

# Haptic Module

~Bringing the Outside to You

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<http://hapticmodule.tommaddoxsoftware.co.uk>





# Genre

Rapid Prototype project with the goal of

- Compact design
- Easy to transport
- Modular
- VR compatible



# Project Overview

Haptic feedback system to be implemented alongside a Virtual Reality Headset

Modular system, allowing users to connect multiple feedback modules

Variable strength feedback



# Developers

Tom: Technical Lead / Lead Programmer

Virtual Experience Creation / Game Design and Development within Unity

Asset Creation with Photoshop CC and Blender

Ben: Hardware Lead

Arduino Uno for Motor Control

# Team Management





# Trello





A screenshot of a Trello board titled "AINT354 - Haptics Project". The board is organized into columns representing different stages of the project, with a background image of a snowy mountain range.




**Board Columns:**

- Specification**
  - + Add a card
- Project Resources**
  - Shopping list (5/8)
  - Our usage of Github "IMPORTANT"
  - + Add another card
- Ideas / Suggestions**
  - Unity3D experiences
  - Implement Variable vibration strength (BW)
  - Implement leap motion mounted to HTC vive
  - + Add another card
- Planned Features**
  - Expand upon Maze Experience (0/2)
  - + Add another card
- Priority Tasks**
  - Update
  - Level design for 1-2 experiences
  - + Add another card
- In Progress**
  - VR Compatibility (TM)
  - Implement VR info experiences / Adapt current experiences for VR (TM)
  - + Add another card
- Done, but needs refining**
  - Discuss planned experiences, research / inspiration gathering
  - Collision detection to fire off motors (TM)
  - Hilobox System (TM)
  - Create Testing Environment for device (4/5) (TM)
  - Experiment with Arduino String Manipulation (1/1) (3/3) (TM)
  - Model and rig VR player arms (2) (TM)
  - + Add another card
- Finalised**
  - Create final functional Prototype (BW)
  - Test Sending of Data to Arduino (1)
  - Connect Vibration Motors (1/1) (3/3) (BW)
  - Make maze pitch black, except for starting area (TM)
  - Refine Glove Design / Initial prototype (1/1) (10/11) (BW) (TM)
  - Usability testing 7/12/18 9:00-13:00
  - Arduino (Main controller) (3/3) (BW)
  - Make a presentation for 6/1/18 (6/6)
  - Implement VR headset tracking (TM)
  - Control Vibration Motors from Arduino (1/1) (BW)
  - Send Message from Unity to Arduino
  - + Add another card
- Team Meetings**
  - Every Monday - 1pm
  - Meeting 1 - 16th October (1)
  - Meeting 2 - 22nd October (1)
  - Meeting 3 - 15th November (1)
  - Meeting 4 - 22nd November
  - Usability session - 7th December
  - + Add another card



# GitHub

 Search or jump to... [Pull requests](#) [Issues](#) [Marketplace](#) [Explore](#)   

[tomdaddoxsoftware](#) / [AINT354-VRHaptics](#)  0  0  0

[Code](#) [Issues 0](#) [Pull requests 0](#) [Projects 0](#) [Wiki](#) [Insights](#)

Team Project for AINT354 - VR Haptics Device implemented with Unity3D


39 commits

6 branches

0 releases


1 contributor

Branch: master [New pull request](#) [Create new file](#) [Upload files](#) [Find file](#) [Clone or download](#)

 Assets


Added Basic Wall Asset 

a month ago

 MiniSite Source


Completed minisite structure, added content and changed design slightly 

a month ago

 Unity Project/VirtualFeel Haptics Sy...


Fixed player size to allow correct collisions 

a month ago

 .gitignore

Initial commit 

3 months ago

 README.md

Initial commit 

3 months ago

 README.md

## AINT354-VRHaptics

Team Project for AINT354 - VR Haptics Device implemented with Unity3D



# Early Prototyping and testing







# Prototype Device

Uses an Arduino Uno

Two modules (Left Arm and Right Arm)

Uses two Xbox 360 Rumble motors for the Right Arm

Uses a Coin cell Vibration motor for the Left Arm (Final design will use three)

Variable size due to adjustable strapping





# Usability

Maze escape

Players will be required to navigate without vision

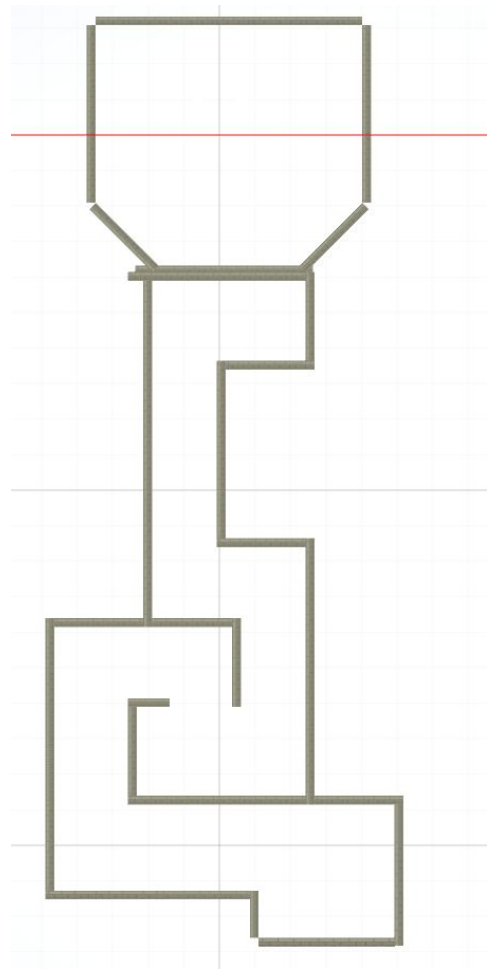
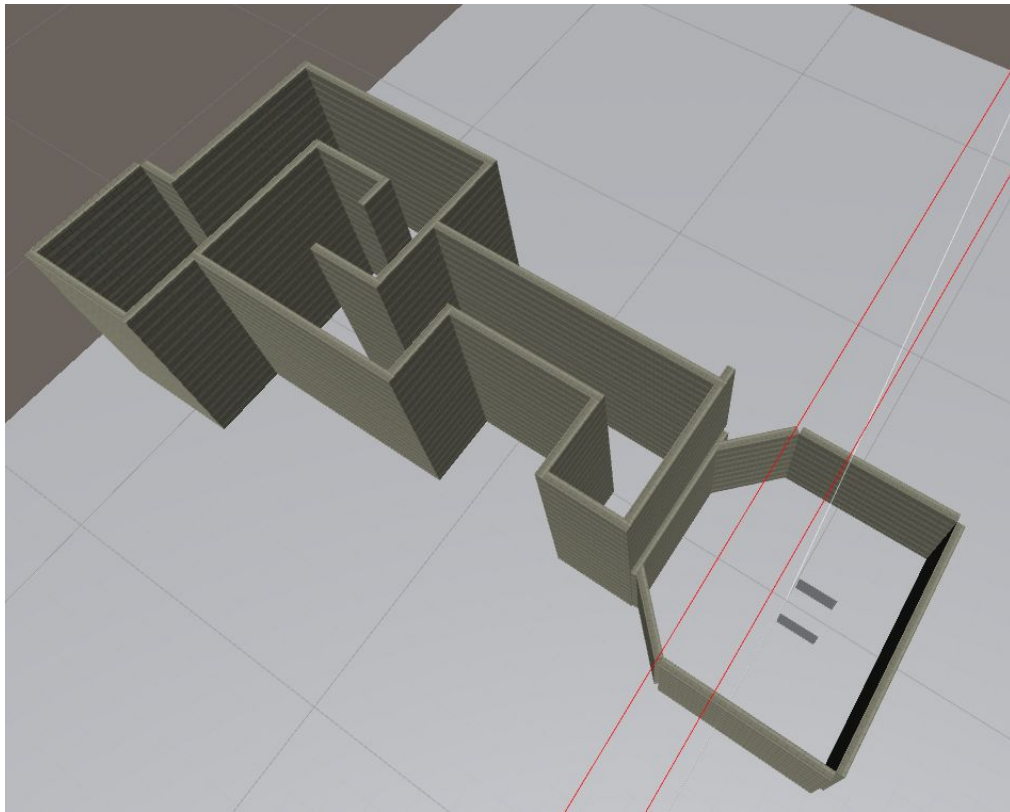
Rumble feedback used to provide environmental feedback in order to navigate the maze

Two types of motors being using (Dual Shock 3/Xbox Rumble motors and Coin Cell Vibration motors)

Goal is to find which motors provide a more natural experience



# Map Design





# Feedback

From Usability testing we were given some very constructive feedback that was then implementing into our design. We were given this feedback from a survey as well as verbal feedback. The main topics that we wanted to focus on was the following:

Which motor do they prefer?

Do they feel that their experience was enhanced?

Do they feel like feedback was strong enough?



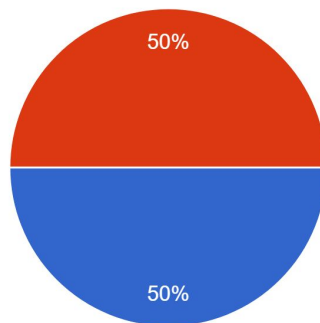
# Motor Preference

We found that from our survey that the preference was the same for both motors.

From verbal and written feedback we found that people that people like the response time of the vibration motors but preferred the feel of that the rumble motor provides

Which type of motor did you prefer?

10 responses



- Rumble (Right Arm Module)
- Coin cell (Left Arm Module)

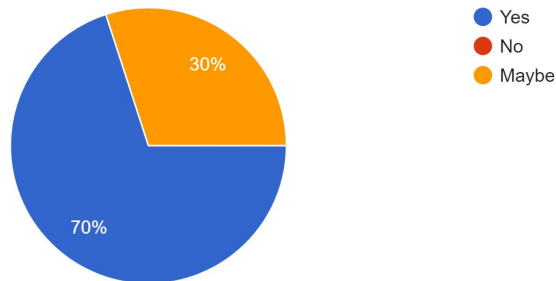


# Do they feel that their experience was enhanced?

Overall it would appear that the Hapics did improve the user's experience and immersion.

Do you feel like the Haptic Feedback improved your immersion and experience in the game?

10 responses





# Do they feel like feedback was strong enough?

We found that we had some mixed results

Overall we think that we need to provide a wider variety of feedback which should accommodate most users

Did you think that the feedback from the motors is strong enough or too strong or too weak?

9 responses

I'm a big boy I could handle more

I found that was strong enough

The rumble was strong enough to be realistic

Too weak

perfectly balanced, as all things should be

Rumble took a while to wind up, but good power. Vibration motor was very responsive but not as good

The rumble motors were definitely too strong, coin one wasn't so bad but was still distracting

Coin cell potentially too weak. Rumble motor strong enough.

Slightly weak

# Improved design

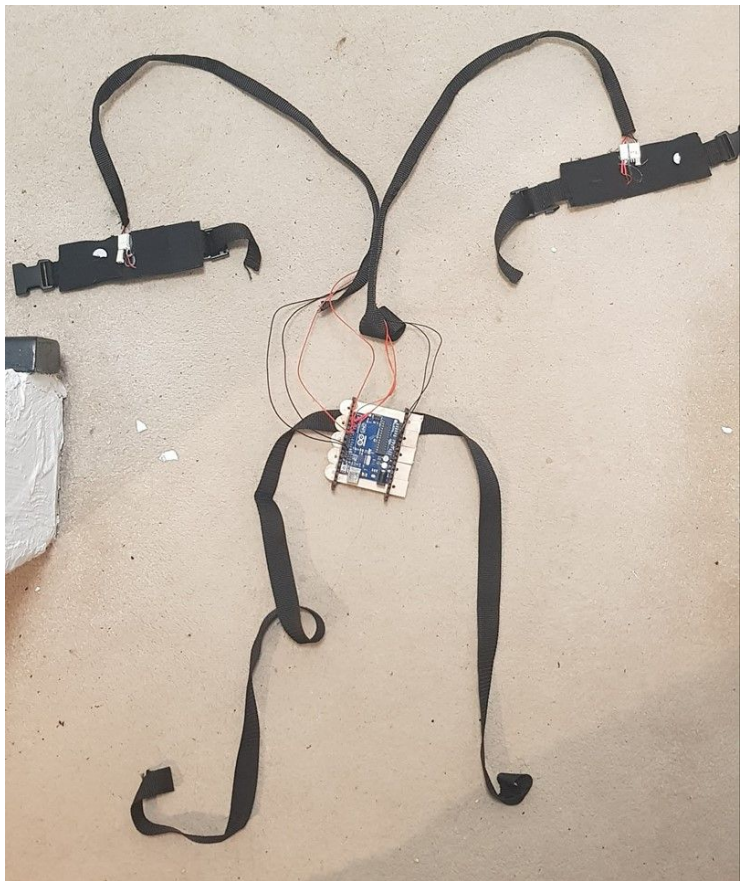






# Hardware

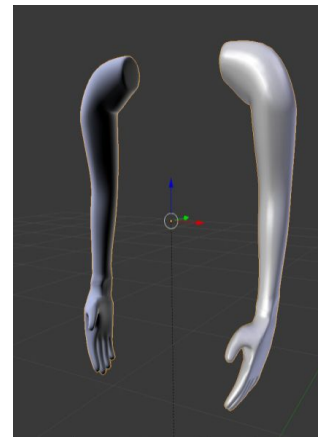
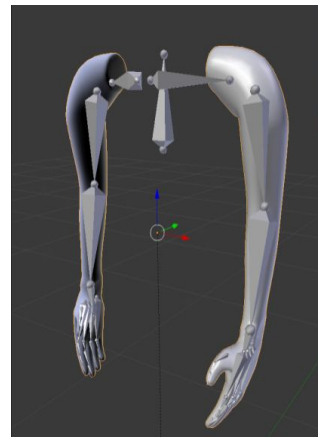
- A two module system
- Each Module has three motors instead of two, which include two Coin cell motors and one Rumble motor.
- This allows us to provide different types of feedback depending on the users interactions
- A cable cover to make the design more sleek, which also reducing tangling
- New coin cell motors which have thicker wires to reduces breakages





# Software

- Make two separate builds of the game, one with VR compatibility and one without
- Improved and varied feedback
- Improved serial communication
- Hand/Arm models



# Welcome to the HapticsModule website

We're currently working on our prototype modular haptic device, for use within controlled experiences within Unity.

Suggest something

Learn More

## Our project



### Haptic Feedback

Our goal is to create a way to feel more of the environment through the means of additional lightweight



### Modular System

The end goal for our Haptic System is a fully modular and expandable system to allow users to customise their levels



### Virtual Reality

We aim to introduce our system as an addition to Virtual Reality technology to provide more immersive

<https://hapticmodule.tomdaddoxsoftware.co.uk>  
[https://www.youtube.com/watch?v=\\_t7ptB2Cjbc](https://www.youtube.com/watch?v=_t7ptB2Cjbc)