SuperLap Racing Line Optimization System

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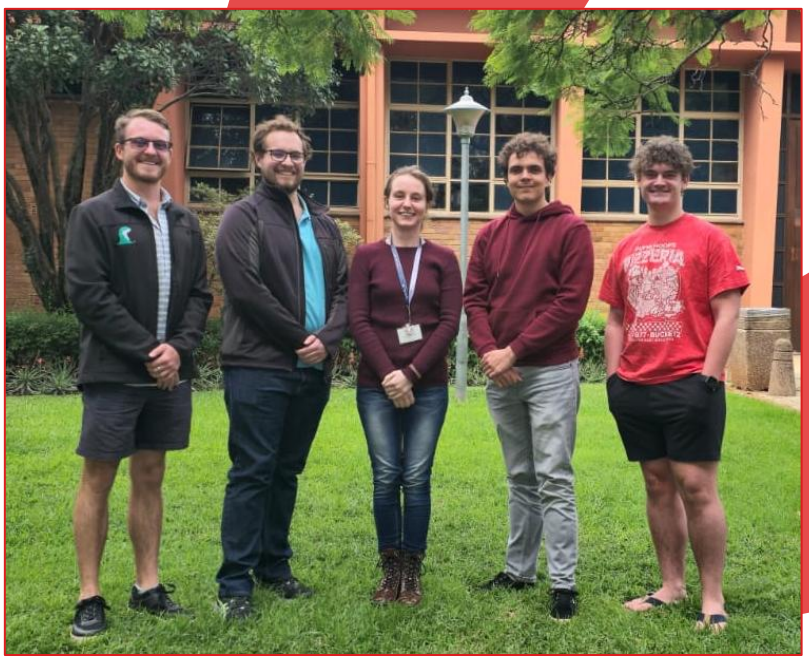

Quintessential

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1. Introduction

The **SuperLap Racing Line Optimizer User Manual** is designed for racers, coaches, and enthusiasts who want to improve their performance on track using AI-powered insights. This manual provides step-by-step guidance on how to install, set up, and use the application. It covers uploading racetrack images, running the optimizer, interpreting the results, and troubleshooting common issues.

The document assumes no deep technical knowledge. If you can use standard desktop applications, you can use SuperLap. Whether you are a beginner rider looking to learn proper racing lines, a coach providing structured training, or a sim racing enthusiast aiming to optimize your performance, this manual will guide you through the process of making the most out of the system.

2. Who can benefit from our system

The **SuperLap Racing Line Optimizer** is designed to assist a wide range of motorsport participants and learners:

Amateur & Hobbyist Racers

- Riders attending track days who want to reduce lap times and understand track dynamics without expensive telemetry systems.

Motorsport Coaches & Instructors

- Professionals who can use AI-generated racing lines and braking points to enhance student training with data-driven insights.

Sim Racing Enthusiasts

- Competitive gamers who wish to import in-game tracks, optimize their racing strategies, and gain a competitive edge in online leagues.

Professional Racing Teams (Privateers/Small Teams)

- Cost-conscious teams looking for affordable tools to validate race strategies, test different conditions (wet/dry), and supplement limited telemetry data.

Engineering & Motorsport Students

- Learners exploring reinforcement learning, racing dynamics, and vehicle physics for academic or research purposes.

In short, anyone with an interest in racing – whether on real circuits, in simulation, or in academic research – can benefit from SuperLap's ability to provide accurate, AI-driven race line insights.

3. Requirements

Minimum PC Requirements

Component	*Requirement*
Operating System	Windows 11
CPU	Intel Core i5
RAM	8GB

4. Getting Started

Please ensure your system meets the recommended minimum requirements before attempting to set up the system.

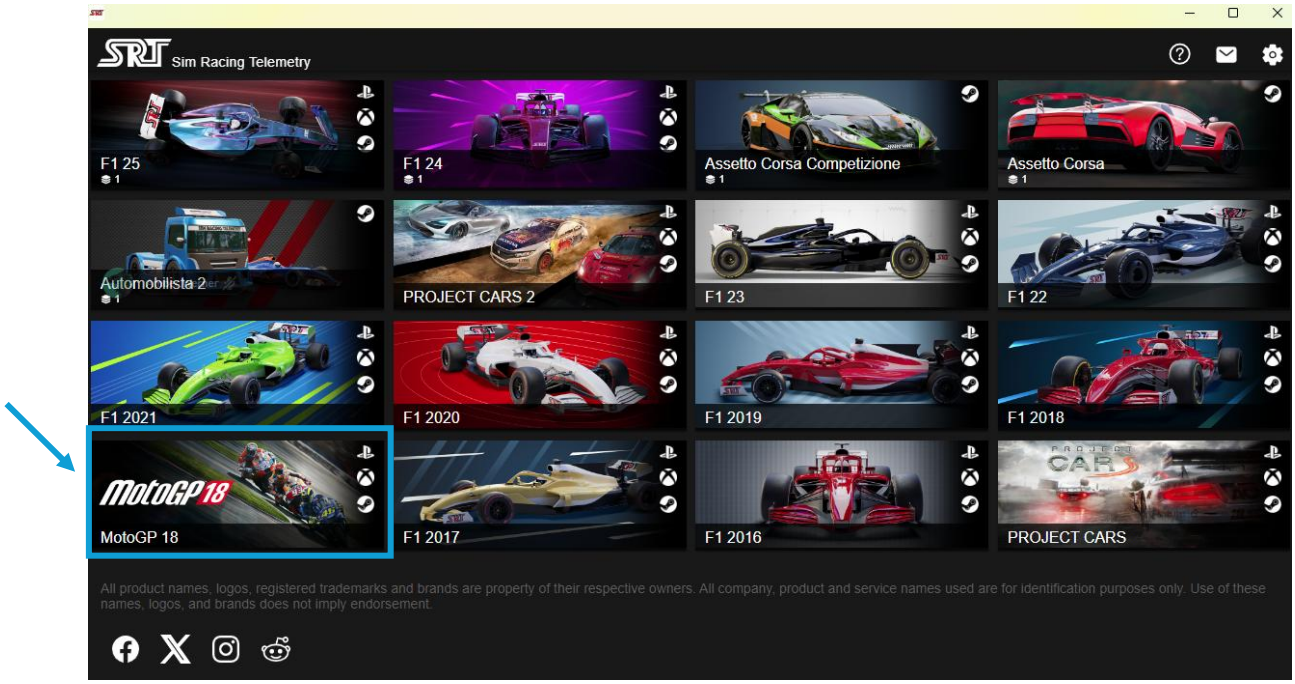
Step 0: You will need the following external systems to use the "Wow factors" of our application – which is game integration. Both are from Steam.

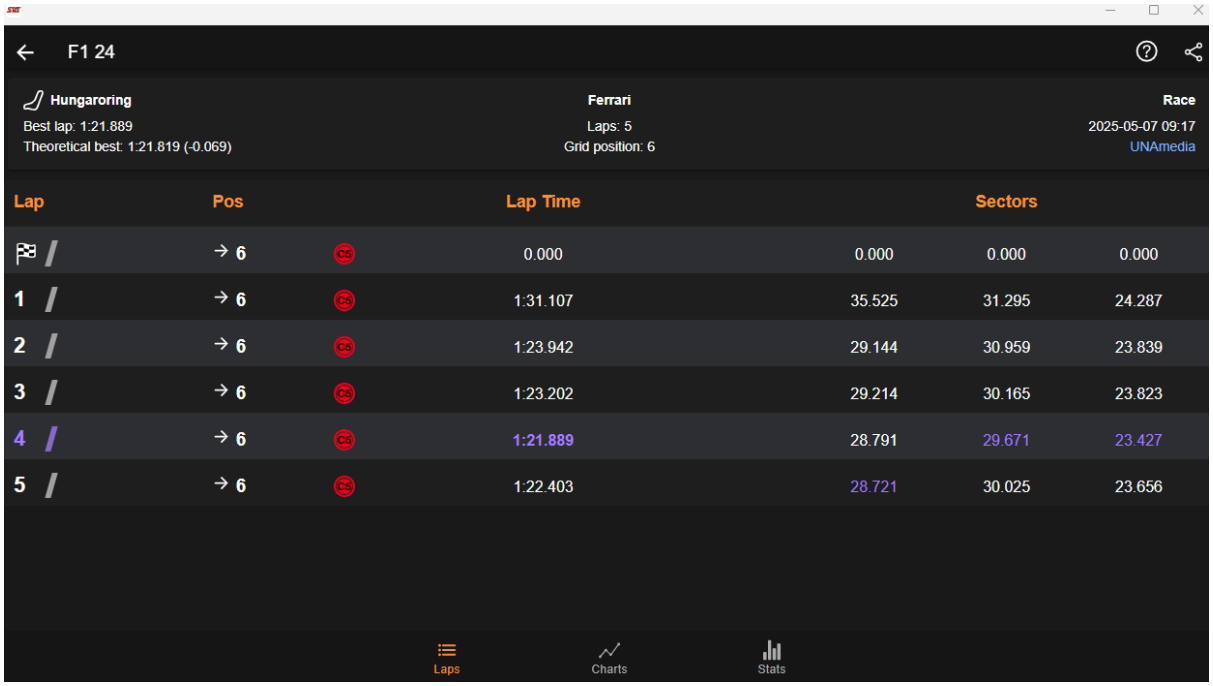
MotoGp18: https://store.steampowered.com/app/775900/MotoGP18/

Sim Racing Telemetry:

https://store.steampowered.com/app/845210/Sim_Racing_Telemetry/

Now you can launch Sim Racing Telemetry (SRT). In SRT select the MotoGP18 tile. It will prompt you to get the DLC. Please get the DLC.





Now you will be able to record laps and export them to CSV files. These can then be imported into our software.

Step 1: Follow this link to our website(https://cos301-se-2025.github.io/SuperLap/).

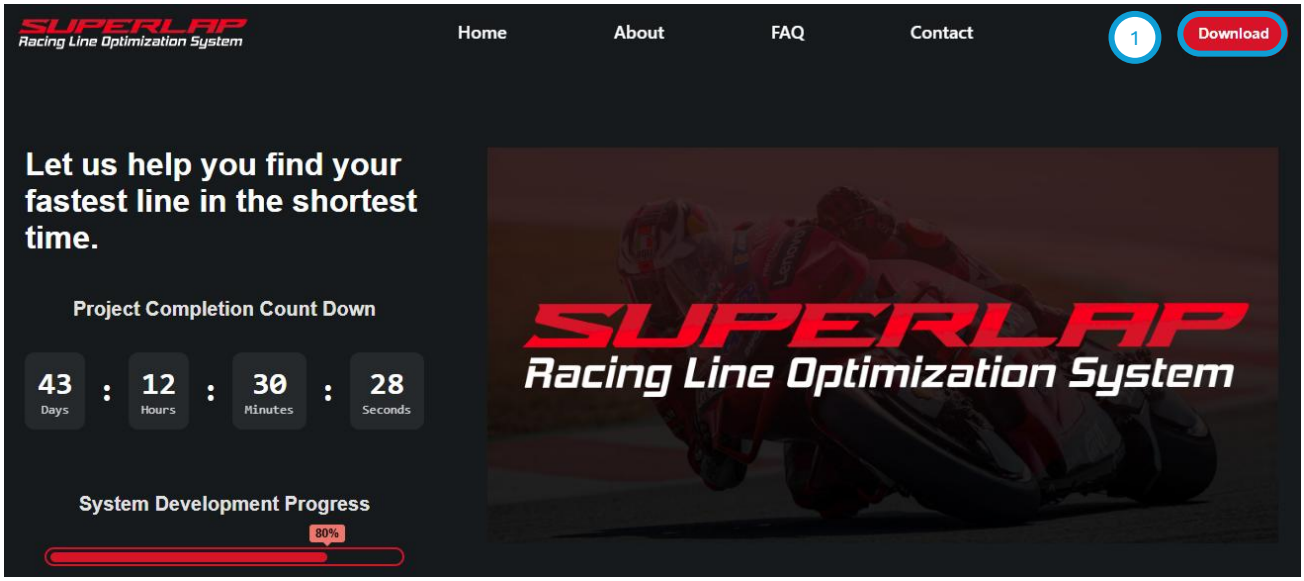
Step 2: Once there you will see a **Download** button in the top right of the webpage. Click on this button to download the application onto your computer. This may take a few minutes.

Step 3: Once the application has been downloaded, double click on the EXE file to run the downloaded file.

Step 4: The *Superlap Raceline Optimizer* Wizard will open in a new window, and the installation will begin immediately. Please wait while the files are installed onto your device.

Step 5: Once the installation is complete click on FINISH to complete the installation.

Once the application is running simply click through each of the onscreen prompts to install the system onto your device.



5. Using The Application

Step 6: Once the application has been installed and started up you will see a log in and quit button. Click on the login button.

Step 7: Login if you already have an account with Superlap. If you do not have a login, then click on the register button to create one.

Step 8: While on the “Dashboard” page a user is able to up load a track image from their device. Once an image has been selected, the user must select on “Choose Image” button.

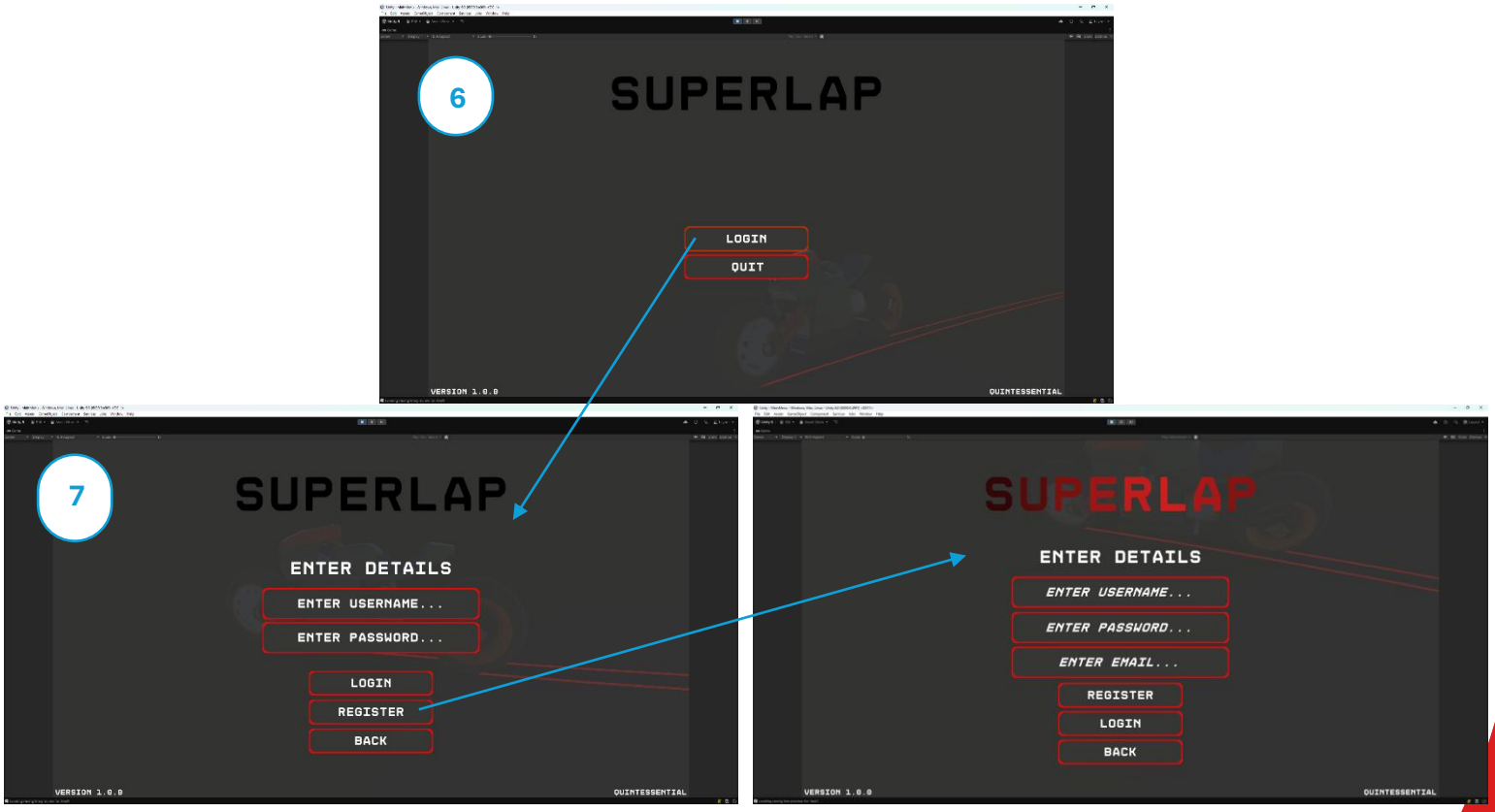
Step 9: After an image has been selected, it is uploaded to the backend of the system. First the Image processor takes the image and calculate the outer and inner bounds of

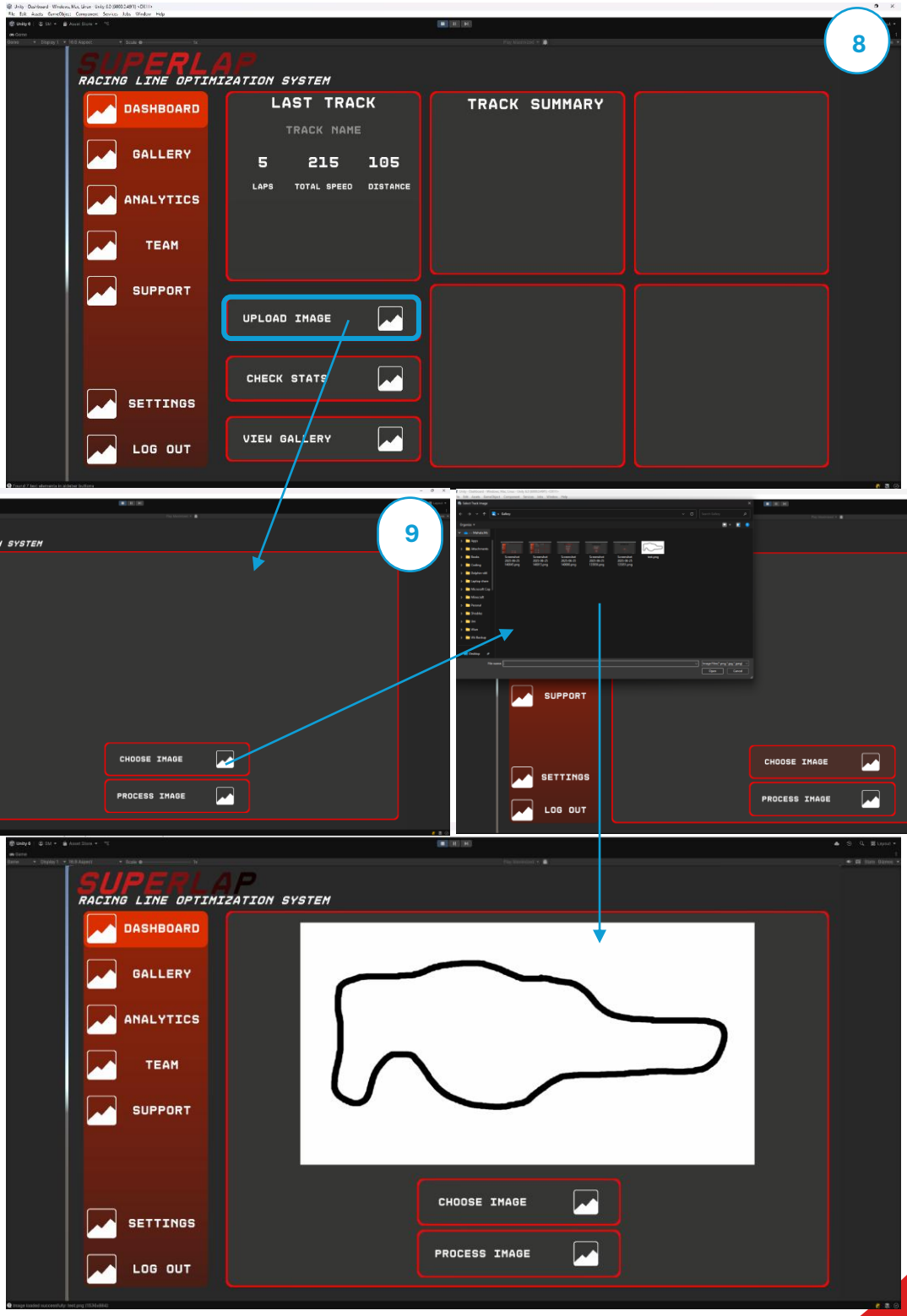
the track. These parameters are then passed into the Raceline Optimizer which uses a partial swarm algorithm to calculate the best track for that specific line.

Step 10: Once the system has analysed the track, it will display a track with red and blue line, the red line is the outer bounds of the track, while the blue is the inner bounds of the track. The green line, is the best path for the rider to follow around this specific track.

Support Page ("Help Page")

This page has some common issues that some might run into when running our system. It also has an FAQ and contact link for interested users.

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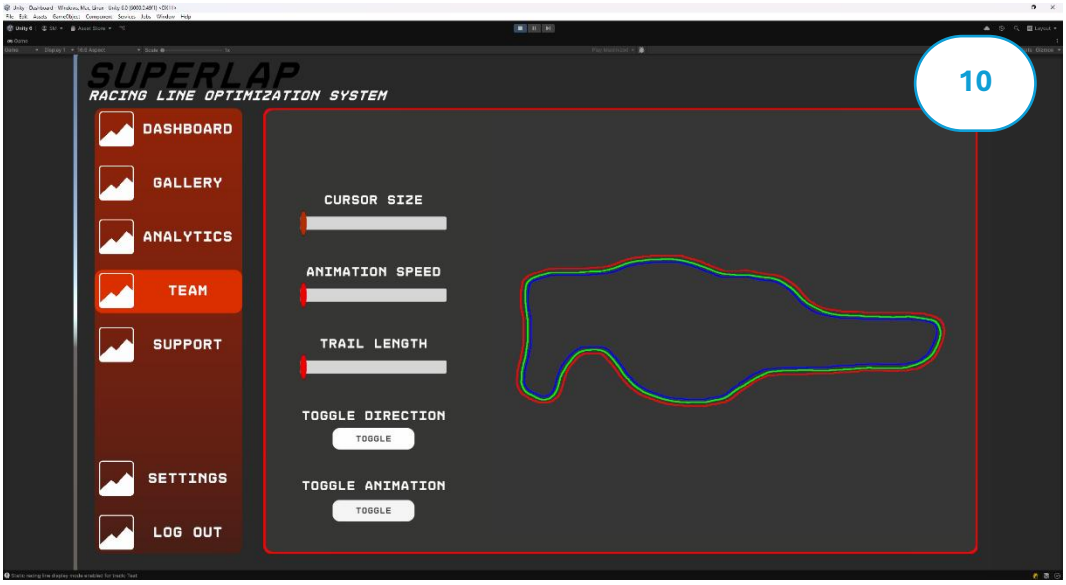
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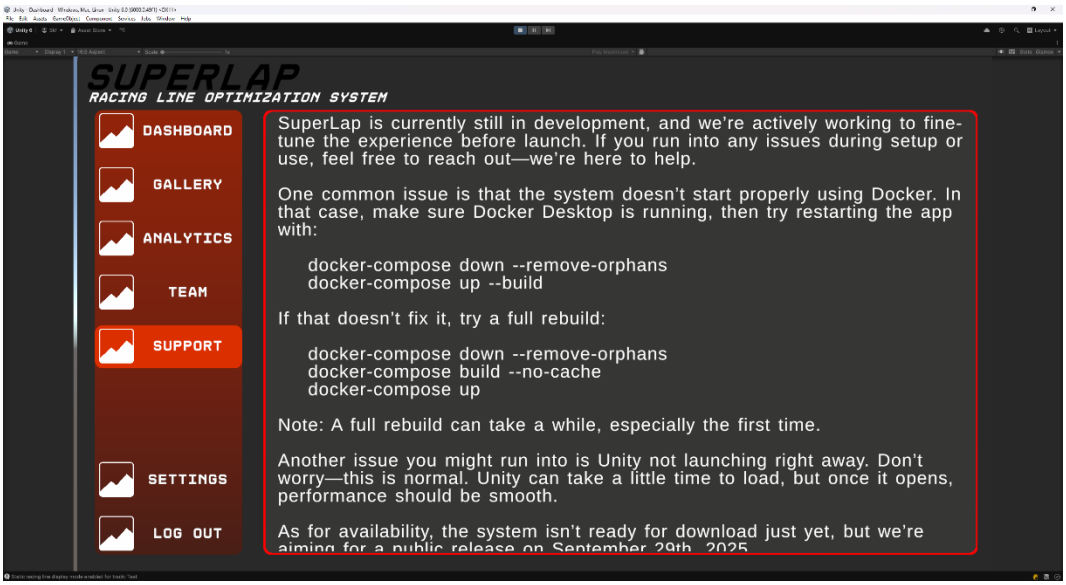
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SuperLap is currently still in development, and we're actively working to fine-tune the experience before launch. If you run into any issues during setup or use, feel free to reach out—we're here to help.
One common issue is that the system doesn't start properly using Docker. In that case, make sure Docker Desktop is running, then try restarting the app with:
docker-compose down --remove-orphans
docker-compose up --build
If that doesn't fix it, try a full rebuild:
docker-compose down --remove-orphans
docker-compose build --no-cache
docker-compose up
Note: A full rebuild can take a while, especially the first time.
Another issue you might run into is Unity not launching right away. Don't worry—this is normal. Unity can take a little time to load, but once it opens, performance should be smooth.
As for availability, the system isn't ready for download just yet, but we're aiming for a public release on September 29th, 2025.

6. Recommendations

Be patient while the system is being installed and starting up. It does take a while for the PSO to run to extract the optimum line from the track, this is done to ensure that the results are as accurate as possible.

7. Frequently asked Questions

Does this system work with other racing sims?

No. Our system has been specifically designed to work with MotoGP 18.

Does the system work with roadways?

No. Our system has been designed to work with racetracks specifically.

Troubleshooting

- You cannot log into the system?
  - Ensure that it is running first.
- You can't upload an image?
  - Ensure the system is still running and has not crashed.

Contact or Support Info

Please send any issues you may experience to our email at:

ctprojectteam3@gmail.com

8. Flow Diagram of System