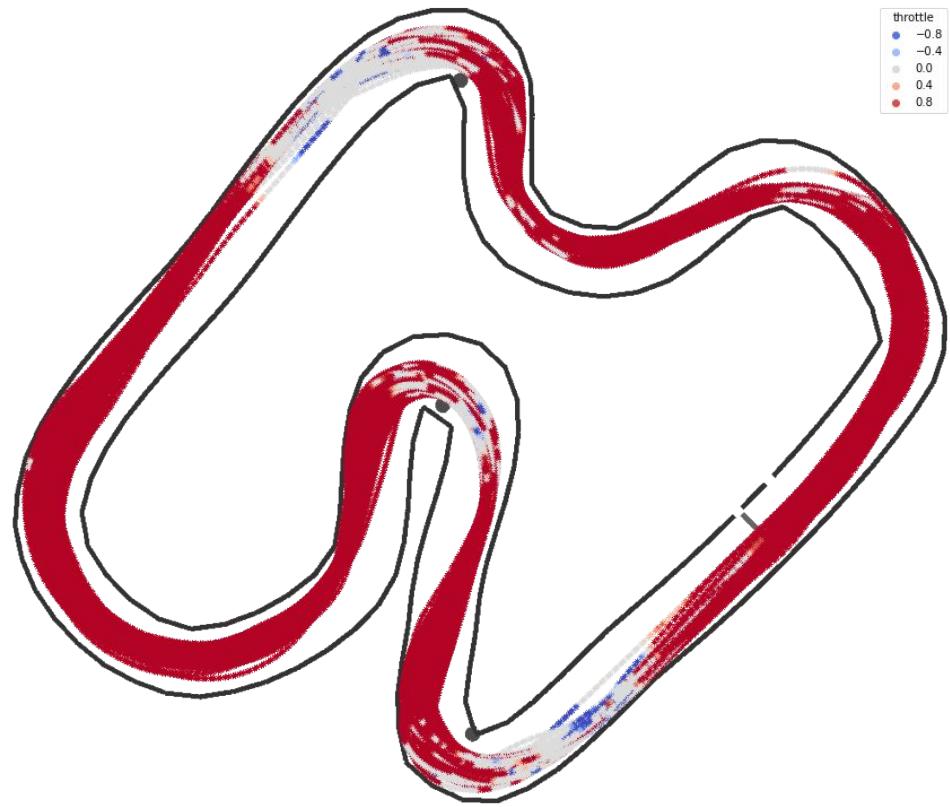
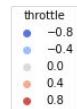


Auto

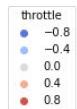


# Throttle

Manual



Auto



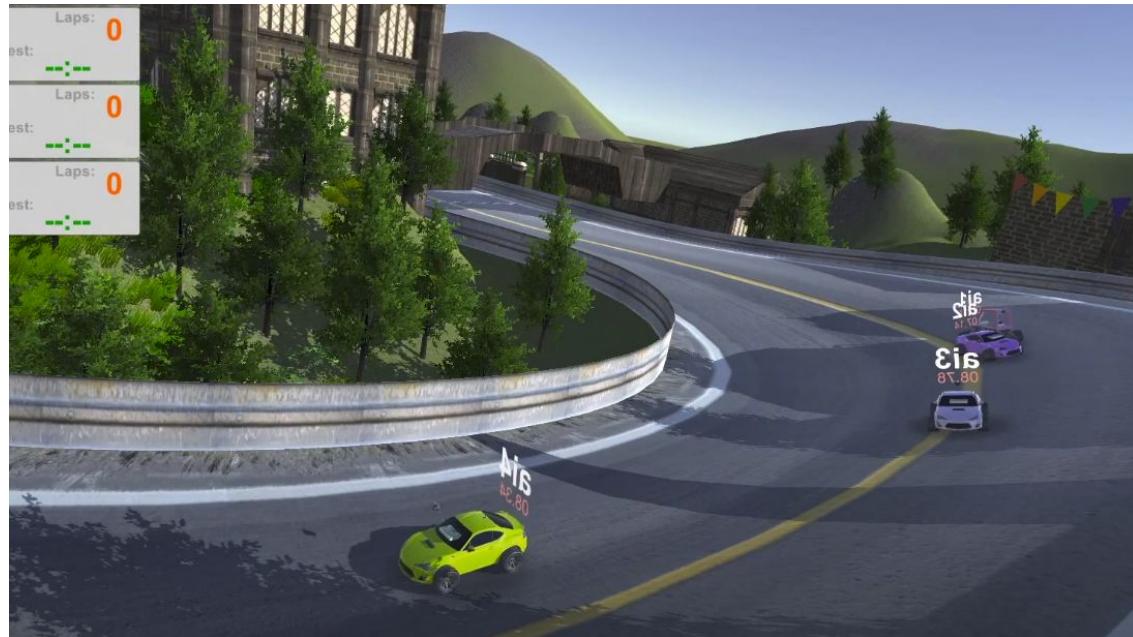
# Analysis

Speed: Too much.

Track: Bad?

Better tracks: Exist!

Other models: Better models?



# CONCLUSION:

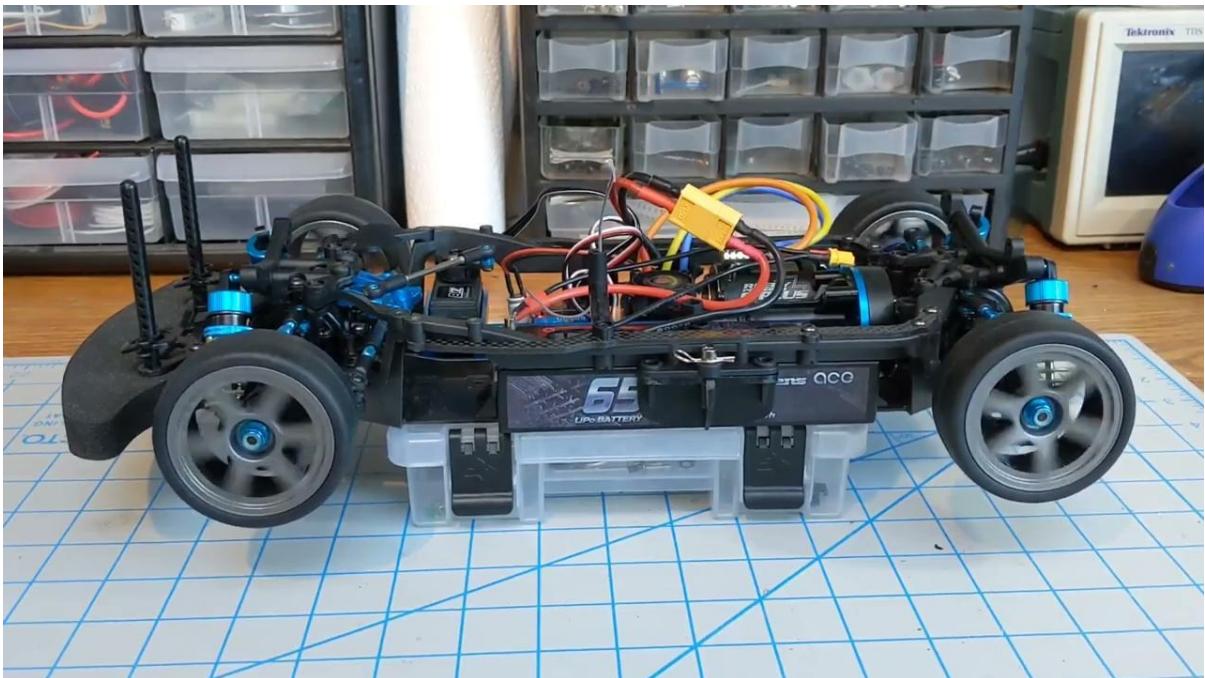
Autonomy is hard.

# Future Work

Keep it up!

Use your tools.

Jump to real life?



Thank you!

