

# Youhan Guan

# PORTFOLIO

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2012-2016

Programming • Physical Computing  
Interactive Art • UI/Graphic Design  
VR/AR

Personal Website  
**youhanguan.com**  
GitHub  
**<https://github.com/yuyug>**  
All videos  
**<https://goo.gl/KYajyw>**

## VR/AR Projects

# Encounter

Encounter is an interactive installation which explores the coexistence of human and a virtual artificial life ecosystem through Spacial Augmented Reality and Tangible Augmented Reality means.

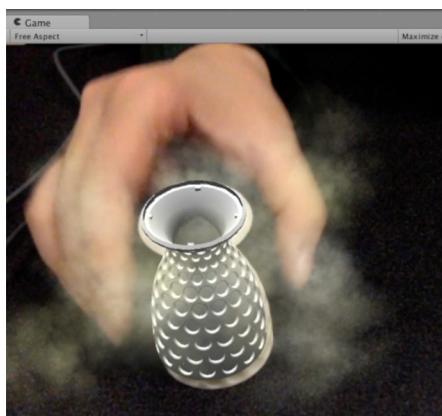
The Tangible AR part of the project explores a new user interface for users to manipulate the virtual world and retrieve data on a macro scale. It gives users a physical landscape of the virtual world with a set of tangible objects, and users can place the tangibles on the landscape and use a mobile device to see the co-located spatial 3D graphics, and then manipulate the corresponding virtual environment and query data with the aid of Vuforia AR markers. The mobile app is developed in Unity Engine. Both android and ios versions are developed and tested.



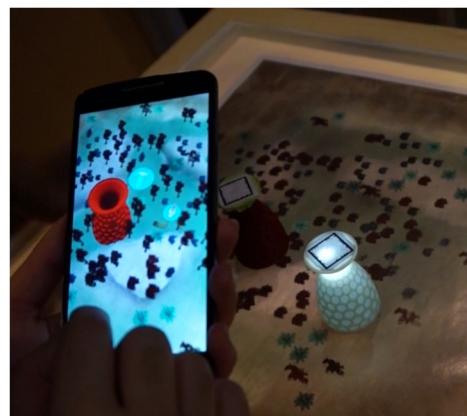
*Tangible AR Station (Macro landscape of the virtual world)*



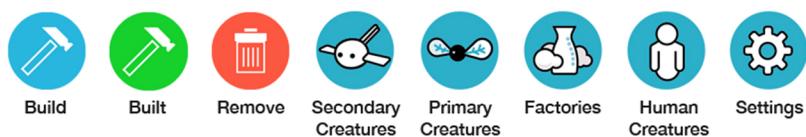
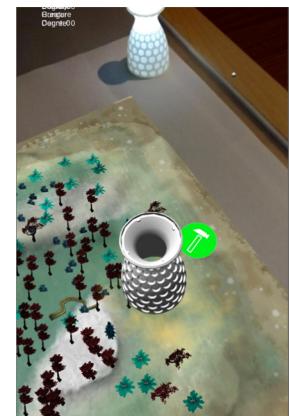
*Spatial AR Area (Projected virtual world)*



*Augmented 3D objects on tangible objects*



*On-screen View of the tangibles and physical landscape*



*Samples of the UI elements*

My Role: Implementation of the tangible AR UI app, modeling and 3D printing the tangibles, laser cutting the landscape.

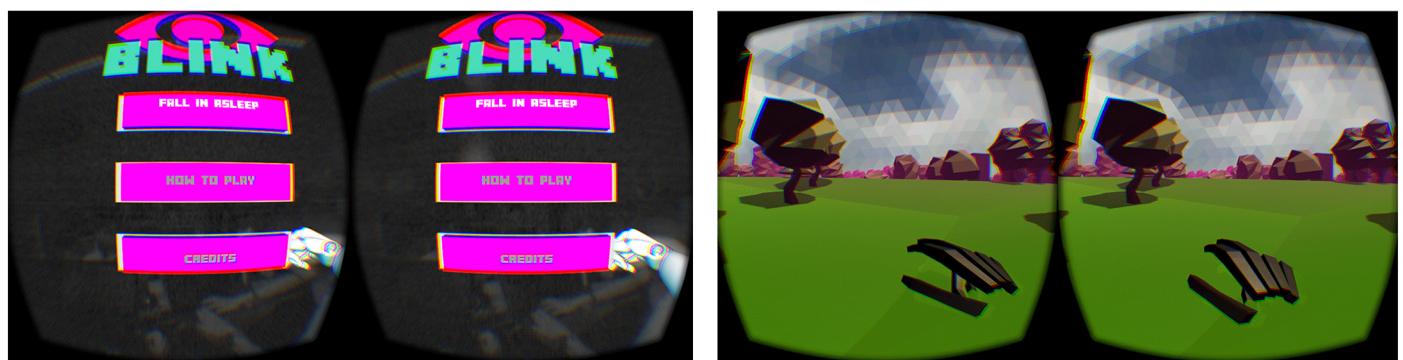
Tools: Unity 5, Vuforia SDK for Unity, Xcode.

## VR/AR Projects

# Blink

Blink is an immersive experience in mixed reality with LeapMotion and Oculus.

The experience begins with the player choosing to "fall asleep" and entering a virtual world representing a dream. The player can choose to explore the dream world with gestures or keyboard. However this dream soon turns into a nightmare when you discover slimes. To survive from the attack of the slimes, the player needs to wake up by using the LeapMotion quick switch gesture. After waking up, the player can conquer the nightmare by defeating the slimes using the tools found in the dream world.



*Final Home Screen UI and Game Scene.*



*Test Gesture and the 3D UI*

My Role: Implementation of the 3D UI, Development of Weapons and Collision Programming in Unity using C#.

Tools: Unity 5, Leap Motion, Oculus Rift

## VR/AR Projects

# Virtual Gallery

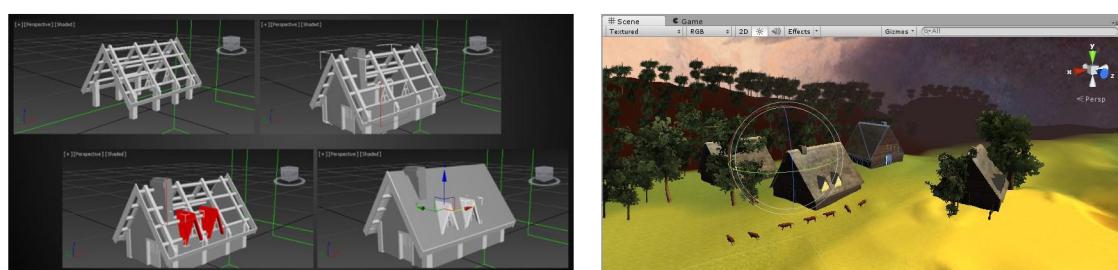
The project Virtual Gallery develops a navigation system using Oculus head-mounted display (HMD) device. A 3D virtual gallery exhibition room is constructed to show the paintings, while the 3D virtual environments are reconstructed from the landscapes in the exhibited paintings to be explored by users. Compared with the conventional text-based or vocal-based descriptions of the art pieces' information in the physical galleries, to convey them to the users more directly and vividly, the virtual gallery project provides the information by giving users immersive trips inside the paintings. This virtual navigation allows users to explore the landscapes and background stories of the paintings by themselves.

Modeling and texturing of the virtual painting worlds are totally based on the paintings' style. An AI system is also implemented for the creatures and characters inside the painting worlds to behave interactively to users' actions. In this project, one virtual gallery exhibition room and two virtual painting worlds – based on Bierstadt Albert's Bavarian Landscape and Von Gogh's Starry Night – are constructed for users' navigation.

### 3D Modeling in 3Ds Max and Scene Building in Unity3D



Modeling in 3Ds Max for Gallery Environtment



Building Models and Refinement of Scene in Unity3D



Re-create the texture bas on the painting



Original Painting

Simulated Scene in Unity3D



*Re-create the world in Van Gogh's Starry Night*

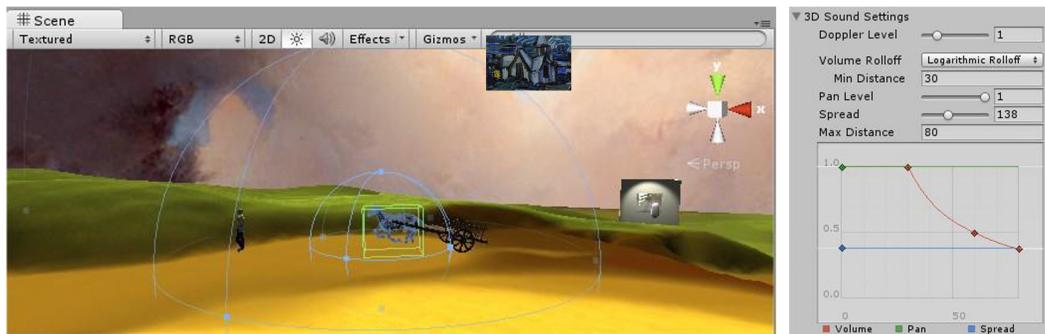


*Original Painting (Part)*



*Creating Texture*

### 3D Sound Simulation for Interactive Elements



*3D Sound Construction for Interactive Elements in the Scene*

My Role: Design Scenes and Concepts, Modeling, Creating Scenes in Unity3D, Sound Programming, Texture Creation and Shader Implementation, Scene constructions

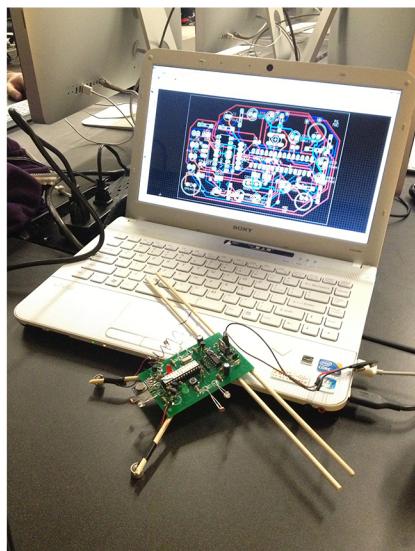
Tools: Unity3D, Oculus Rift

Team Members: Youhan Guan, Danning Lu, Lu Li, Sandra Koo

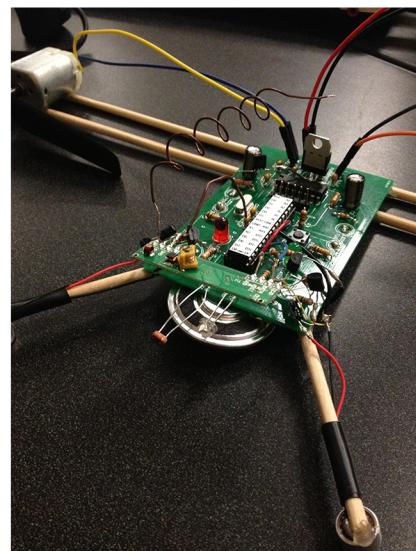
## Physical Computing Projects

# Conversation Siphon

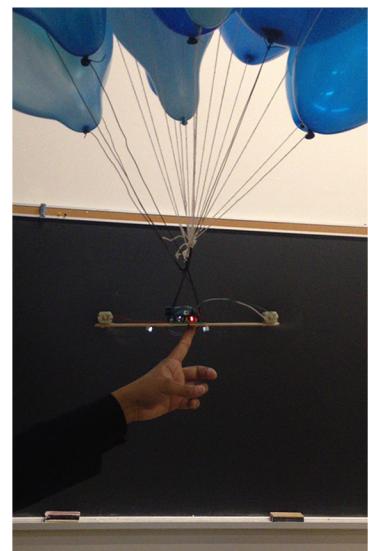
The project is to build up an autonomous system which includes two balloon-supported drones, with sound and light detection reacting to the environment and guiding the drones' individual movements. There is also a data transmission system between these two drones. One (receiver) is able to detect the crowd with certain degree of noise and record the sound, at the same time the other one (repeater) detects the quieter place and moves to broadcast the recorded sound. The drones are designed to control their own moving directions, enabled by rotors mounted on the drones. The decibel level received by the sound sensors from different directions will be computed, which gives the control panel the direction of movement.



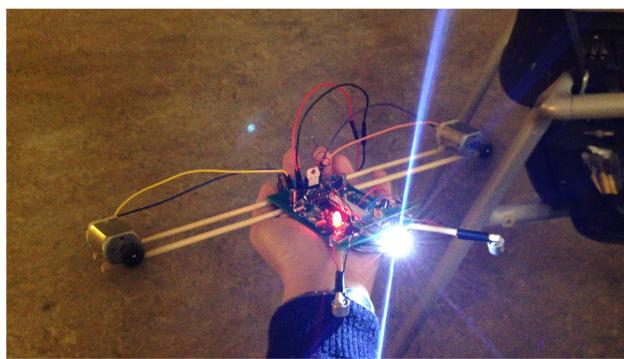
*Circuit Board Design in Eagle*



*Arduino-Based Circuit Board with Speakers and Microphones*



*Lifted By Balloons, Use Motors to Move Around*



*Use LED light as Photocell's Light Source*



*Two Units of the System in Exhibition*

Team Members: Rhys Mendes, Youhan Guan

My Role: Circuit Design, Budget Planning, Electronic Collecting, Programming and Testing using Java  
Tools: Arduino

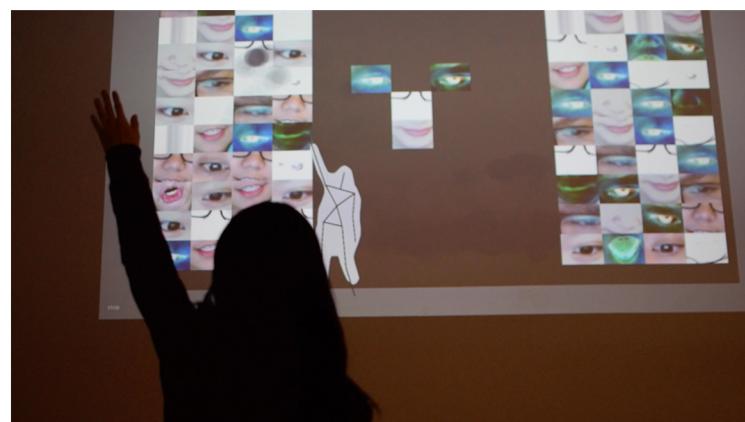
## Interactive Art Installation and Theatre Productions

# Impress:Visage

Impress Visage is an interactive photo experience for Pan Am / Parapan Am Games that explores the relationship between a person's identity and community's identity.

Participants are encouraged to take photos on our many selfie stations. The selfies are then break up into major components of faces — eyes, month and nose. the facial fragments are projected onto a wall and the participant moves and recombines them via body and hand gestures in thin air, using the motion-sensing technology of a Microsoft Kinect. The newly constructed portraits are saved and projected on an adjacent wall in the space.

Through the process of recombining all our faces, the bounds of cultural origins blur. With this installation, we invite people to engage with and appreciate the differences between diverse communities as well as what brings us together.



*Re-Combining Face Features Using Body Motions*

Team Members: Lalaine ult-destajo Youhan Guan

My Role: Programming in Processing for Face Feature Display and Recombining using Java

Tools: Kinect V2, Processing, Max/Msp

## Interactive Art Installation and Theatre Productions

# Beggar's Opera

The Beggar's Opera was an Theatrical and meta-theatrical production by York Theatre Company, in collaboration with York University Dance, Music and Digital Media students. In this production, I and my teammates did collaborative design and implementation of a security system by designing and creating simulated surveillance cameras. The real0-time footage were shown on the screen which can be seen by audiences.



*Concept drawing of the entrance path*



*Built the entrance path*



*Prototyping of the surveillance cameras*



My Role: Making Concept drawings, built entrance path, built interactive surveillance system using Max/Msp

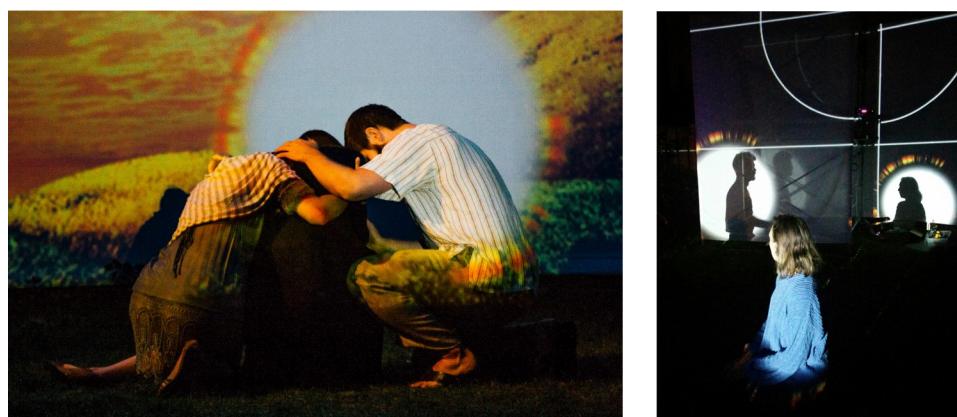
## Interactive Art Installation and Theatre Productions

# Lazarus And His Beloved

Outdoor theatrical production of Lazarus And His Beloved by Kahlil Gibran, in collaboration with Broken Hill Theatre. In this production, I and my teammates created an interactive **projection mapping system**, to map halos to the actors in the projection behind them, using Kinect V2.



*Projection and Stage*



*Halos are projected following the heads of the Actors/Actress*

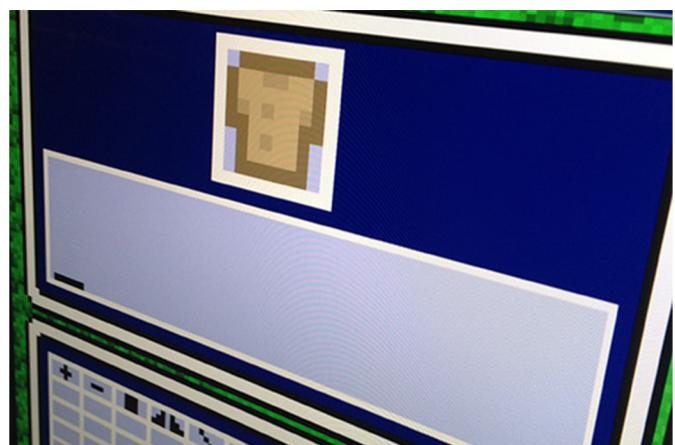
My Role: Programming the display of halos based on the head coordinates in Processing using Java, Design and Implement the Projections on Stage.

Tools: Processing, Max/Msp

## Art Games

# Descendants

Descendants is a 2D open-world sandbox adventure game built on Unity Engine. The game explores indirect human interaction and cooperation through players along the time line. Each player will have 20 minutes of playing time, as the character's lifetime, during which the player will explore, build and invent using resources from the surrounding environment. The first player will start from the Stone Age, while navigating the world and survive with limited food sources, the player can invent tools and linguistic characters, and pass their legacy to the next generation, which is the next player, until the Medieval. The game Descendants was selected to be showcased in the I/O Interactive Exhibition at York University, as well as the Level Up Showcase 2015 at Design Exchange, Toronto (<http://levelupshowcase.com/2015/>).



*Player playing Descendants, and cloth has been created (The Player is naming it)*



*Pixel Art Drawing in Photoshop and texture testing in Unity 3D*

My Role: Pixel Art Drawing, Testing in Unity3D (C#)

Tools: Unity3D, Photoshop

# Programming, Web Development and UI Design

## Food R Us

Food R Us is an e-commerce website using APACHE Server based on MVC structure, coded in Java. The website features full functionality of B2C online shopping, user analysis, user authentication, and a B2C-B2B middleware providing purchase order report files to food supplier. This project has been ranked the 1st place in the course EECS 4413, Building eCommerce Systems, 2015, at York University.

The image displays four screenshots of the Food R Us website, showing its functionality from a user's perspective:

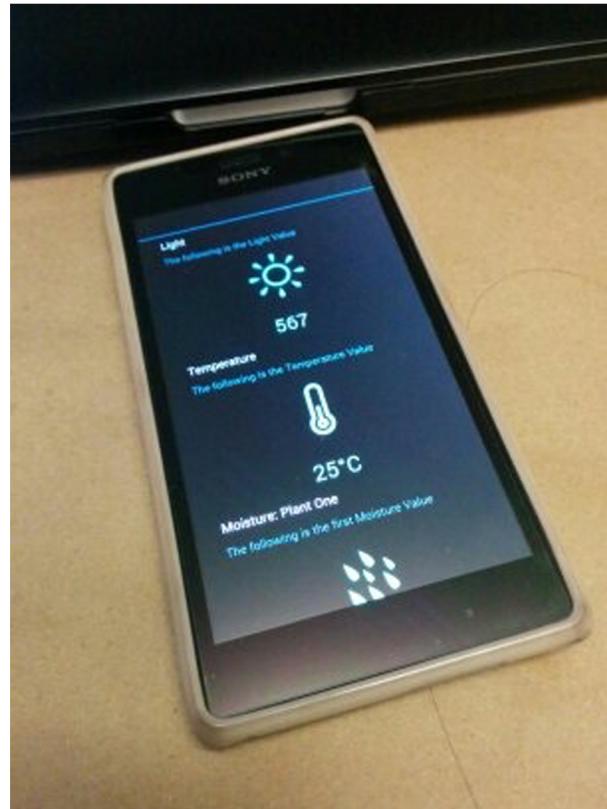
- Homepage:** Shows a wooden cutting board with various food items like onions, berries, and a parsnip. It features a search bar and four category cards: Meat, Cheese, Ice Cream, and Cereal.
- Product List:** Shows a list of products with details like name, product ID, quantity, and price. It includes two product cards: "Semi-Cheddar Cheese by JC" and "Provolone Cheese by RI".
- Shopping Cart:** Shows a cart with one item: "Semi-Cheddar Cheese by JC" at \$4.26. It includes a summary table with Subtotal, HST, and GrandTotal.
- Checkout:** Shows a checkout page with the same cart item. It includes a summary table and buttons for Continue Shopping, Cancel Order, and Confirm.

My Role: Implementing models, views and controllers using Java, Jsp, and designed the visual  
Tools: Eclipse

## Internet of Things Project

# PlantPot

Plant Pot is an Internet of Things (IoT) project developed for the Intel IoT Roadshow 2015 at Toronto. The project features an auto gardenign system using Intel Edison and sensors, sending data to user's mobile phone. The project won the thrid place at Intel IoT Roadshow Toronto.



My Role: Developing the mobile application

Tools: Intel Edison, Intel XDK