VRDC

Designing for AR: A Postmortem on the Development of 'Woorld'

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Introduction and Overview

Who am I?

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What is this talk about?

What is this talk about?

- Not about detailed technical implementations

What is this talk about?

- Not about detailed technical implementations
- Is about the things that we tried and what worked for us in making Woorld

What is Augmented Reality?

Augmented Reality Examples

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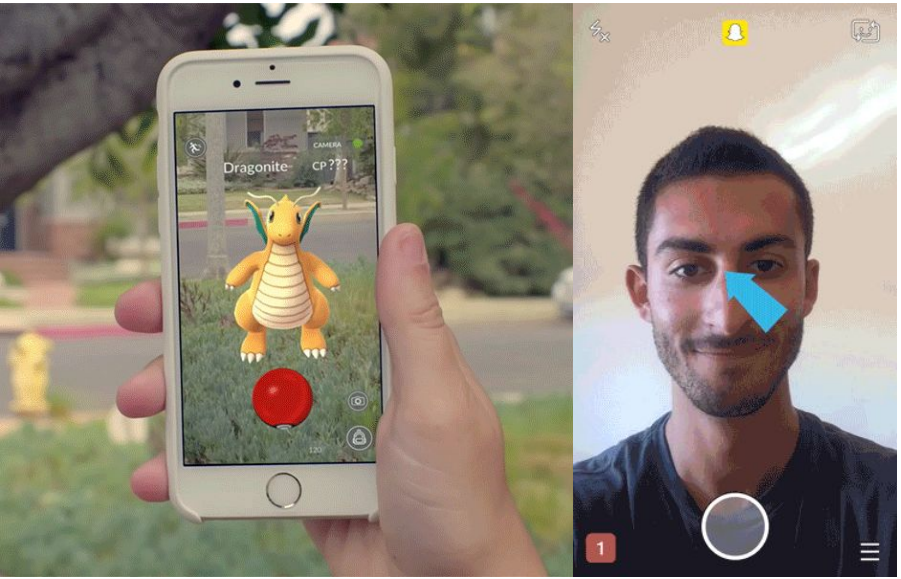
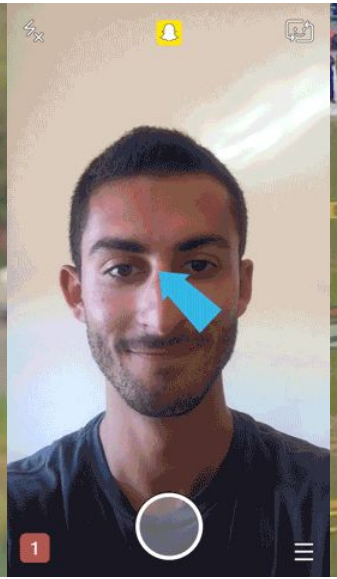
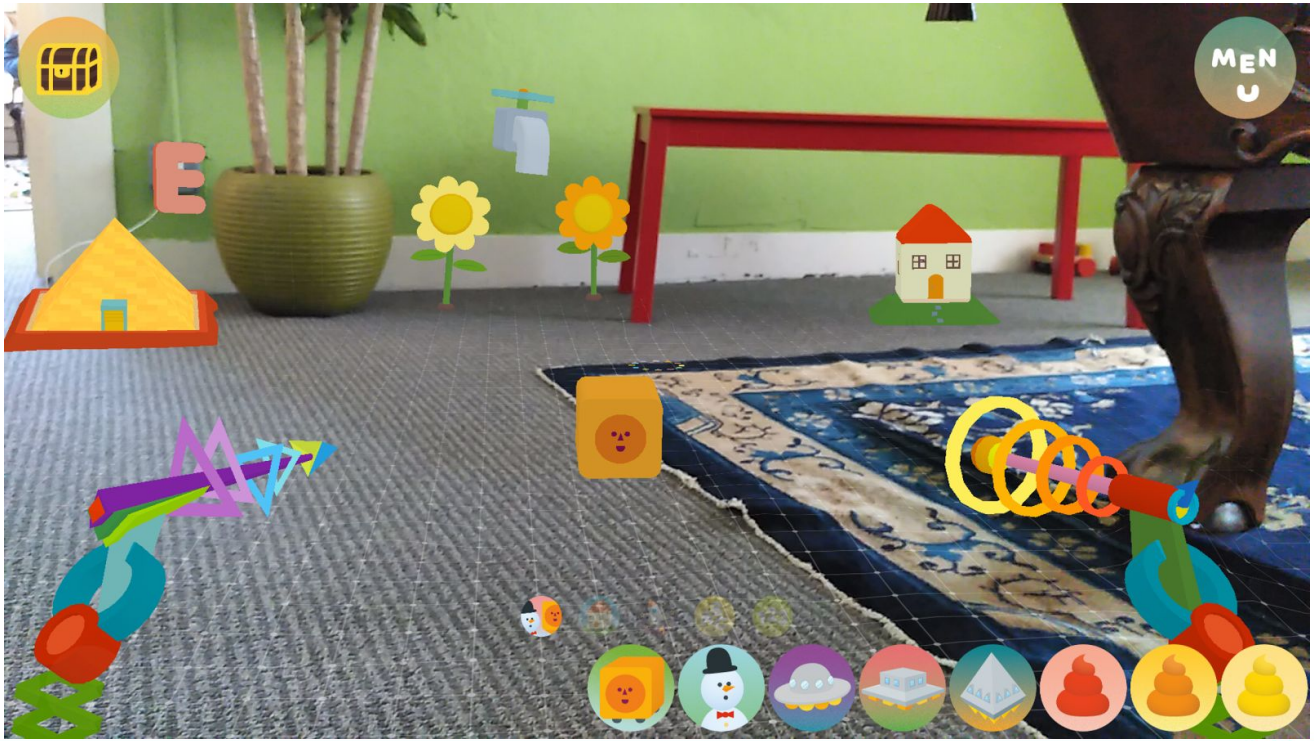


Augmented Reality Examples



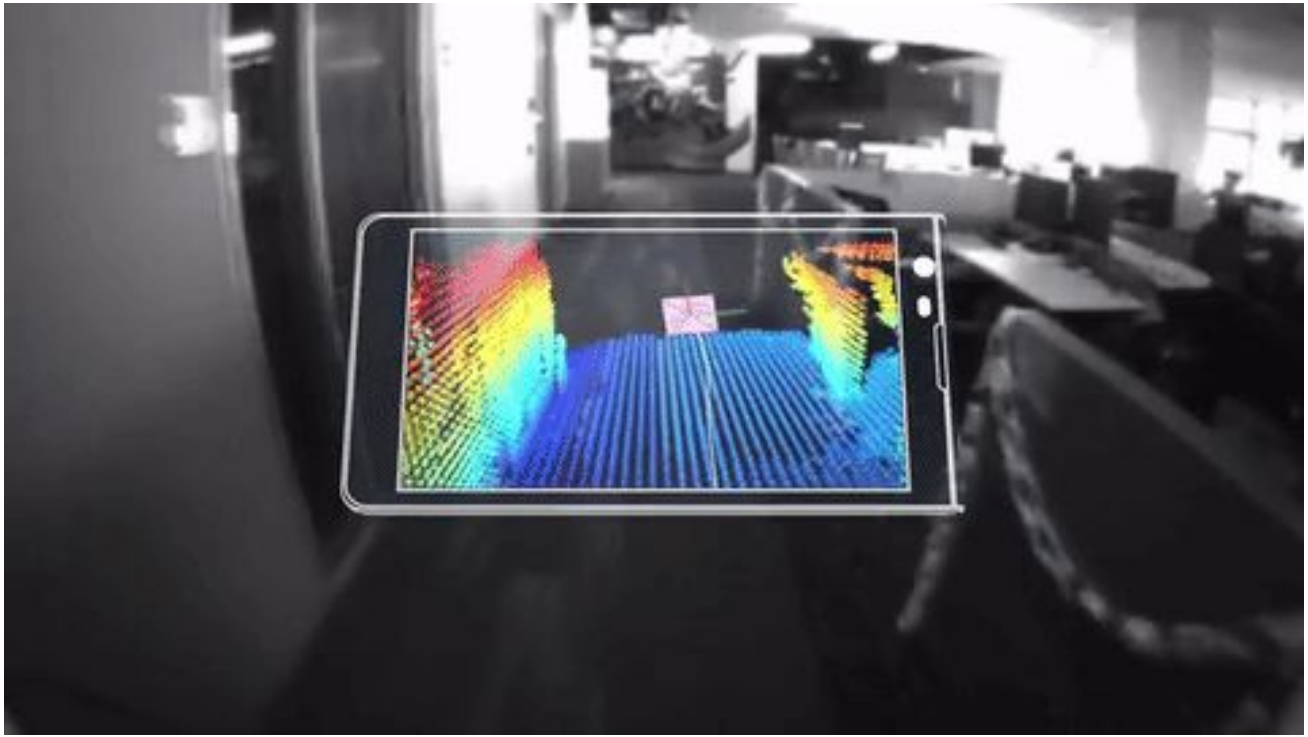
What is ‘Woorld’?

Woorld



What is Tango?

Tango



Tango Devices

Tango Devices

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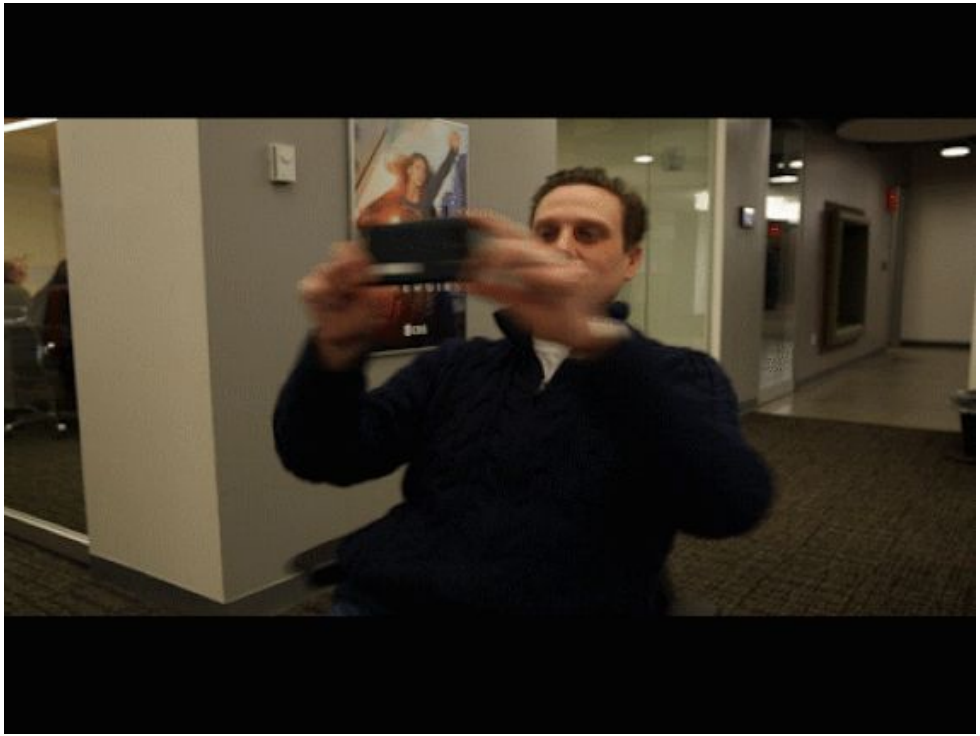
Problems with AR and Tango

No Camera Control



The Messy Real World

Mobile Device Limitations

Mobile Device Limitations

- performance

Mobile Device Limitations

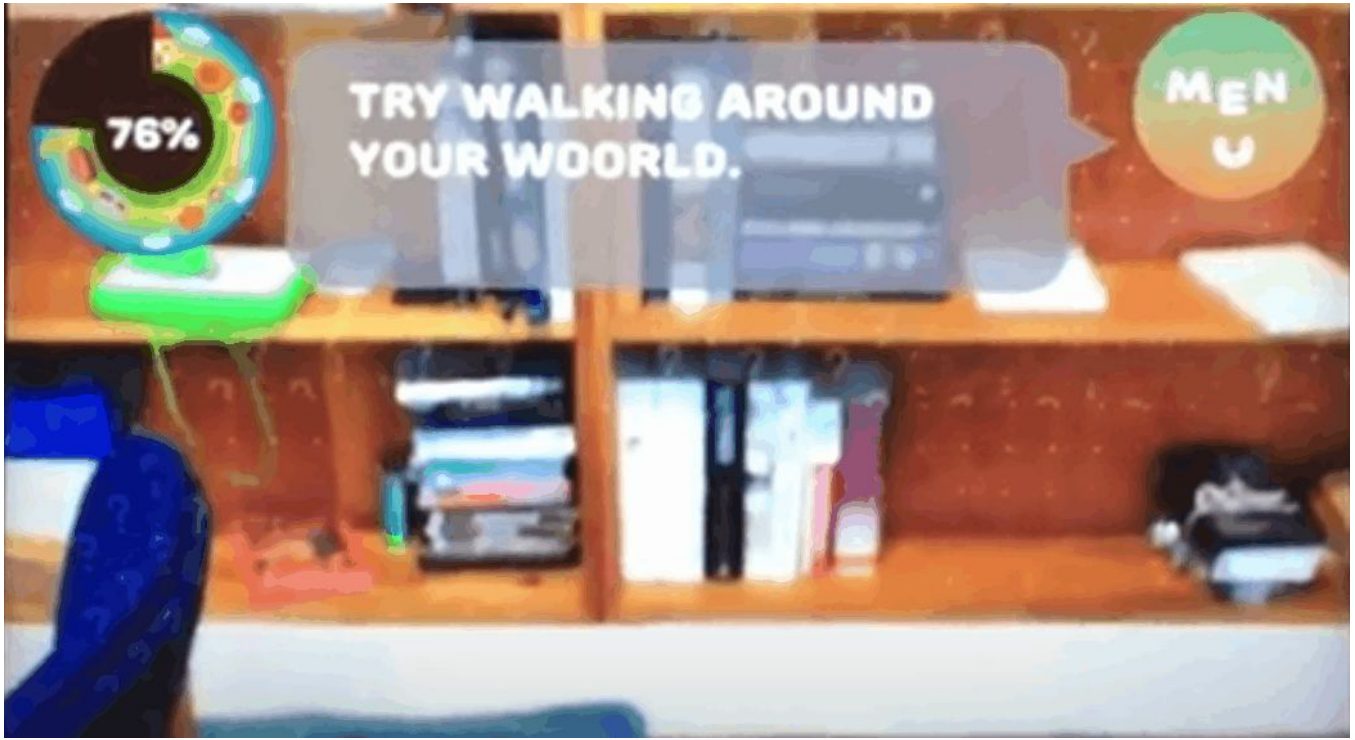
- performance
- Heat and battery drain

Mobile Device Limitations

- performance
- Heat and battery drain
- Heavy to hold

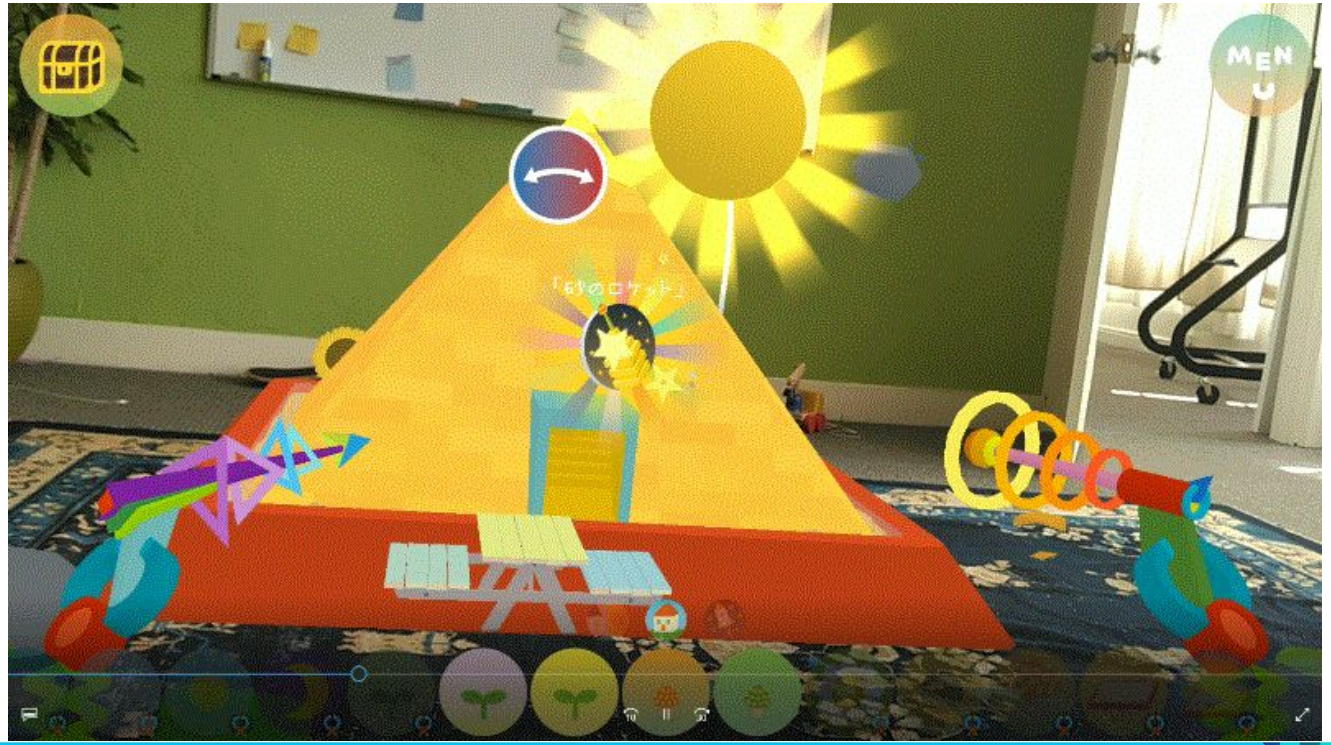
Player Attention

Direct: On Screen UI

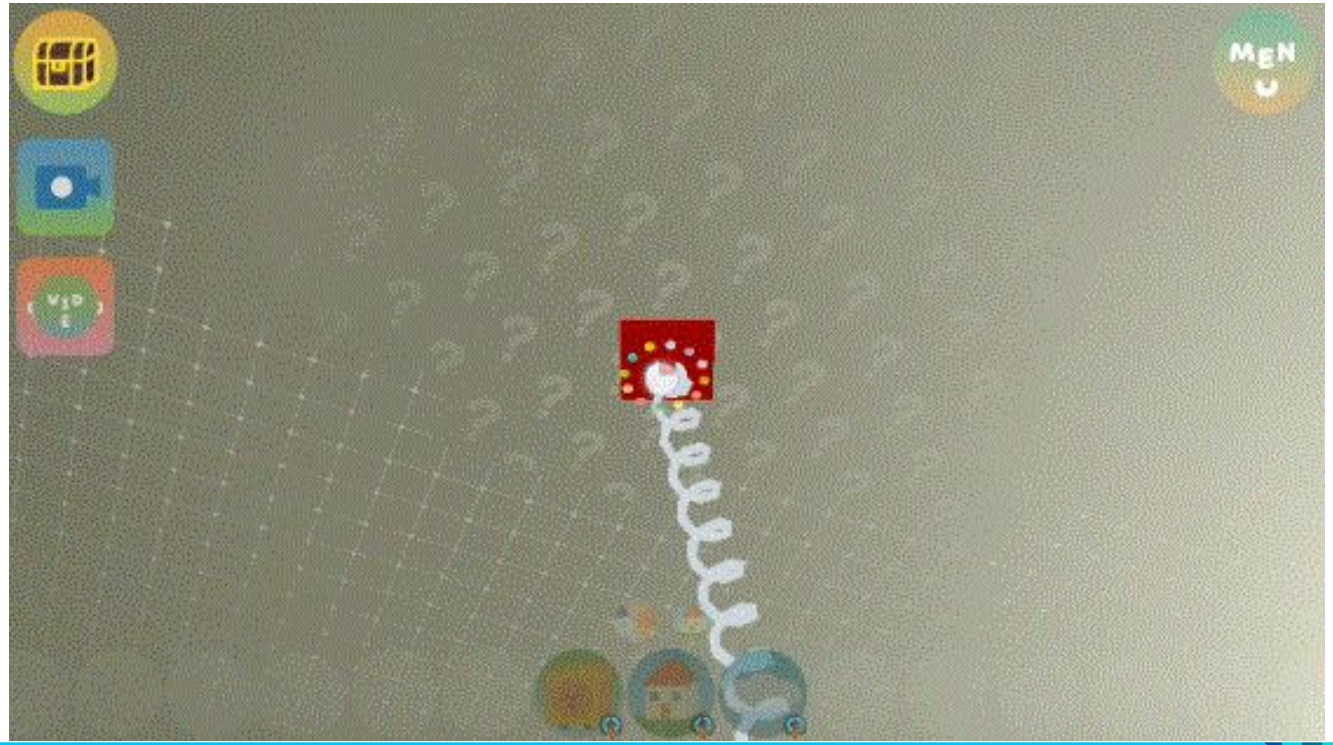


Direct: Attach to Camera

Direct: Camera Tracking



Indirect: Teleport into View



Indirect: Character Movement

Indirect: VFX Trails

Indirect: Combination

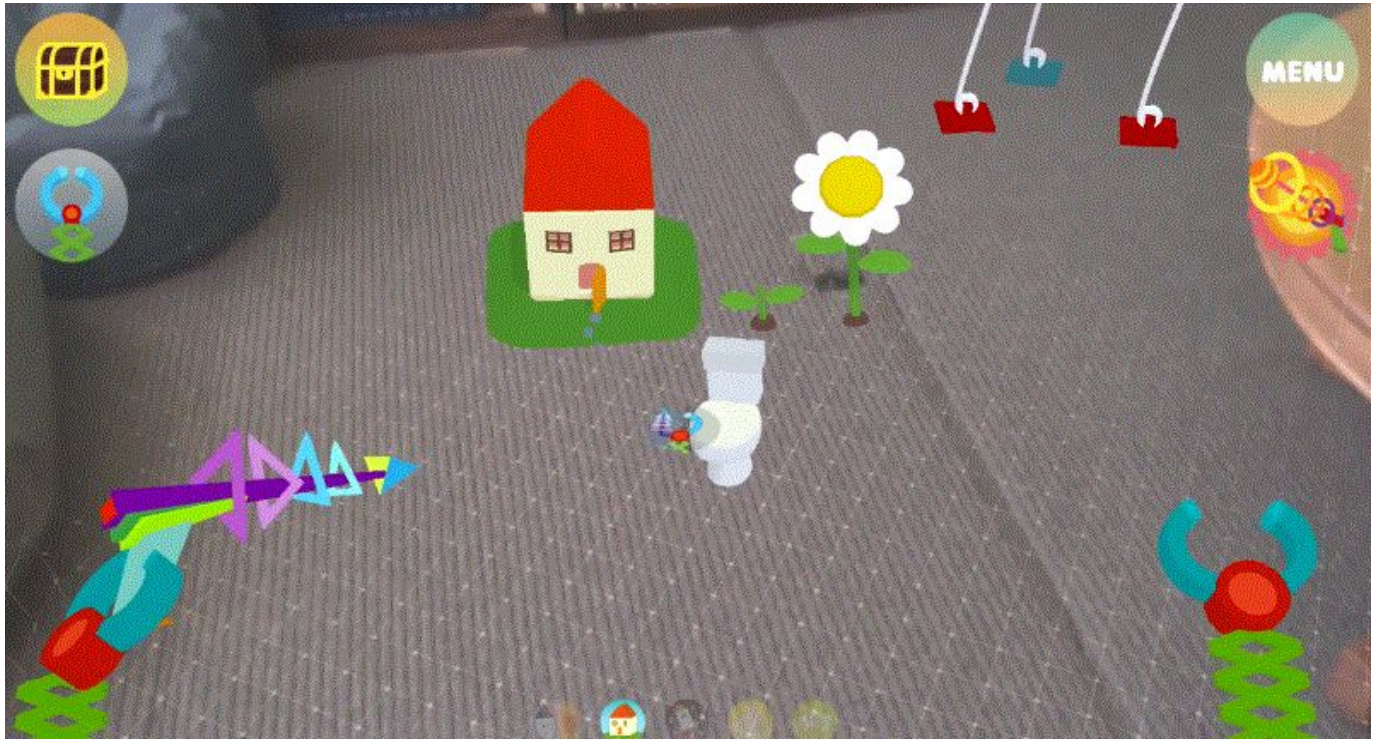
Visual Metaphors

Interaction Design

Direct: Tapping

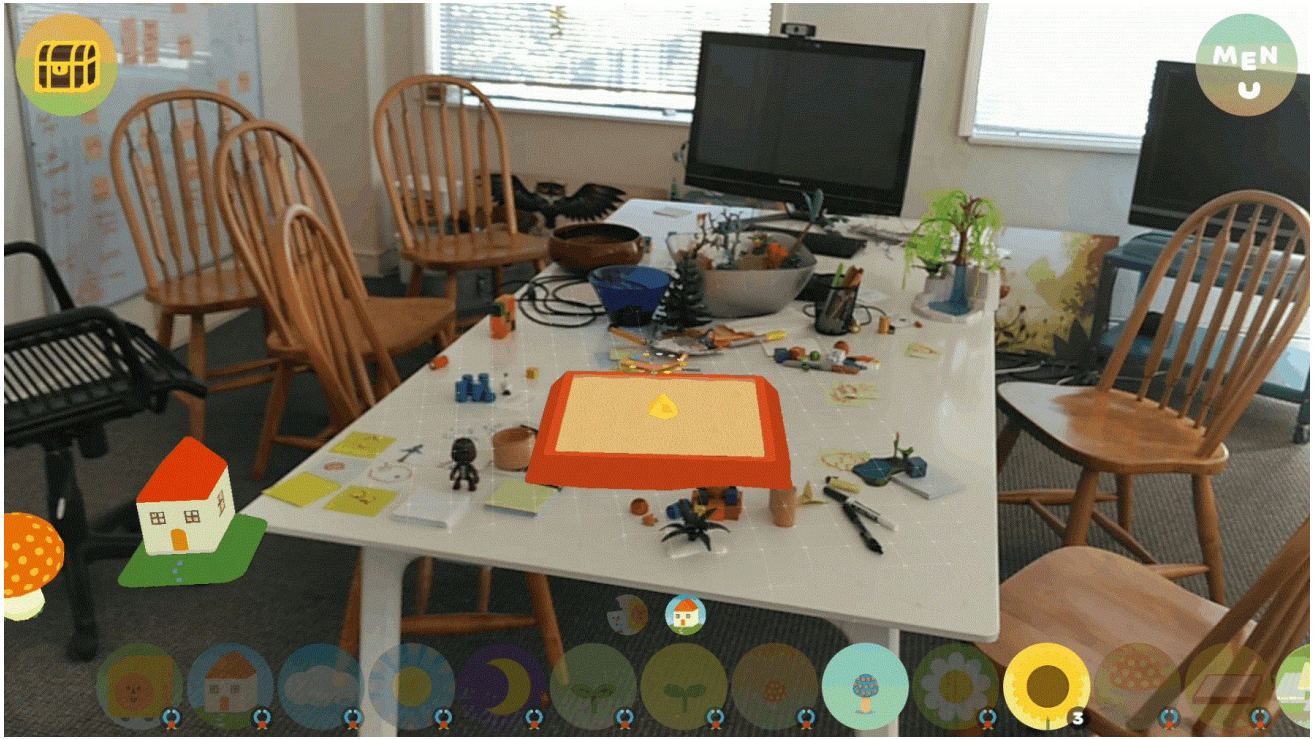
Direct: Touch and Drag

Indirect: Magic Hands



Indirect: Grow and Shrink Rays

Indirect: Context Menu

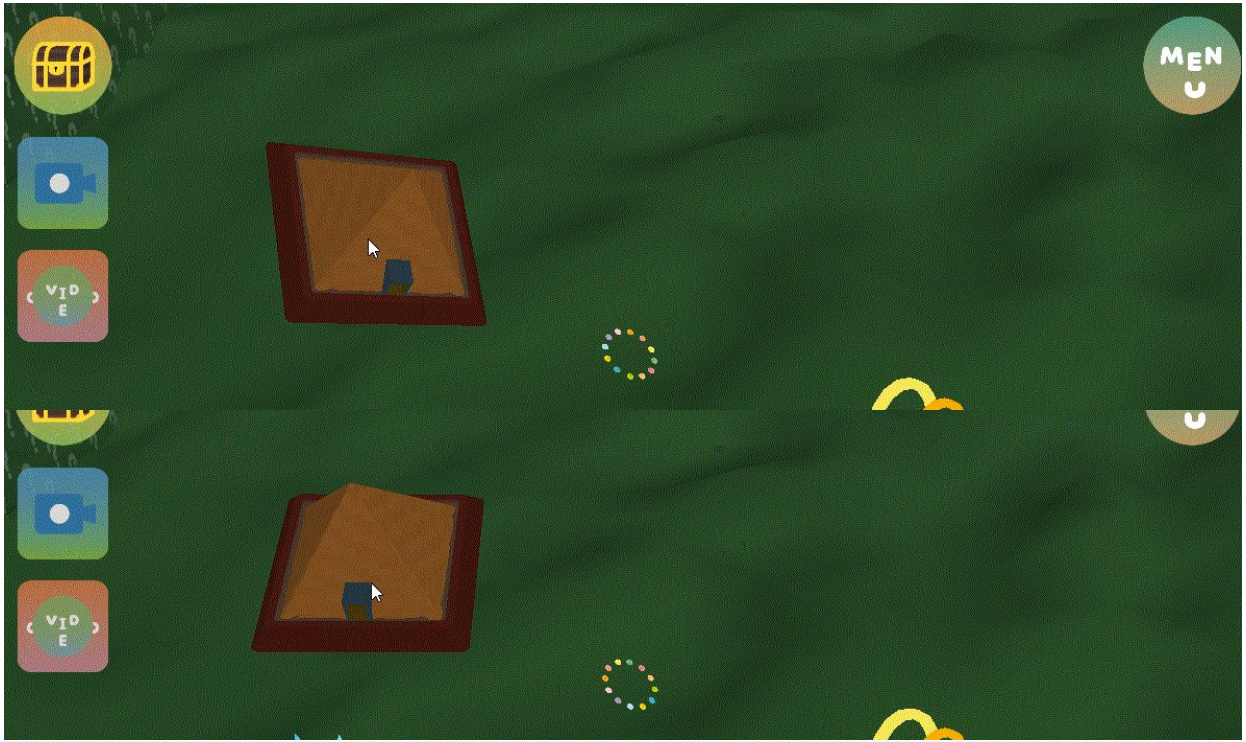


Environment Interaction

Camera Relative Placement

Object Relative Placement

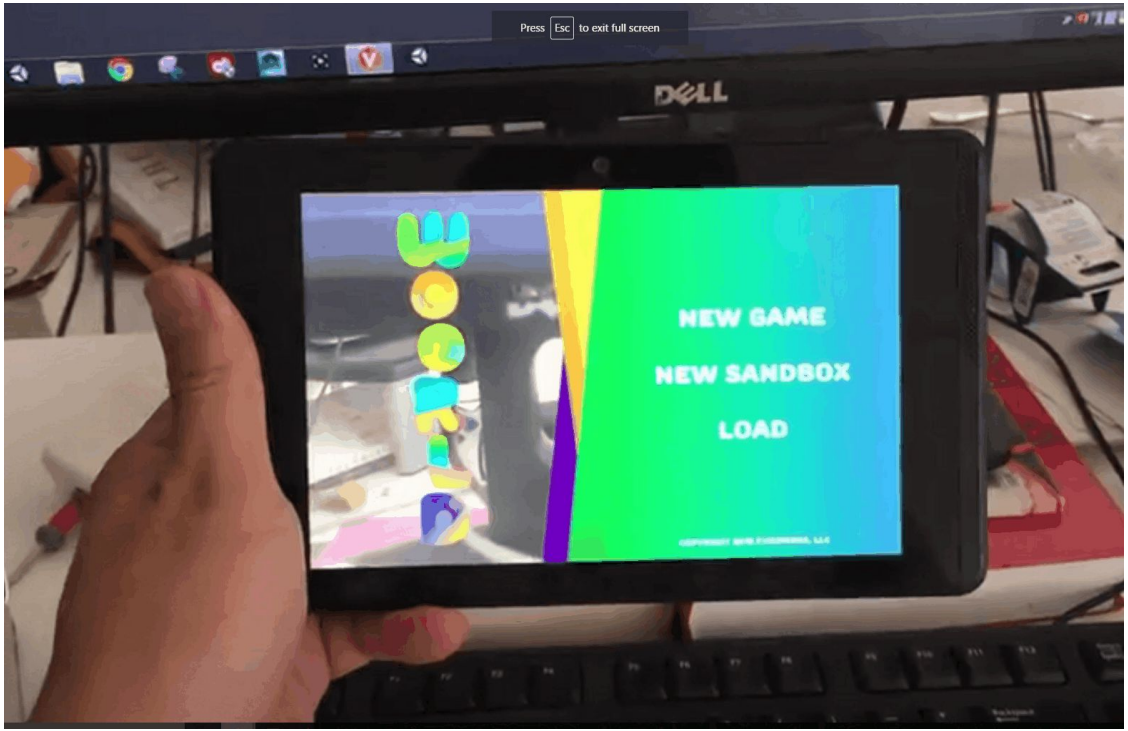
Placement Smoothing



Embodiment

Accommodating the player

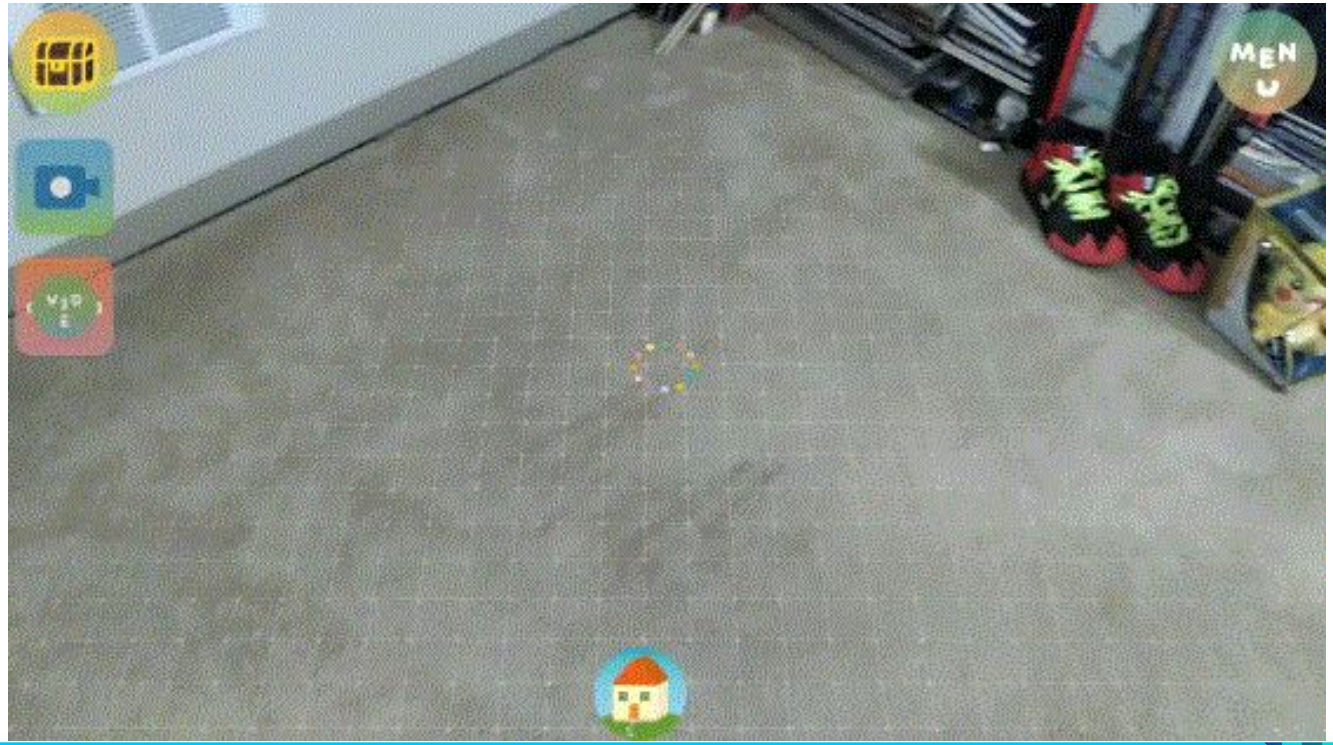
Orientation Independence



Staggered Tutorial

Tutorial: Room Scanning

Tutorial: Object Placement



Tutorial: Physical Movement

Tutorial: Tapping

Tutorial: Dragging

Tutorial: Context Menu

Flexible Gameplay

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- No lose condition

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- Auto-saving

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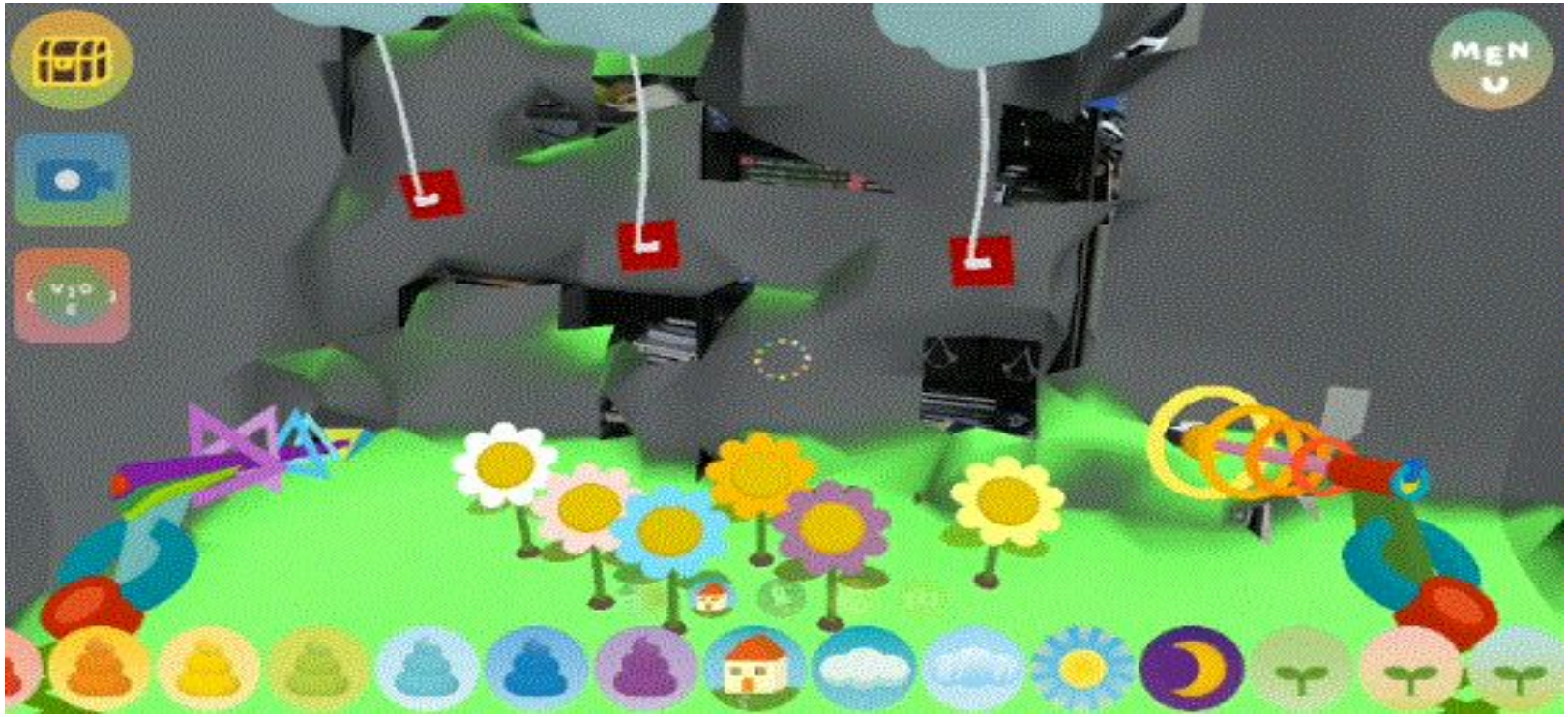
- Easy object recovery

Flexible Gameplay

- No lose condition
- Auto-saving
- Easy object recovery
- Sandbox mode

Virtual Space

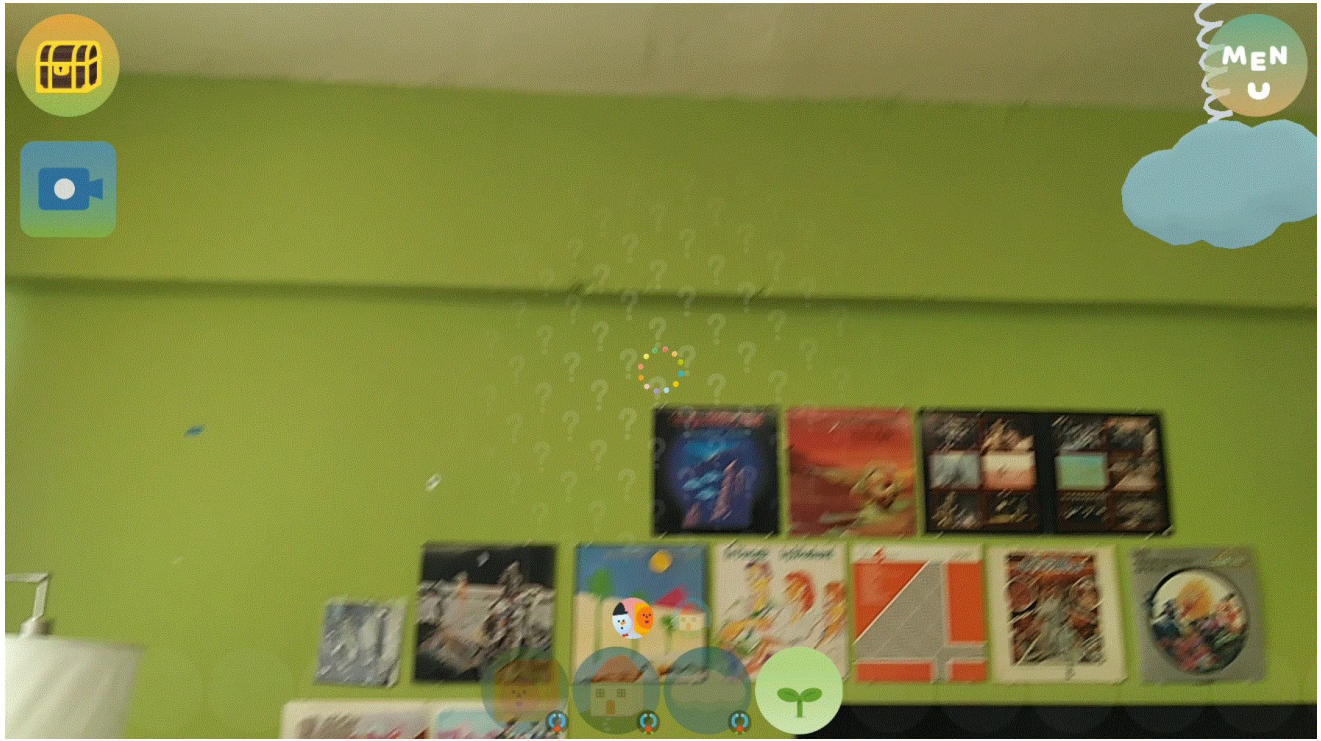
Early Environment Rendering



Final Environment Rendering

Fully Visualized Environment

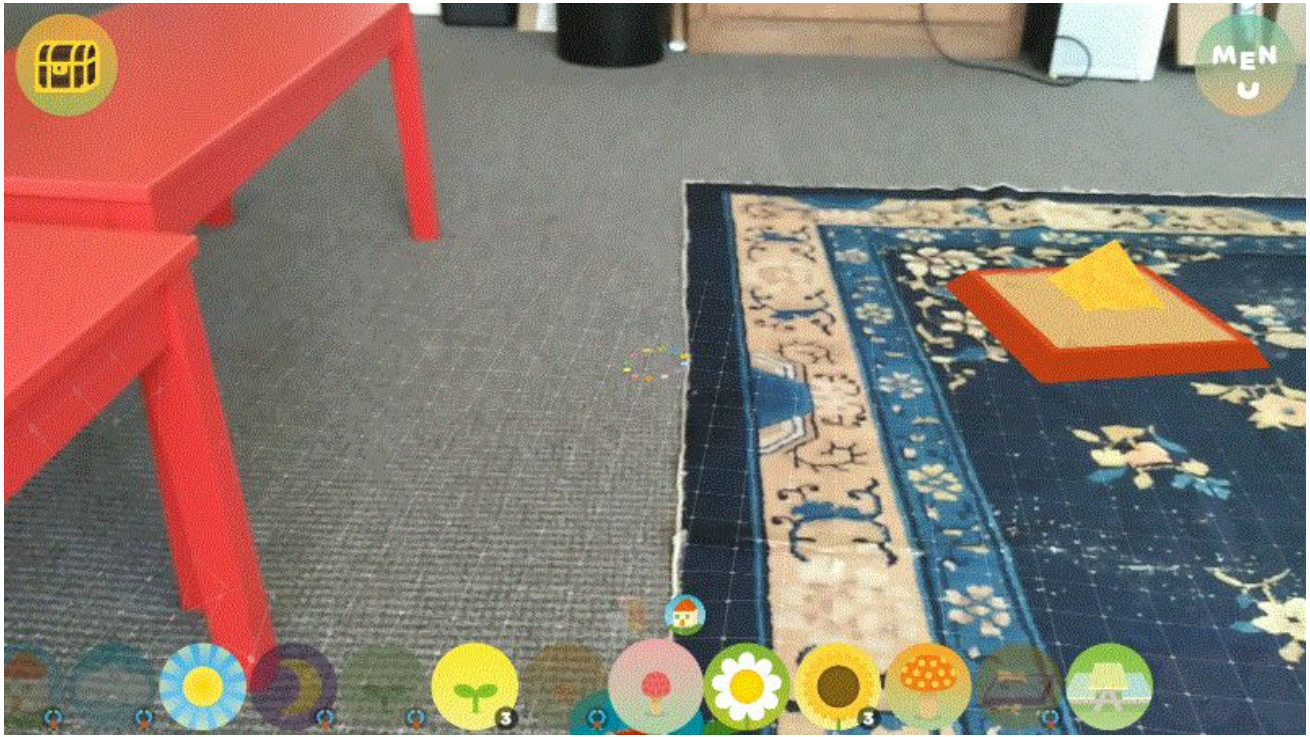
Gameplay Visualized Environment



Environment Subtraction

Cavernous Space

Camera Feed Manipulation



Surface Feedback: Reticle

Surface Feedback: Taps

Virtual Objects

Visual Aesthetic

Physicality

Physicality

Object Permanence

Overcoming Technical Limitations

Save and Load

Optimization and Tips

Mobile performance

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- Low-poly count

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- Share materials/textures

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- Share materials/textures
- Batch render to reduce draw calls

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- Low-poly count
- Share materials/textures
- Batch render to reduce draw calls
- Resolution reduction and upscaling

Unity Optimizations

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- Async load audio assets

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- Crunch textures

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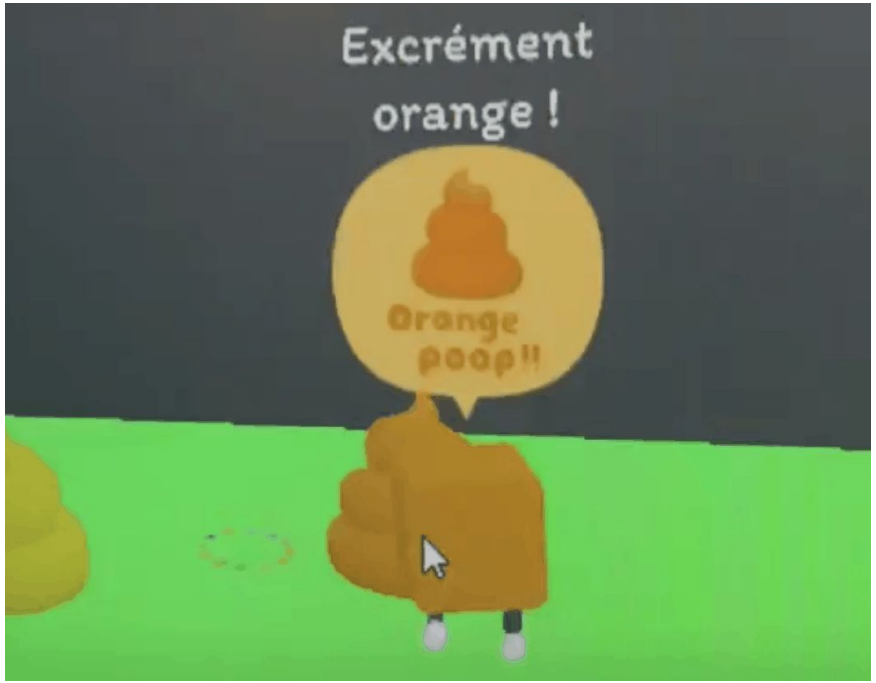
- Atlas sprites

Unity Optimizations

- Async load audio assets
- Crunch textures
- Atlas sprites
- Use physics layers

Development Environment

Localization



Final Takeaways

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- Be aware of the player’s perspective

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- Be adaptive to the environment

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- Be aware of the player's perspective
- Be adaptive to the environment
- Test test test!

Q&A