

Initial Plan

2D racing game with a focus on oversteer/drift physics

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Project Overview

The game will be single player racing game with a top down 2D view. The gameplay would focus on drifting a car and racking up the highest score given for drifting as well as extra objectives such as collecting “coins”, hitting a bonus points zone, comboing drifts etc. The selling point of it would be realistic driving physics while still being fun while drifting.

Driving Physics

Using a 2D perspective, while saving my time, poses a problem of translating car physics from 3D to 2D. Cars are complex and I will probably have to simplify certain mechanics to fit the 2D representation and to be able to finish it within the given time scale.

The plan is to achieve realistic powertrain physics, with different torque at different engine RPMs, clutch control etc. As well as realistic suspension/tyre physics where suspension alignment, tyre type or steering angle will affect how the car handles. On top of that I will also have to simulate weight of the car including momentum and weight transfer onto each tyre. Type of the surface, wet/dry tarmac or grass, will also have effect on the cars handling.

I also plan to introduce drivetrain and suspension tuning so that the variation between different setups can be felt.

The game will have gamepad support as it will allow better control over the car. Triggers and thumbsticks on the gamepad are analogue signal, as opposed to fully binary keyboard, which allows for a better control of the throttle, brake and steering.

Gameplay

Real drift competitions have two drivers going up against each other being judged by 3 judges or so. I've never seen any done this way in a video game and I believe it's mainly due to lack of instant feedback to the player as well as subjectivity of it therefore we need a different approach.

Therefore I turned to the classic game approach where the driver is awarded points based on the drifts themselves as well as extra objectives. The points for the drifts will be awarded based on speed, angle and length of the drift. Joining drifts together will also increase the point multiplier. I will be adding bonus points zone or racing lines to follow, that will further multiply the drift score, rewarding the driver for taking good lines. Additionally, there will be some type of tokens to collect, or places to wall tap with the rear of your car for extra points. All of this will be stored in a high score leader board.

Tools

The game will be made in PyGame framework in Python. PyGame is 2D game creation framework based on SDL. Initially I thought of making it in 3D but at the same time I wanted to use a simpler framework over a game engine. Creating a game like that without a game engine but DirectPython instead would not be feasible on such timescale for one person.

I will be outsourcing the graphical and sound assets as my art skills are not great and I would rather focus on the mechanics of the game itself.

I also looked into automated testing for games and the only relevant way was to record inputs and playing it back seeing if the variables at the end match. The most amount of testing will be with the different variables for drivetrain and suspension values however due to the differences between different cars/car setups the results will be different every time and I will most likely be doing all the testing by hand. It could come useful when testing collisions for tokens, wall taps or bonus zones.

Project Aims and Objectives

- Realistic drivetrain physics
- Realistic suspension/tyre physics
- Suspension/drivetrain tuning
- Gamepad support
- Choice of multiple levels
- Interesting gameplay elements

Work Plan

Me and my supervisor scheduled weekly meetings, every Friday. On top of that the review meetings are set after my first major milestone which is drivetrain physics. This is a good point to have a review meeting as I will have done some work and figured out whether it is truly feasible in practice. The next review meeting would be during the first week after Easter break. This would allow me to complete the rest of the car physics as well as tuning mechanic. From then I could focus on fleshing out the game and finishing it.

I plan on writing the report as I progress with the program, while also leaving myself a week of buffer at the end to focus solely on the report.

I would start off with the gamepad support first as the game will be based on that. This should be straightforward as it's just mapping gamepad controls to move the sprite, rest of it will be added as I flesh out the physics. Then I would start with powertrain physics as they're simpler than suspension physics and I need them done to test the suspension physics fully. Last part of the car physics component will be tuning. From there I can do the gameplay aspects as well as design the race tracks before polishing the game and testing.

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