Virtual Reality in Experimental Economics

Capstone Project: Computer Science

Aaska Shah, Kerala Brendon, Nolan Slade, Vyome Kishore, supervised by Dr. Jacques Carette[†] and Dr. Stephanie Thomas

{shaha8, brendokh, sladenj, kishov, carette}@mcmaster.ca, stephanie.thomas1@curtin.edu.au and Team

[†]Department of Computing and Software, McMaster University
1280 Main St. W, Hamilton, Ontario, Canada L8S 4L8

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Project Overview

- **What**: develop virtual reality environments, as an extension of previous work done by the McMaster Decision Science Laboratory, to carry out experimental economics research.
- **Why**: gain insight into how participants make decisions when they are impaired.
- The focus of the simulations is a basic task.
- Participants are paid cash for successful task completions.
- Participants will be virtually impaired and required to choose between methods of treatment.
- Simulation environments are designed in Unity; to be used with an HTC Vive.

Existing Simulation

- **Task**: move crates from a pile to the target block.
- The environment does not scale to the Vive-equipped testing room (Figure 1).
- No extensive customization of configuration variables.

Figure 1: Experiment room

Our Simulations

- The virtual environments and experiment structures will be highly customizable.
- Metrics will be tracked and persisted in a database for analysis.
- Environments are designed according to the physical constraints of the Vive-equipped testing room (Figure 2).

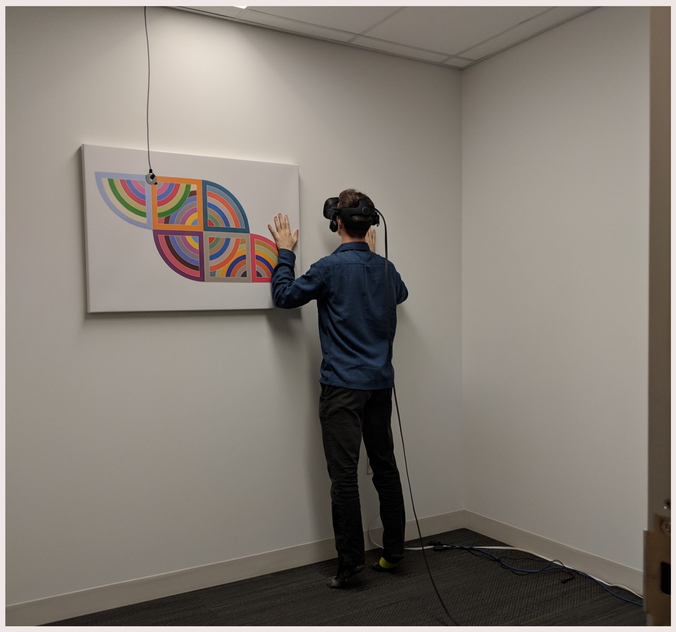


Figure 2: Experiment room

Summary of Configuration Variables

- Cash obtained by the participant for completed task iterations.
- Impairment types and their intensities.
- Treatment methods, costs, and effectiveness.
- Per-day settings such as duration and active impairment(s).

Simulation One

- **Task**: repeatedly transport a volume of liquid between a source and destination using a single hand-carried vessel.
- **Goal**: maximize the total volume of liquid that successfully reaches the destination.

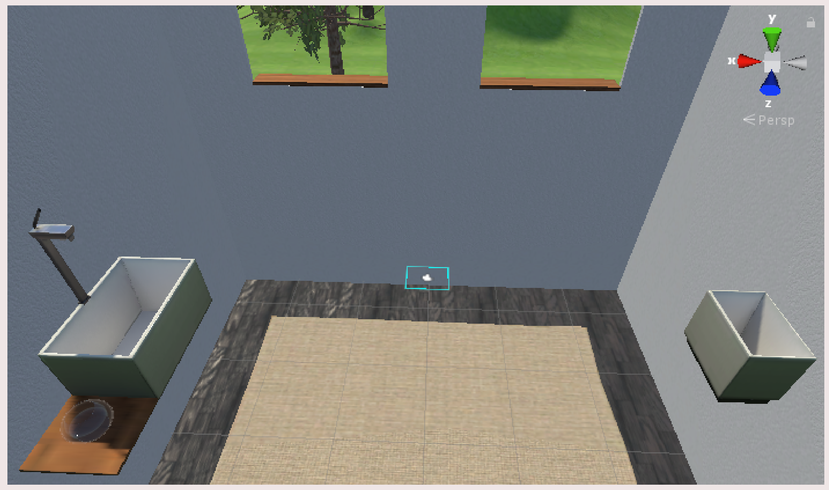
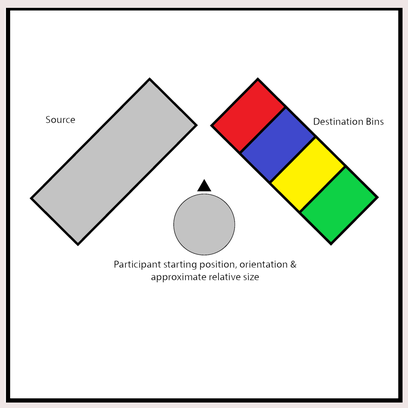


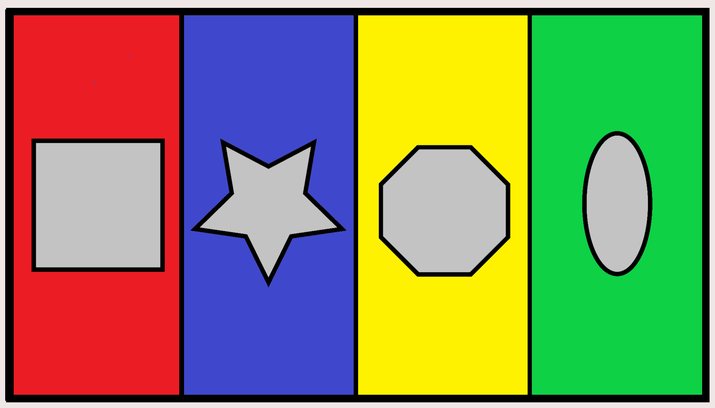
Figure 3: First simulation environment

Simulation Two

- **Task**: sort a set of three-dimensional shapes into separate containers by passing them through a filter that only permits one particular shape.
- **Goal**: maximize the total number of shapes sorted into the correct container.



(a) Layout of simulation environment.



(b) Shape sorting filter.

Sound Interesting?

- Email us what you think of our project, and/or to participate in experimental trials.
- Please CC our coordinator, Dr. Christopher Anand: anandc@mcmaster.ca
- Experimental trials will likely be scheduled for February 2019.

Acknowledgements

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