FEEL THE SHIFT

A Multimodal Learning Experience for Manual Transmission (MT)

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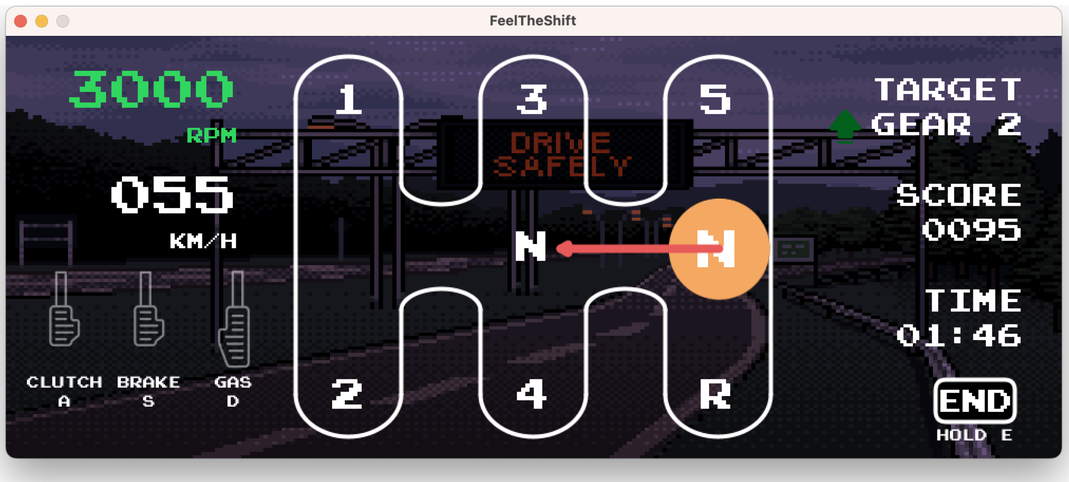
INTRODUCTION

- **CanHap501** is a 3 mos. graduate haptic experience design project course bridging students & instructors across Canada
- Focuses on developing expertise in haptic and multi-modal interface design using the **Haply 2DIY** force-feedback device
- Aims to understand the cycle of inception, creation, and evaluation of complex multi-modal systems—with an attention to haptics



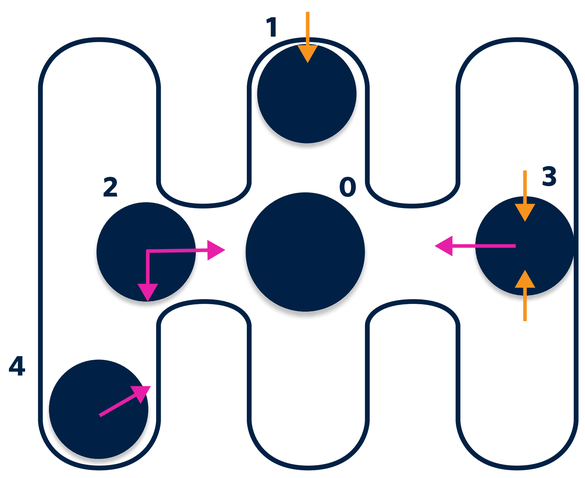
Main Game Screen *The red arrow shows magnitude & direction of force exerted on end-effector from gear mechanism*

MOTIVATION

- Learning to drive MT can be challenging in North America—affecting drivers' confidence and safety
- Existing tools are designed for gaming or research
- Integrating active haptic feedback into a MT simulator can facilitate and enhance the learning experience of driving a real vehicle
- Aid in promoting safe driving habits

HOW MIGHT WE

Create an accessible at-home MT simulation to allow drivers to explore MT and develop the necessary shifting rhythm in a safe environment using a 2D force feedback device ?



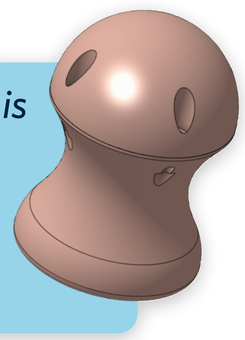
Force Visualization
Constant forces &
When clutch is not engaged

Game Screens *Respectively showcasing the start & end screens*

METHODS

- Grounded approach in haptic experience design—emphasizing rapid iteration and evaluation
- Created MT learning environment using Processing & Haply 2DIY to design & render force feedback
- Accentuated force-feedback with audiovisual cues to deliver convincing simulation
- Packaged overall solution as a retro-themed game to incentivize fun learning environment

FEEL THE KNOB *Proper hand placement on the shift knob is crucial when driving a MT vehicle. To mimic the real driving experience, we created a 3D-printed knob for our 2D force feedback device. This heightened immersion, as the driver had to replicate actual driving techniques.*



TAKEAWAYS

- **Parameterization** is essential to simulating driving experiences
- **Gamification** provides incentive for continued learning
- **Multi-modal** cues *(haptics, visual, audio)* are integral for an immersive and convincing experience
- **Interdisciplinary** collaborative team fosters interesting and more nuanced perspectives—designing for real people

VIDEO DEMO

GITHUB

FIGMA PROTOTYPE

THE UNIVERSITY OF BRITISH COLUMBIA · McGill · HAPLY · UQAC Université du Québec à Chicoutimi · ÉTS École de technologie supérieure Université du Québec · UNIVERSITY OF WATERLOO