

COMP 2003 | Game Design

Document: Driving Simulator

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Overview

General Description

The Interactive Learning Project (ILP) will teach people who have little to no experience in driving the very basics of driving.

ILP Mechanics

It will have simple mechanics:

- [Prototype] Forwards
- [Prototype] Backwards
- [Prototype] WASD | Gradual turning (based on driving wheel movement)

What to teach

The information needed to learn how to safely operate a car will be provided to the user, like what steps you should take when first getting into one, the do's and don'ts, etc.

Levels/Scenarios

Levels

- [Prototype] The first level of the game will teach you the controls of the car.
- The second level will have an informational UI that explains what to look out for when driving a vehicle. Similar to how a first driving lesson would go.

Level 1 - vehicle familiarisation and controls

- Teach basic controls and how to operate the car in VR

Level 2- basic driving on a straight road

- Practice smooth driving and lane keeping

Scenarios

- Straight road
- Motorway
- Roundabout
- Junction
- T-junction
- Crossroads
-

VR

It is possible to implement the ILP into VR in the future.

User Customisation

- A choice between manual and automatic
 - [Prototype] Start with manual implementation
- Choice of traffic laws or lawless driving (for testing and learning purposes)

Game Feel

The player camera will be positioned in a way that the player feels as if they were the one driving the car (i.e. in the driving seat).

They will also have the option to press “C” to toggle between camera views (e.g. driver seat POV, top down view) to aid in knowing the space a car uses, as sometimes this is difficult to see from the driver’s perspective.

Controls

The player will press “W” to use the accelerator, “S” to use the brakes, “A” to turn the wheel to the left and “D” to turn it to the right. They will also have the option to use “Space” to toggle the handbrake

If in manual mode, “Q” to use the clutch and “E” to go a gear higher while pressing the clutch and “X” to go a gear lower while pressing the clutch.

Reasons for Selecting the Driving Simulation Project

- Existing Resources and Infrastructure:
The University already has the necessary driving simulation equipment available, which reduces setup effort and allows us to begin development and testing more efficiently.
- Value to the University:
The final solution has strong potential for use during University Open Days and outreach events. This makes the project beneficial not only to our

group but also to the University by showcasing interactive and engaging technology to prospective students.

- Established Client Expertise and Research:

The client has prior experience with driving simulation research and has published relevant findings. This existing body of work provides us with a strong foundation for planning and executing our own testing phase with greater clarity and confidence.

Technical problems that we could come across in the project

- **Alignment & Comfort:** The fixed GT Racer 2.0 rig (seat, wheel, pedals) may not perfectly align with the virtual driver position, which can break immersion and cause discomfort if the user's real posture doesn't match the in-game car.
- **Input & Performance Issues:** Because we are showing a full 3D driving world in VR and reading inputs from the wheel and pedals at the same time, the system demands extra performance. If the frame rate drops or the view stutters, or lags, the users can feel uncomfortable.
- **Input mapping complexity:** Getting the steering wheel and pedals to work smoothly together with the VR headset and controllers can be tricky. We need to make sure the wheel and pedals respond reliably at all times, and that the controls feel natural and stay the same across every level, so learners don't have to "re-learn" how to drive each time.

LSEP

L – Legal

- Comply with relevant data protection rules if any user data or logs are stored

S – Social

- We want the app to be welcoming and usable for as many people as possible. That means building in accessibility options like subtitles, adjustable sound levels, and clear, easy-to-read visuals.
- Avoid stereotypes in characters or voice-overs if any are added later.
- The VR lessons should feel like a safe space where beginners can try things out, make mistakes, and learn without feeling judged or embarrassed.

E – Ethical

- We should avoid reckless or unsafe driving, as appealing or desirable. Even within a more permissive “lawless” mode, the application must communicate that unsafe behaviour carries consequences, using informative warnings and constructive feedback rather than reinforcement.
- All user testing sessions must be conducted voluntarily. If any data is collected for evaluation or research purposes, participants should be clearly informed about what is being gathered and must provide explicit informed consent before taking part.

P – Professional

- Maintain regular communication with the client, documenting requirements, design decisions, and changes.
- Follow good project management practices: plan milestones, keep version control, and document the code and design.
- Test thoroughly with real users where possible, record feedback, and iterate on the design.
- Present the final product and documentation in a clear, professional format suitable for academic assessment and client handover.