

Exploring Haptic and Multimodal UX Design Through Distributed CanHap501 Projects

The 2023 CanHaptics class, presented by the course instructors:

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Abstract—CanHap 501 is a cross-Canada, graduate-level multidisciplinary course which introduces students to *haptic and multimodal experience design*. Teams collaborate across timezones and disciplinary cultures, mentored by seven instructors at six campuses and one company, each student working with an identical force-feedback display, a low-cost but performant 2D Haply 2diy pantograph. [2] This demo curates a set of team projects notable for their varied and inventive sensory integrations and unusual ways of incorporating haptic feedback or learning from it.

Index Terms—haptic, teams, multimodal, user experience

I. INTRODUCTION

Haptic user experience design connects perceptual, motor and attentional foundations and haptic control principles to methods for ideation and construction of haptic and multimodal human-computer interfaces, focusing on how haptics can build or support a larger experience. We have previously described how we expanded the perspectives we could share with our students with a course connecting universities across Canada [1]; course information at <https://ch501.canhaptics.ca/>. After three offerings to 40 students (12 teams), we are sharing what this remote, UX-focused format can produce.

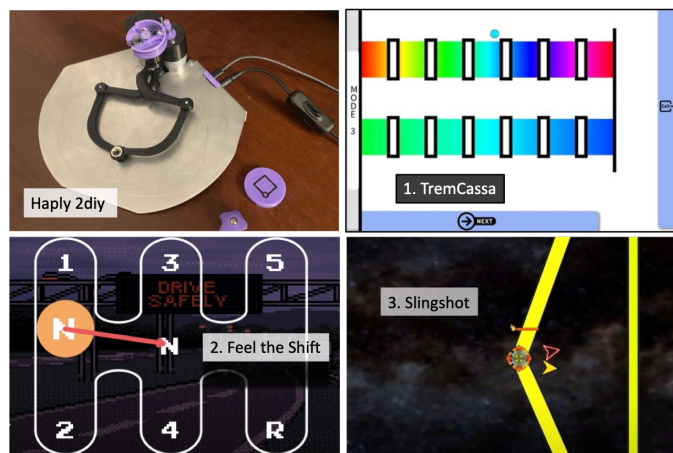


Fig. 1. Each team created a novel concept and graphic-auditory integration with force feedback provided by the Haply 2diy (all members had their own).

1. *TremCasso: Haptic Color-Picker to Support Users with Physiological Tremor*. Position-based selection, a common feature in mainstream digital tools, is difficult for individuals with motor control challenges. Our force-enabled color picker examines how selection palettes can be expanded by relying on movement-based selection. Force effects dampen tremor, prevent unintentional selection, craft activation profiles for “push-wall” buttons, and prioritize customization. We capture our ideas with a proposed set of design guidelines.

2. *FEEL THE SHIFT: A Multimodal Learning Experience for Driving a Manual Transmission*. New stick-shift drivers must learn many skills at once. This low-cost, force-feedback simulator allows drivers to explore bimanual shifting rhythms and develop coordination in a fun multimodal gaming context. The manual transmission model renders grid boundaries, centering springs and grinds if you shift when the clutch is out!

3. *Slingshot: A Gamified Educational Haptic Experience About Gravity*. Young students learning science may struggle to grasp ideas taught in a purely theoretical manner, or relying solely on graphics for illustration. We provide a gamified, 2D haptic experience about *planetary motion*: the user must assist slingshot launch and subsequent navigation of a spaceship across a solar system, taking gravitational forces into account.

Credits: Projects are created by Antoine Aubet, Venissa Carol Quadros, Yaman Sanobar (*TremCasso*), Bereket Guta, Jano Fu, Tommy Nguyen (*Feel the Shift*), Maxwell Gentilli-Morin, Punit Kunjam, Ken Jen Lee, and Anchit Mishra (*Slingshot*).

Special Demo Needs: A student from each team will present their project. We thus request 3 small table setups arranged in a cluster. Full details in Layout figure.

REFERENCES

- [1] MacLean, Schneider, Weill-Duflos, Levesque, Irani, and Cooperstock, “CanHap 501: Learning haptic UX design in remote teams.” Proc. of IEEE WorldHaptics Work in Progress, 2021.
- [2] Weill-Duflos, Ong, Desourdy, Delbos, Ding, & Gallacher. Haply 2diy: An Accessible Haptic Platform Suitable for Remote Learning. Proc. Int’l Conf On Multimodal Interaction, 2021.