Cal Chiu

Engineering Student – INSA de Lyon, France
Research Graduate – Tohoku University, Japan

Digital Arts, Game Dev & Tinkering hobbyist

2020 Ver.

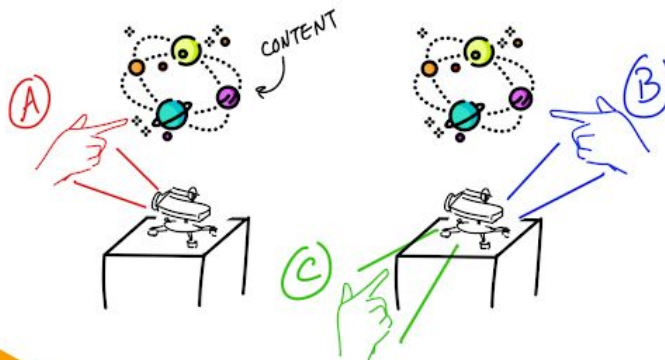## Creative Content & Engineering Portfolio

FreeMo(tion)

A wearable hand tracking device with full body range for enhanced user freedom in VR !

Research Paper Published at ACM SUI '19

I designed and prototyped a simple, low-cost and flexible solution to camera sensor range limitations for hand tracking in VR. The device follows the user's hands around itself, providing extra range and user freedom.

DESKTOP MODE :

Multiple capture angles for static content

Turn based interactions for collaborative tasks

WEARABLE MODE :

Users can benefit from real-time single or dual hand tracking for mobile and room-scale VR. Gestures are detected from head to lap.
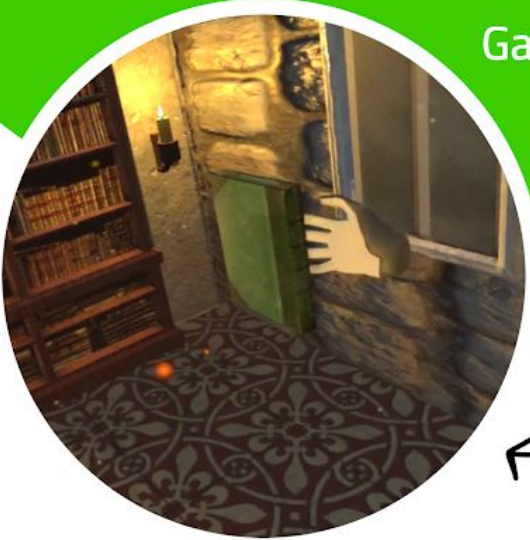

Leap Motion Sensor

Repurposed Drone Gimbal

GoPro Torso Mount

https://github.com/CalChiu/PursuitSensing

FreeMo Applications

Immersive experiences to demonstrate the potential and capabilities of FreeMo !

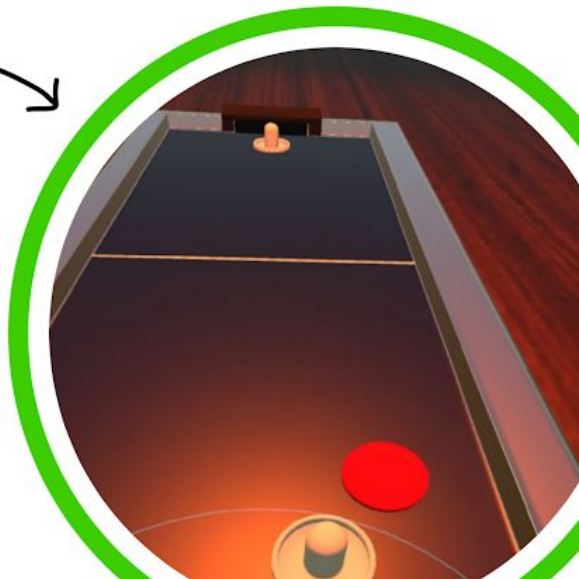Games featured at SIGGRAPH Asia 2019's Extended Reality Program

THE LIBRARY

This is a room-scale experience showcasing the effectiveness of FreeMo's wearable version. Players are immersed in a magical library and can interact with flying books around them while using telekinetic powers to put them back to their shelves.
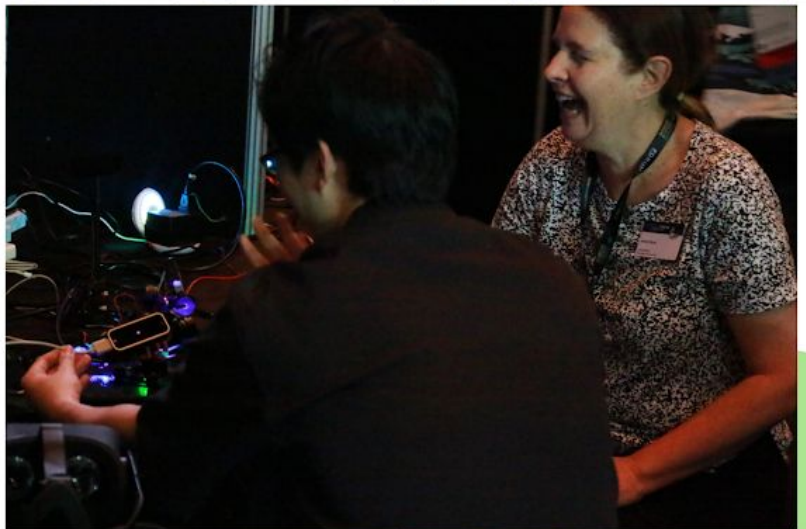
AIR HOCKEY VR

To present some of the capabilities of FreeMo's desktop mode, I developed a game where a display-using player confronts a VR user. Air hockey was chosen because of my fondness for arcades and its ability to demonstrate gaze-independent inputs and rapid gestures.
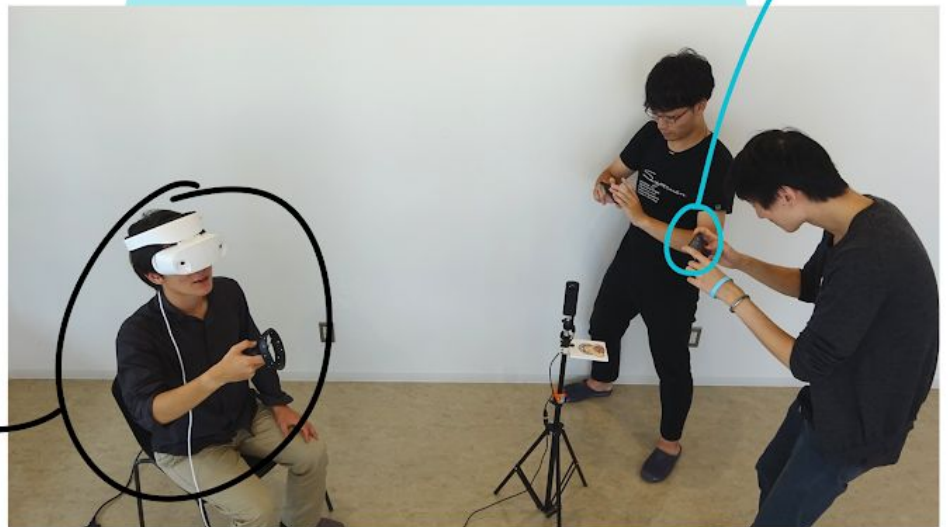
Presenting FreeMo

ACM SIGGRAPH Asia 2019 in Brisbane

My passion for engineering is driven by my love of technology and its ability to inspire people. This is what motivates me to perpetually seek new things to learn and strive to build tools that people enjoy using. I have found that seeing users react to content and experiences that I contributed to has been the greatest of rewards.

https://github.com/CalChiu/airhockeyVR   -   https://github.com/CalChiu/the_library
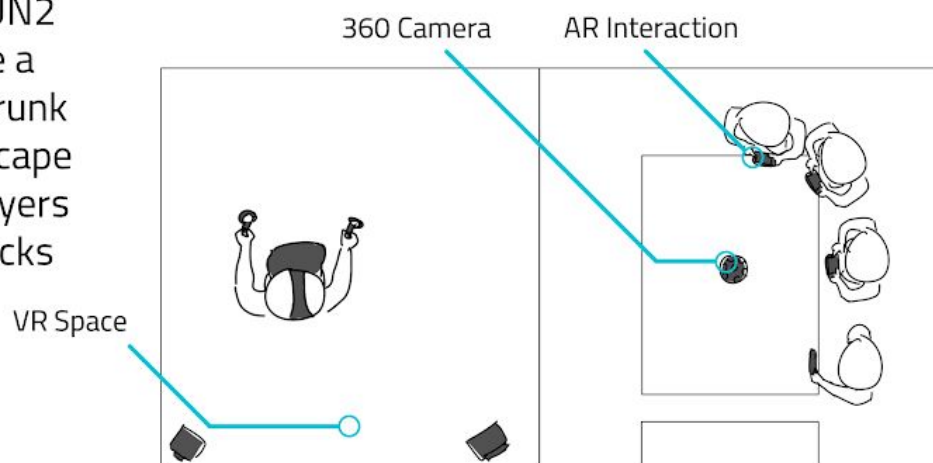
TableTop ARrietty

A competitive game between multiple giant AR users and a VR player, whose body is shrinked !

Contest entry qualified for IVRC 2019 Finals, Tokyo, Japan
Won 4th place during preliminary round
Won Jury's Award during final round

I developed the game's VR-side, including assets, gameplay mechanics, and shaders for one of our entries to the International collegiate Virtual Reality Contest in Japan. Live feed from a 360 camera is used as texture, rescaled, and rendered in VR to make nearby players appear as giants ! (More at https://vron.jp/2019/09/14/ivrc-2019/#4Tabletop_ARrietty).

We are using Unity, ARKit 2, and PUN2 among other technologies to create a tabletop virtual stage in which a shrunk VR user has to gather items and escape while being targeted at by giant players using smartphones to perform attacks (projectiles, traps, etc).

360 Camera

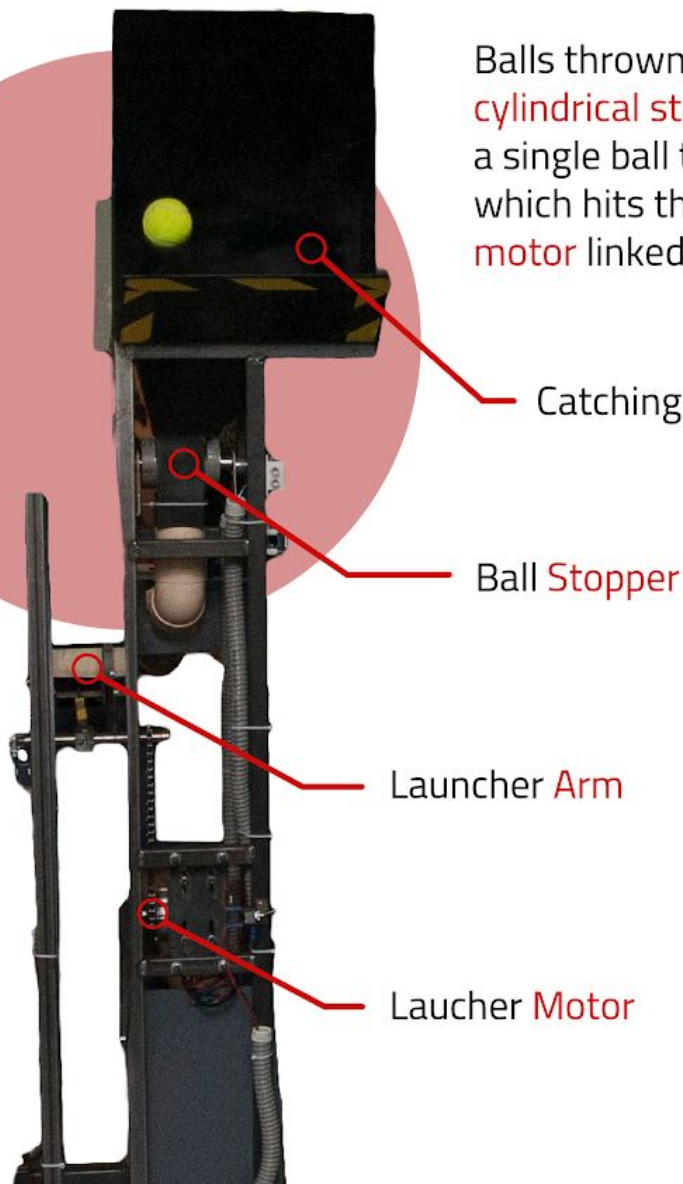AR Interaction

VR Space

Juggling Robot

A robotised juggling partner designed and built from the ground up.

Yearly industrial project at INSA de Lyon, France

Users can throw balls at the robot at any timing while juggling and receive one by voice or gestural command.

Balls thrown inside a funnel end up stacking on top of a cylindrical stopper which rotates on command to only let a single ball through. A tube then directs the ball to an arm which hits the ball by rotating at high speed thanks to a motor linked to it by a bicycle chain.

Catching Funnel
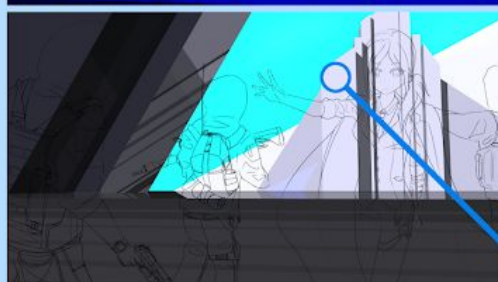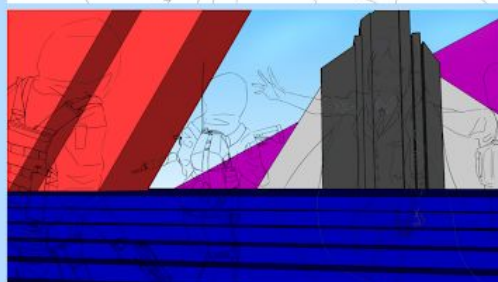
Ball Stopper

Launcher Arm

Laucher Motor

Hobby Projects

I like to make art and tell stories to share with others, and dedicate my free time to that purpose.
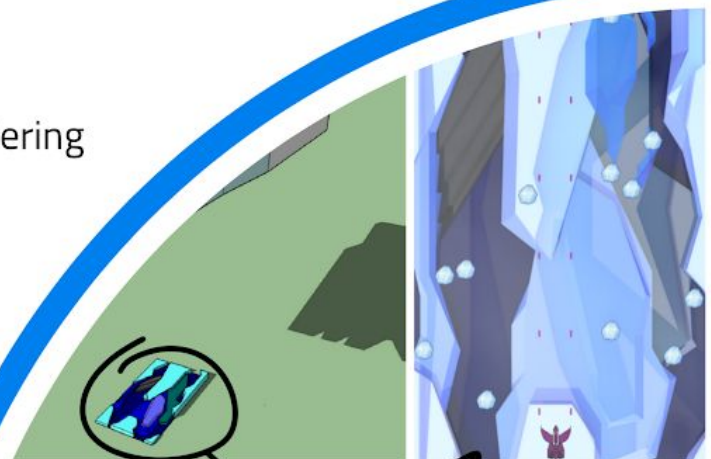
Personal game dev & illustration works

For illustration works, I use mainly two techniques to create backgrounds : 3D scene paint-over (left) or texture painting (top).

3D Scene Rendering

Paint-Over

I also use 3D modeling and art to create my own assets for game development.