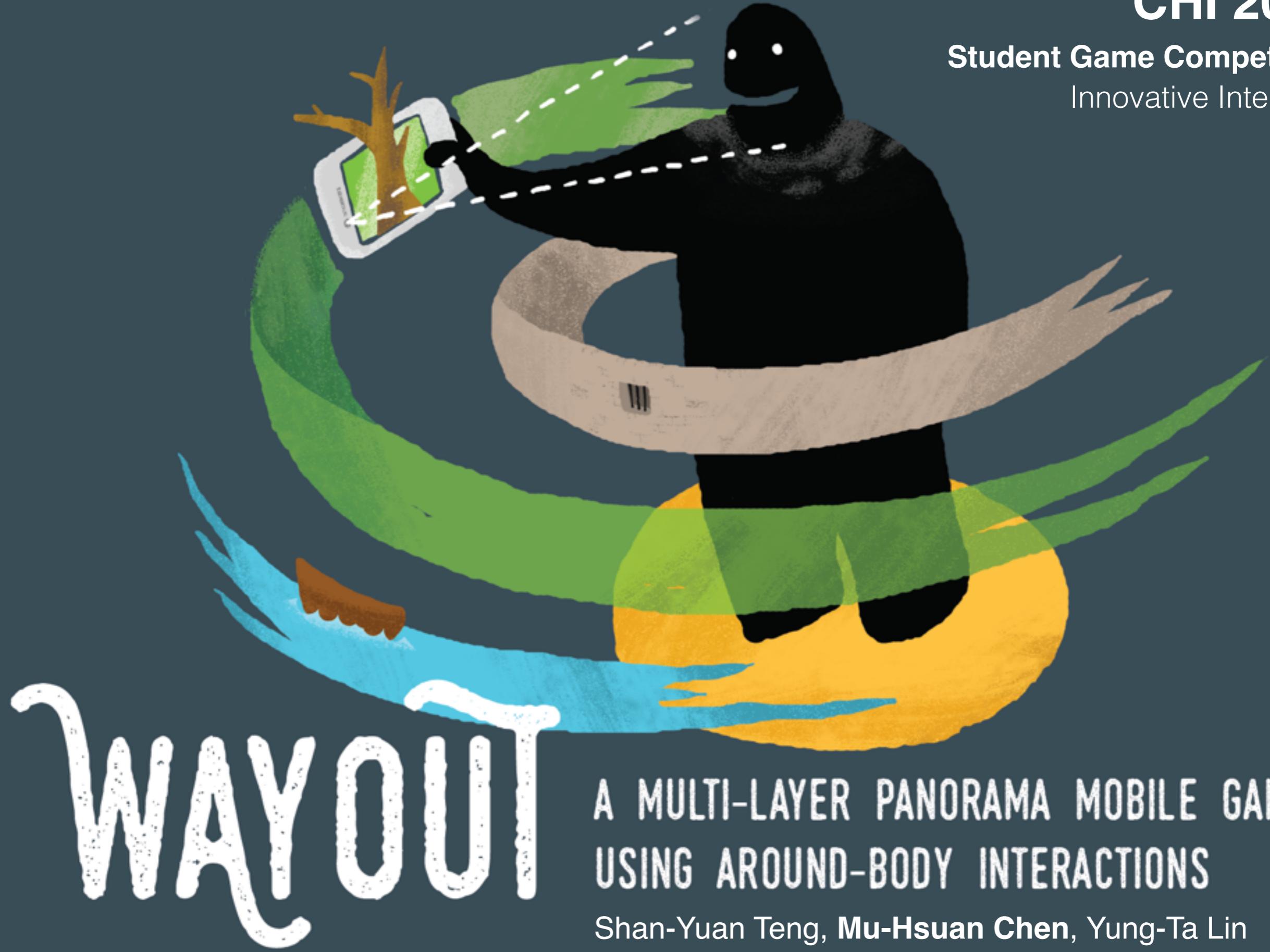


CHI 2017

Student Game Competition

Innovative Interface



# WAYOUT

A MULTI-LAYER PANORAMA MOBILE GAME  
USING AROUND-BODY INTERACTIONS

Shan-Yuan Teng, Mu-Hsuan Chen, Yung-Ta Lin  
National Taiwan University

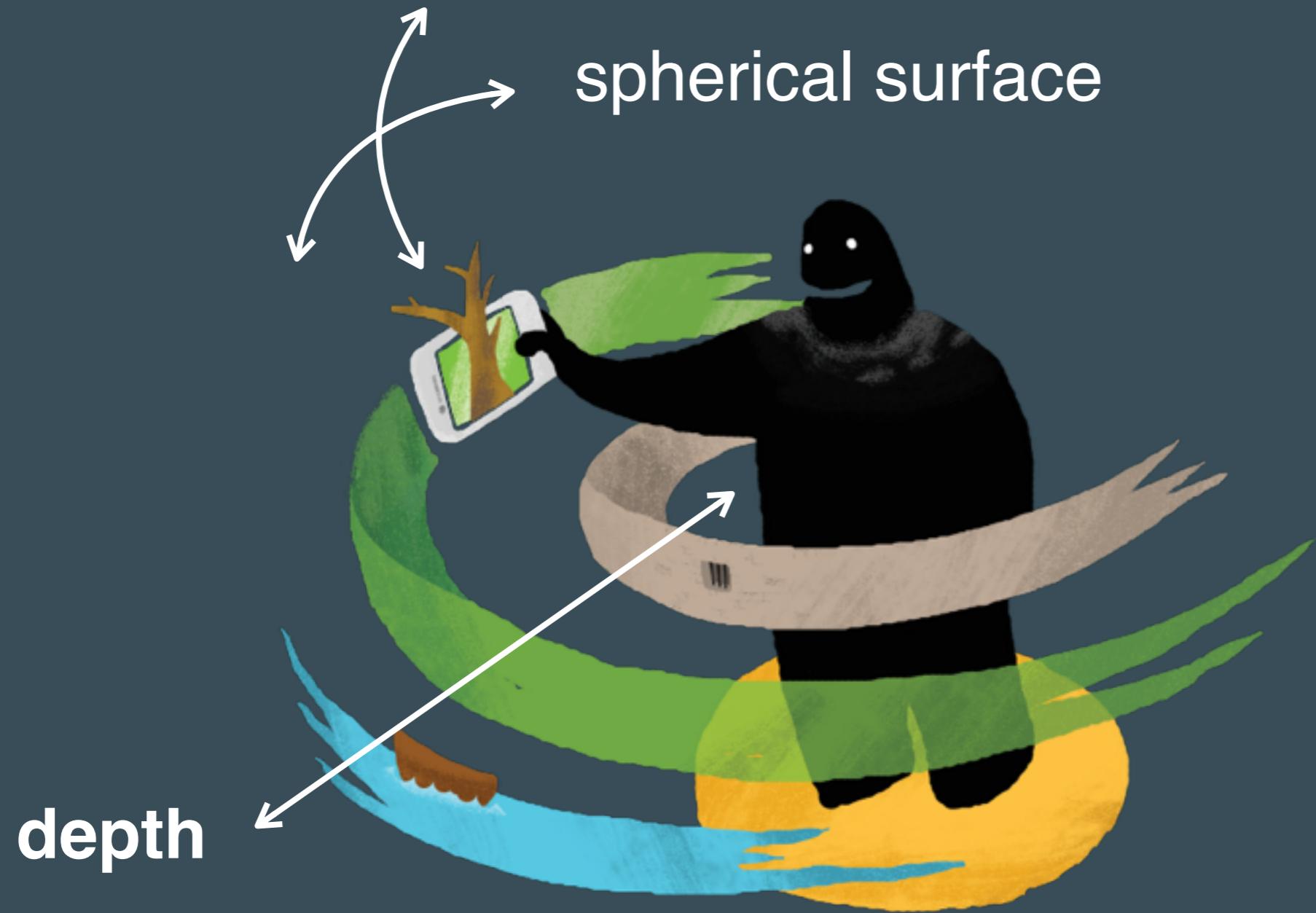


360 degree panorama



spherical surface

Navigation is limited to  
**single-layer panorama**



Depth enables **multi-layer** panorama navigation



**Face tracking**  
with built-in front-facing camera



*Way Out*  
multi-layer panorama interactions



# Technology

**2.** Estimate the distance between phone and player by the distance between eyes\*



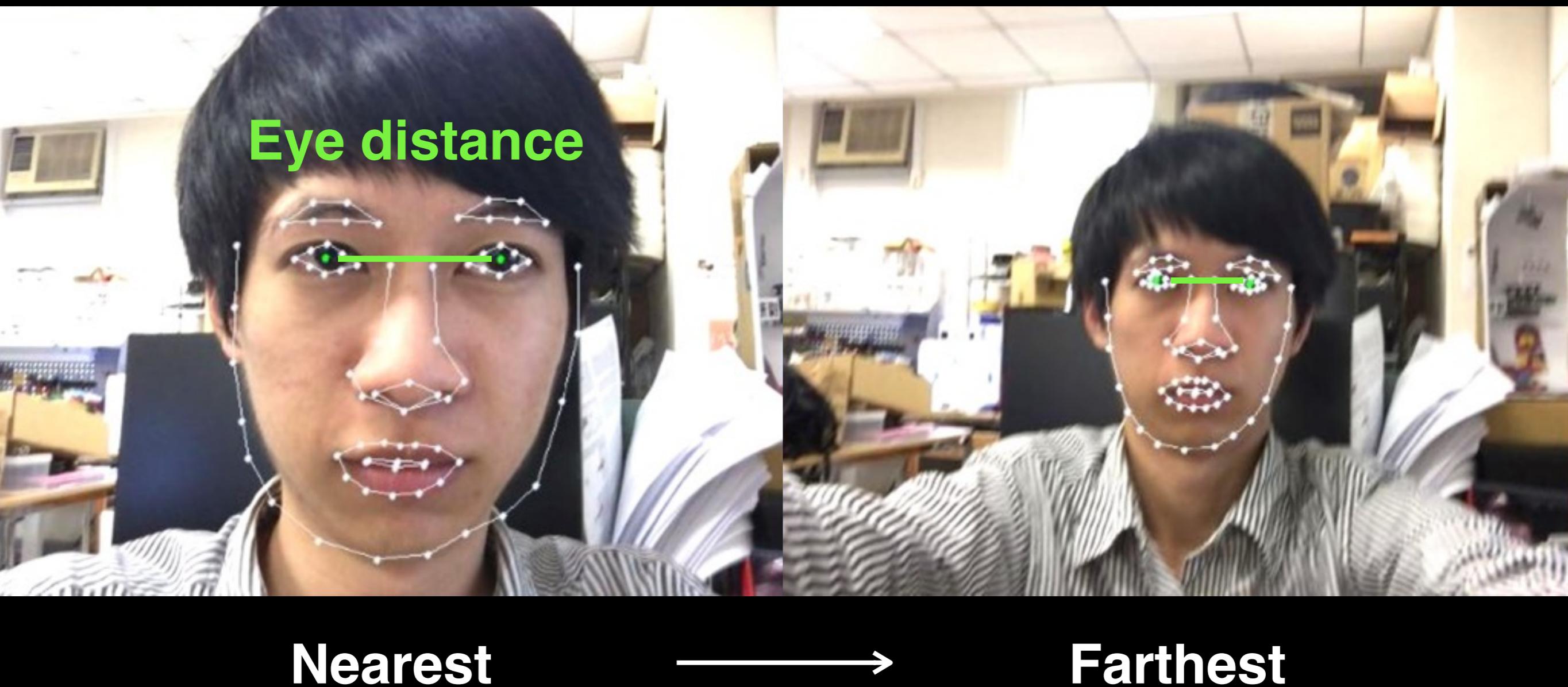
**1.**

Track facial feature points  
with OpenCV using built-in  
front-facing camera

*Unity on iPhone*

\* We have improved the implementation after camera-ready version.

# Non-rigid face tracking (OpenCV)











# Game Design\*

\* We have improved the game design after camera-ready version.

# Multi-layer panorama scene

Layer 1

Layer 2

Layer 3

Layer 4



**Near body**

**find a way out**

**Far**

**Layer 1  
Cell**

**Layer 2  
Wall**

**Layer 3  
Forest**

**Layer 4  
Shore**



# Navigation in 3D space



Explore current layer

Cross different layers

# Dragging and manipulating items



Drag items



Shake tools

# Limitation

Player's **arm is not stable** and **feel fatigued soon**

**The number of layers** is limited since the length of arm and the muscle memory is limited

# Contribution

*Way Out* explores the around-body interactions in multi-layer panorama:

- **Stand-in-place navigation in multiple layers that matches body movement**, which is comfortable and preserves immersivity.
- Multi-layer scenes that make use of player's **spatial memory**.
- **Dragging and manipulating game items** in multiple layers feels more natural.

# THE END



# WAYOUT

A MULTI-LAYER PANORAMA MOBILE GAME  
USING AROUND-BODY INTERACTIONS

Shan-Yuan Teng, Mu-Hsuan Chen, Yung-Ta Lin  
National Taiwan University