



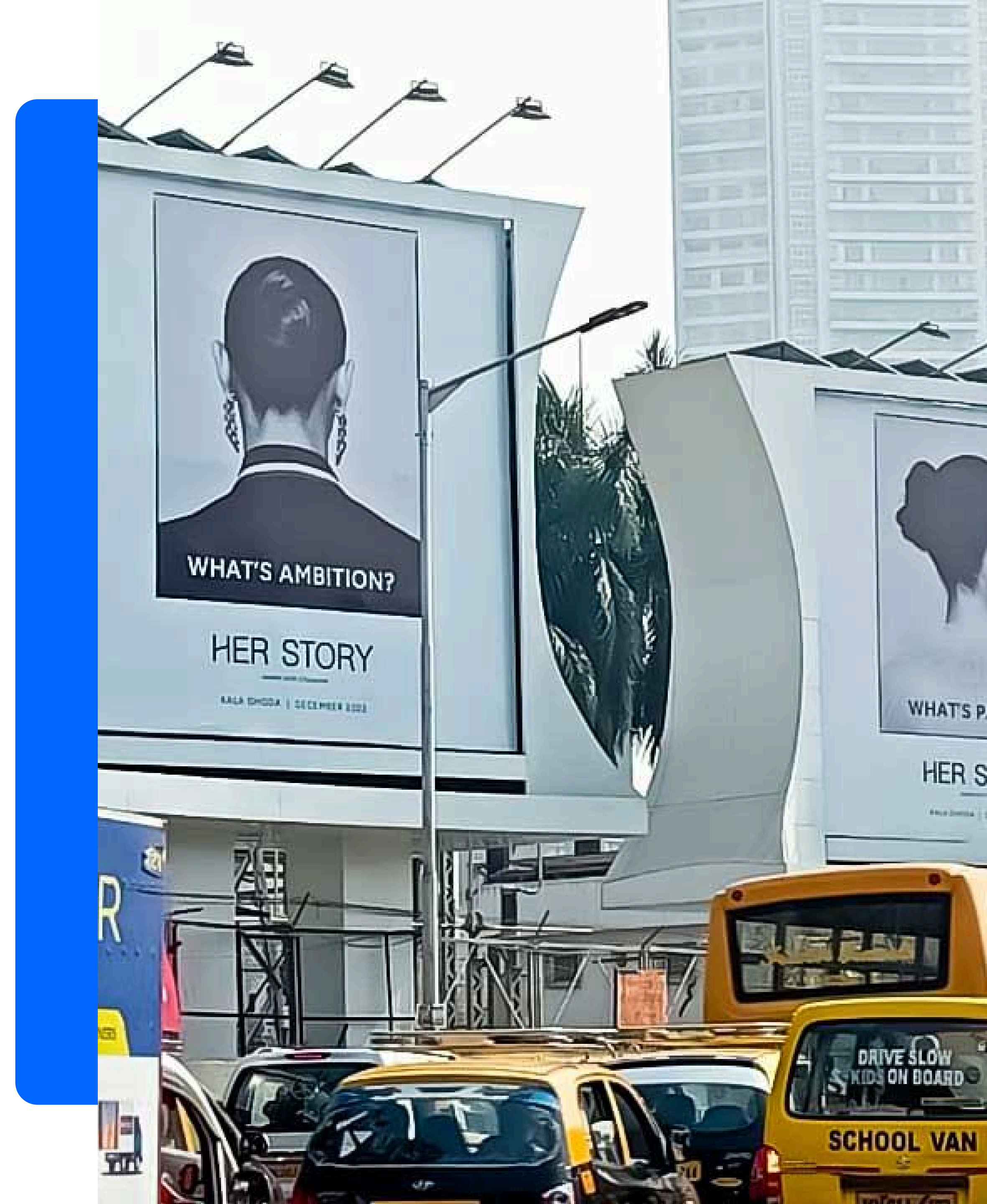
Gesture-Based Game for Immersive Advertisements in Urban Spaces of India

save

Burst

INTRODUCTION

With traditional OOH ads losing impact in busy urban spaces, advertisers are exploring more engaging formats like digital OOH and advergames. These interactive experiences turn viewers into participants, making ads more memorable. This project investigates how gesture-based advergames can bring playful, immersive interaction to public advertising

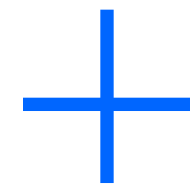


REIMAGINING URBAN ADVERTISING

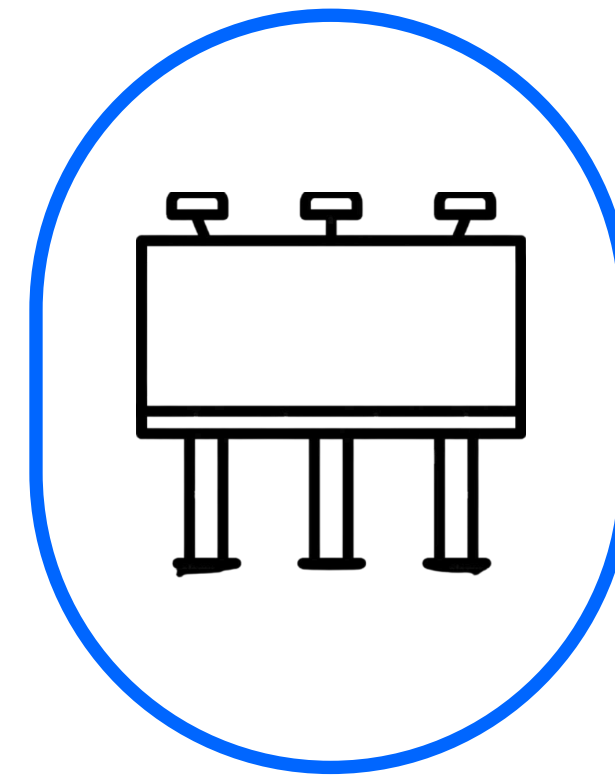
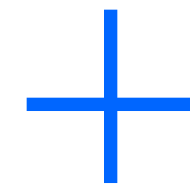
With the rise of interactive technologies, there's a growing opportunity to turn public advertising into something people don't just watch but actively play with.



Gesture-Based Input



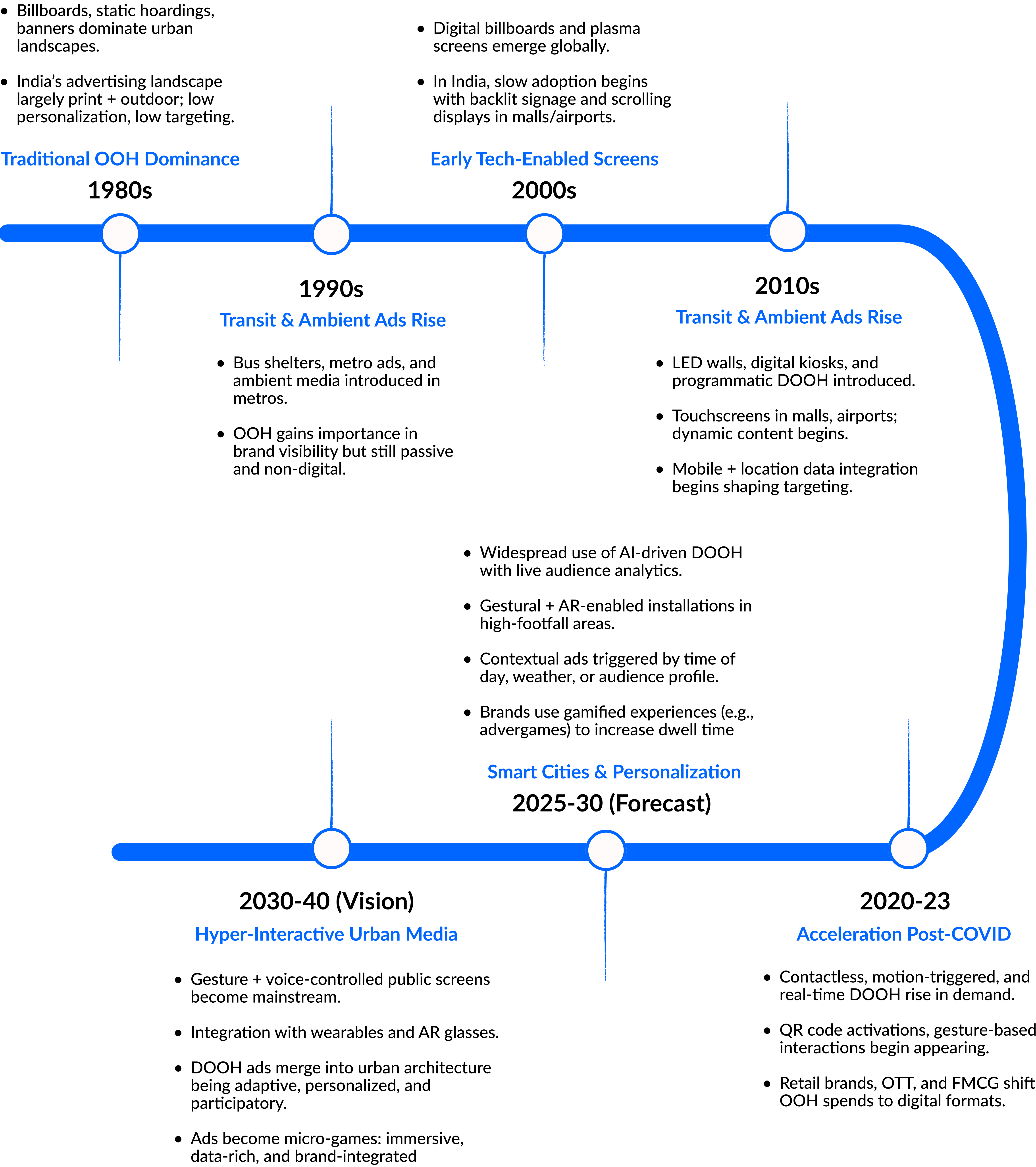
Game Mechanics



Public Screens

Can transform ads into participatory experiences that attract attention, prolong interaction time, and enhance message recall.

EVOLUTION OF OOH TO DOOH IN INDIA

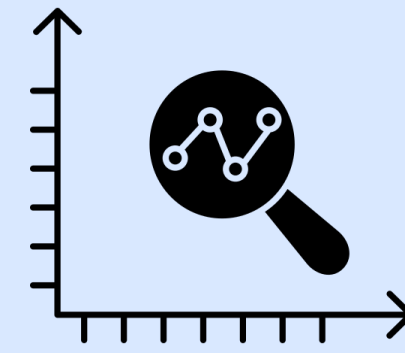


MARKET SIZE & OUTLOOK



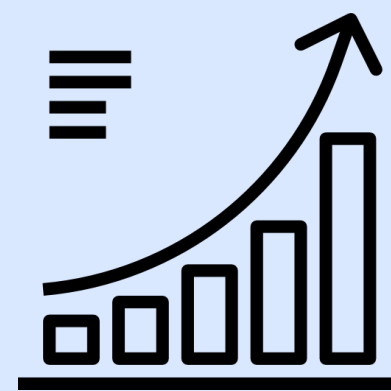
Revenue 2024

₹2,359.61 Cr



Forecast 2030

₹5,260.5 Cr



CAGR 2025-2030

13.8%

USER ENGAGEMENT ACROSS AD MEDIUMS

Criteria	Static Ads	Interactive Ads	Advergames
Engagement Level	Low	Moderate to High	Very High ($\approx 2\times$ higher than static)
Brand Recall	Low (Passive Exposure)	Improved via interaction and personalization	High ($\approx 3\times$ higher than static ads)
User Control	None	Partial (e.g., click, swipe)	Full control through gameplay and decision-making
Emotional Involvement	Minimal	Moderate (depends on design)	High (fun, competition, immersion)
Attention Span	Short	Longer if content is dynamic	Longest due to goal-driven interaction
Message Delivery	One-way, often overlooked	Responsive, can adapt to viewer behavior	Integrated into game mechanics and visuals
Best Use Context	High-footfall locations	Targeted digital platforms, smart kiosks	Malls, exhibitions, campaigns requiring deeper engagement
Brand Integration	Visual only (logo, tagline)	Click-throughs, branded microsites	Deep integration (characters, storyline, rewards)
User Experience	Passive, low recall	Interactive, moderately engaging	Participatory, memorable, emotionally engaging

UNCOVERING THE PROBLEM SPACE

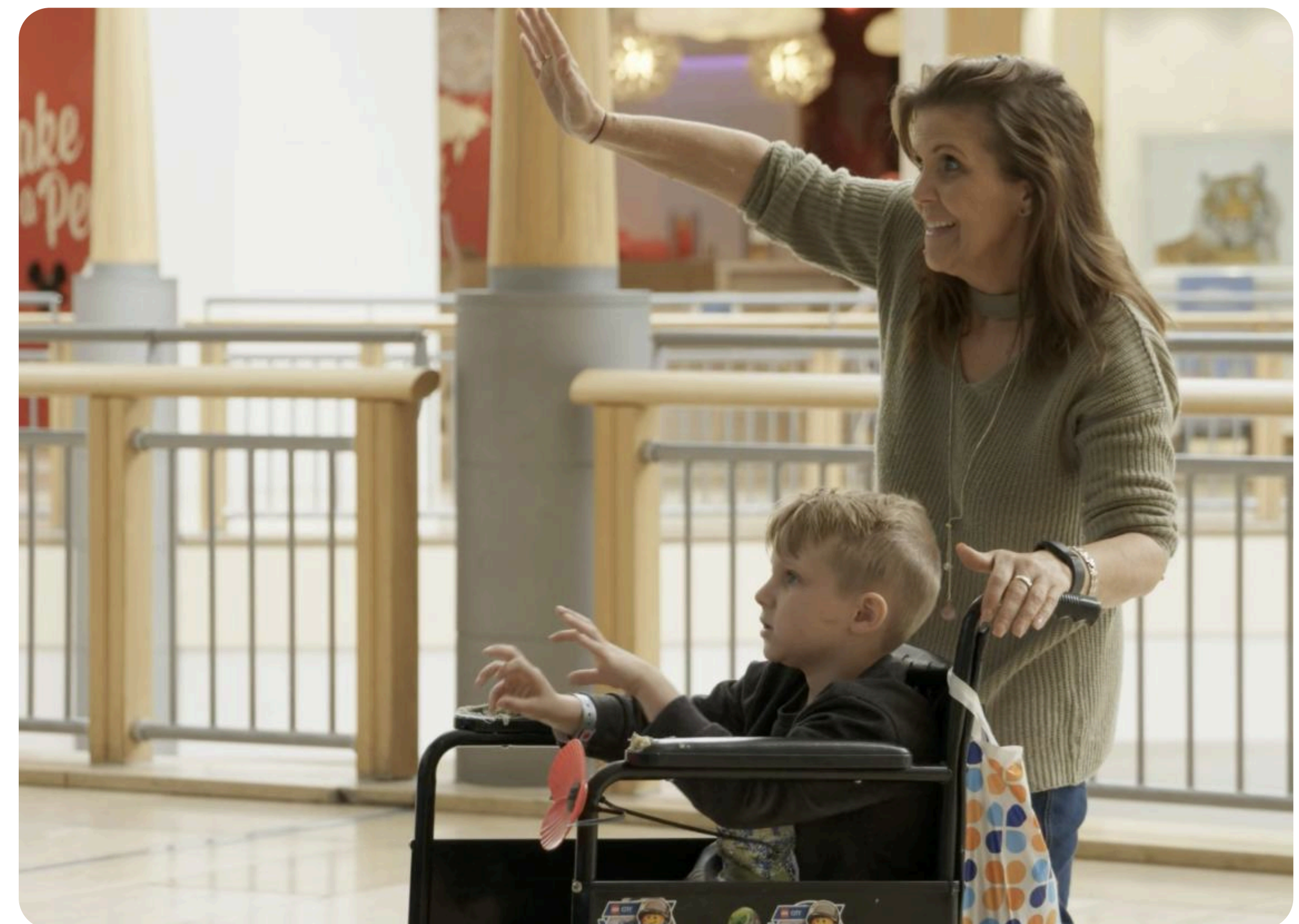
Real-World Observations



Traditional outdoor advertisements in India often go unnoticed due to their static nature and oversaturation in urban environments.

INSPIRATION

Experiential campaign by LEGO Star Wars named “Master the Force” at a mall in the UK



The LEGO ‘Master the Force’ campaign used gesture-based interaction to turn public advertising into a memorable, participatory experience.

DESIGN CURIOSITY

**What if we brought something similar to
Indian public spaces with a purpose deeper
than play: **advertising?****

SEARCH OVERVIEW

Google Scholar

Brand Memory

Emotional Engagement

Google Scholar

Touchless

Intuitive

Embodied Play

Google Scholar

Static

Crowded

Lacking Interactivity

Google Scholar

Memories

Participatory

INSIGHTS OVERVIEW FROM LITERATURE REVIEW

01

Advergames and Persuasive Play

Advergames combine entertainment with brand messaging, leading to greater emotional involvement and memory retention. Studies show that they can achieve up to 2× higher engagement and 3× stronger brand recall than static ads.

(Cauberghe & De Pelsmacker, 2010, p. 3)

Gesture Interaction in Public Displays

02

Gesture-based systems promote touchless, intuitive interaction—ideal for public installations. Research has shown that such interfaces increase participation and attract attention due to their novelty and embodied interaction.

(Müller et al., 2012, pp. 117–118)

03

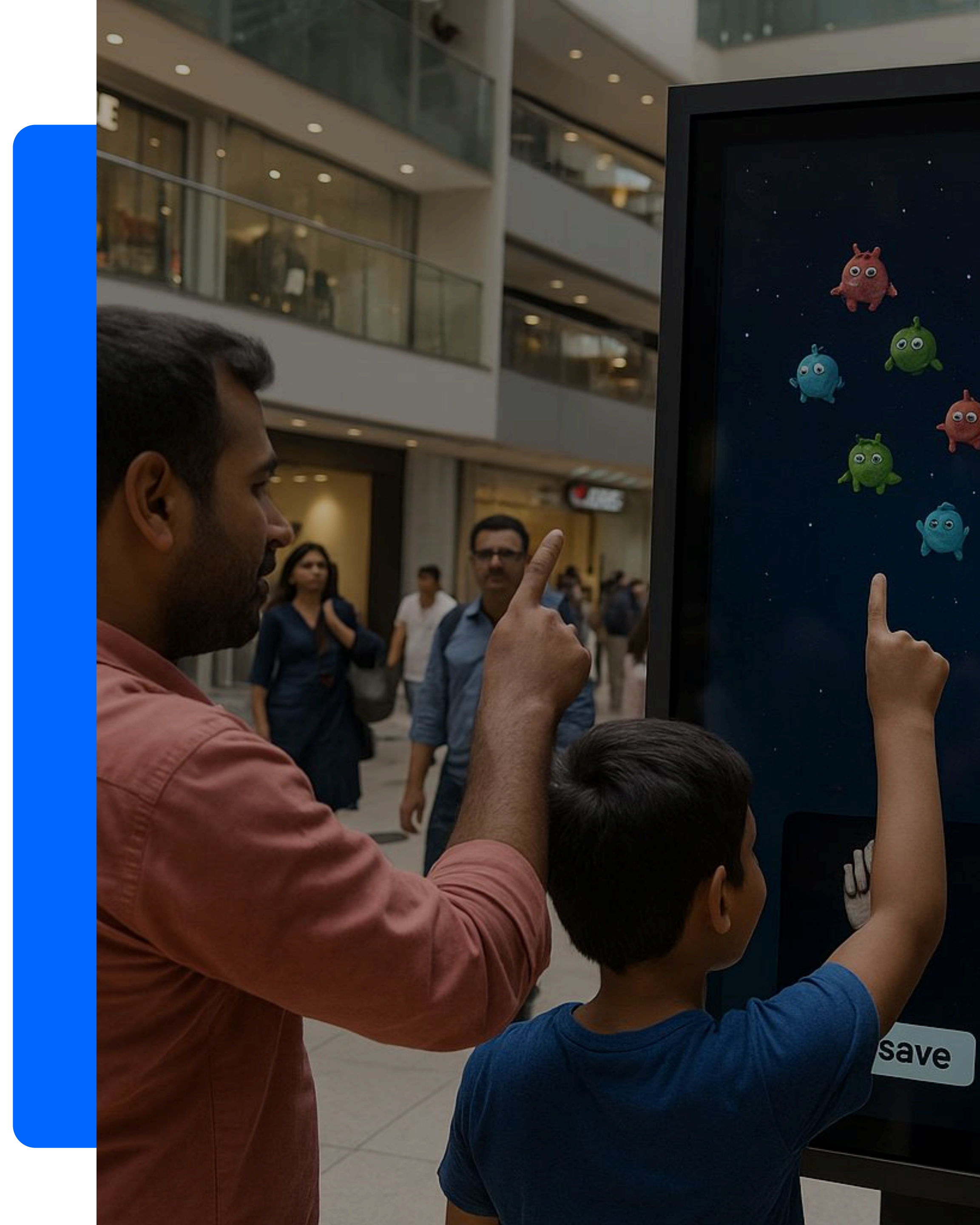
The Indian OOH Landscape and Missed Opportunities

India's OOH market is large (₹4,650 Cr in 2024) but underutilized in terms of interactivity. Most campaigns still rely on static visuals, missing the opportunity to engage audiences through immersive technologies.

(IMARC Group, 2024, p. 7; Emerald Insight, 2016, p. 2)

AIM

To design a gesture-based, immersive advertising game that transforms passive public screens into engaging brand experiences and is easily deployable in urban spaces using minimal hardware and adaptable for various brand narratives.



OBJECTIVES

01

Easy to Play

The gameplay needs to be simple and intuitive, requiring only basic hand gestures that users can perform without instruction. This ensures it can be enjoyed even in high-footfall, fast-paced public environments like malls or stations.

Short and Engaging

02

The game must be designed to deliver a complete experience in under 2 minutes, making it ideal for capturing quick attention while ensuring users stay long enough for the brand message to register.

03

Hardware-Free & Public-Space Friendly

The system should work with just a standard webcam and should not require wearables, controllers, or touch input making it scalable, contactless, and hygienic for use in public installations.

Brand Adaptability & Customization

04

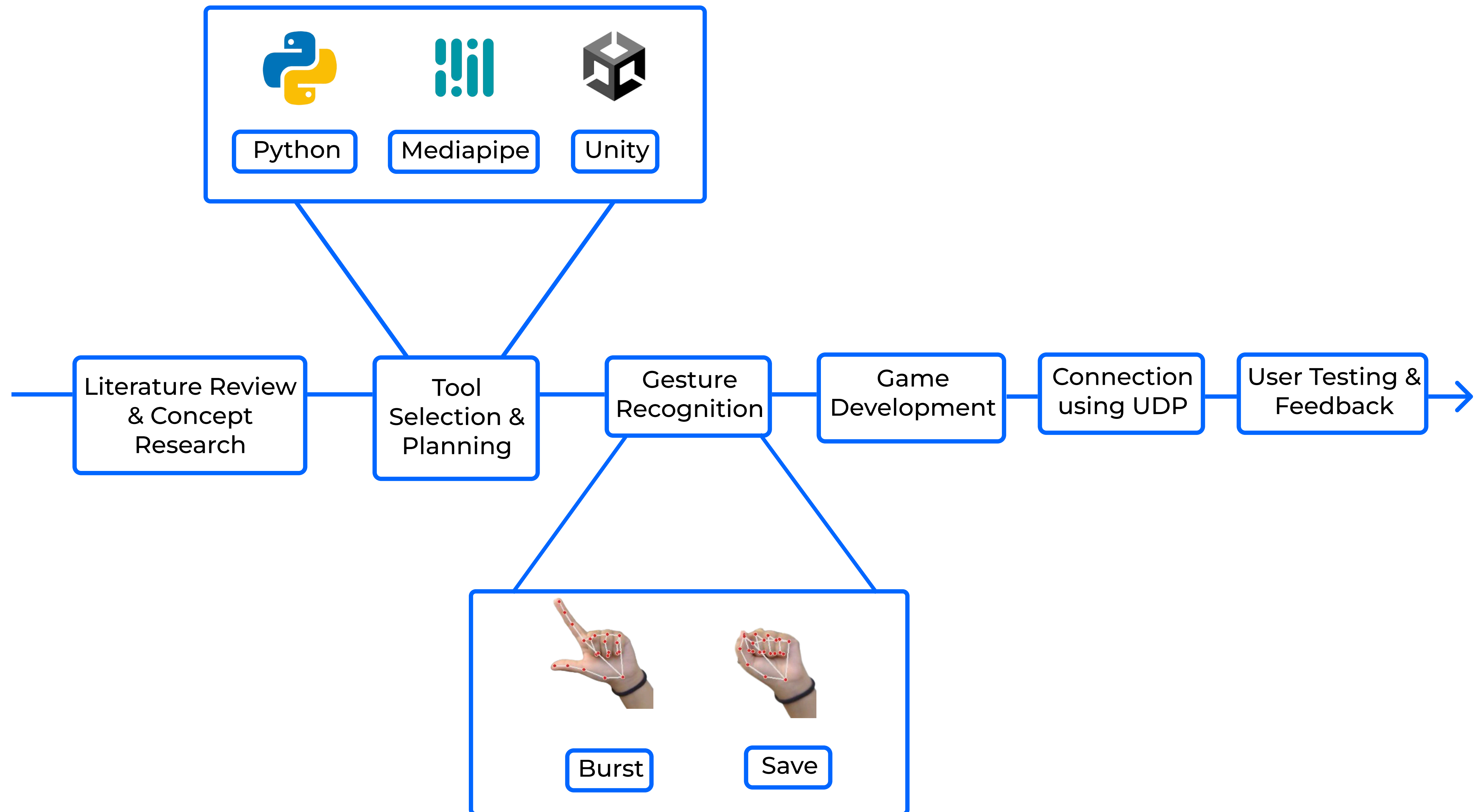
The game must be built as a modular framework, allowing brands to easily integrate their identity without altering the core interaction. Customizable elements include:

- Characters (e.g., enemies/astronauts can be replaced with product mascots or themed avatars)
- Visuals and environment (e.g., space background can be swapped with a brand-specific universe)
- Audio and scoring (e.g., sound cues or slogans during gestures)

Example

A beverage brand like Coca-Cola could replace the enemy characters with floating soda cans and the astronaut with a chilled Coke bottle. Users could “save” the bottle using a catch gesture, triggering a brand message like "Refresh Your Space!"

METHODOLOGY



EARLY PROTOTYPES

To understand the effectiveness and limitations of gesture-based interaction in public contexts, a series of early functional prototypes were developed before finalizing the gameplay design.

01

EXPERIMENT: Apply a mosaic effect when the user performs a pinch gesture, and smoothly return to the original view upon release of the gesture.

TOOLS USED: Python, Mediapipe



02

EXPERIMENT: Control the car using webcam-tracked gestures: two fingers left/right to steer, five fingers forward to move, and a fist to stop.

TOOLS USED: Python, Mediapipe



KEY INSIGHTS

To understand the effectiveness and limitations of gesture-based interaction in public contexts, a series of early functional prototypes were developed before finalizing the gameplay design.

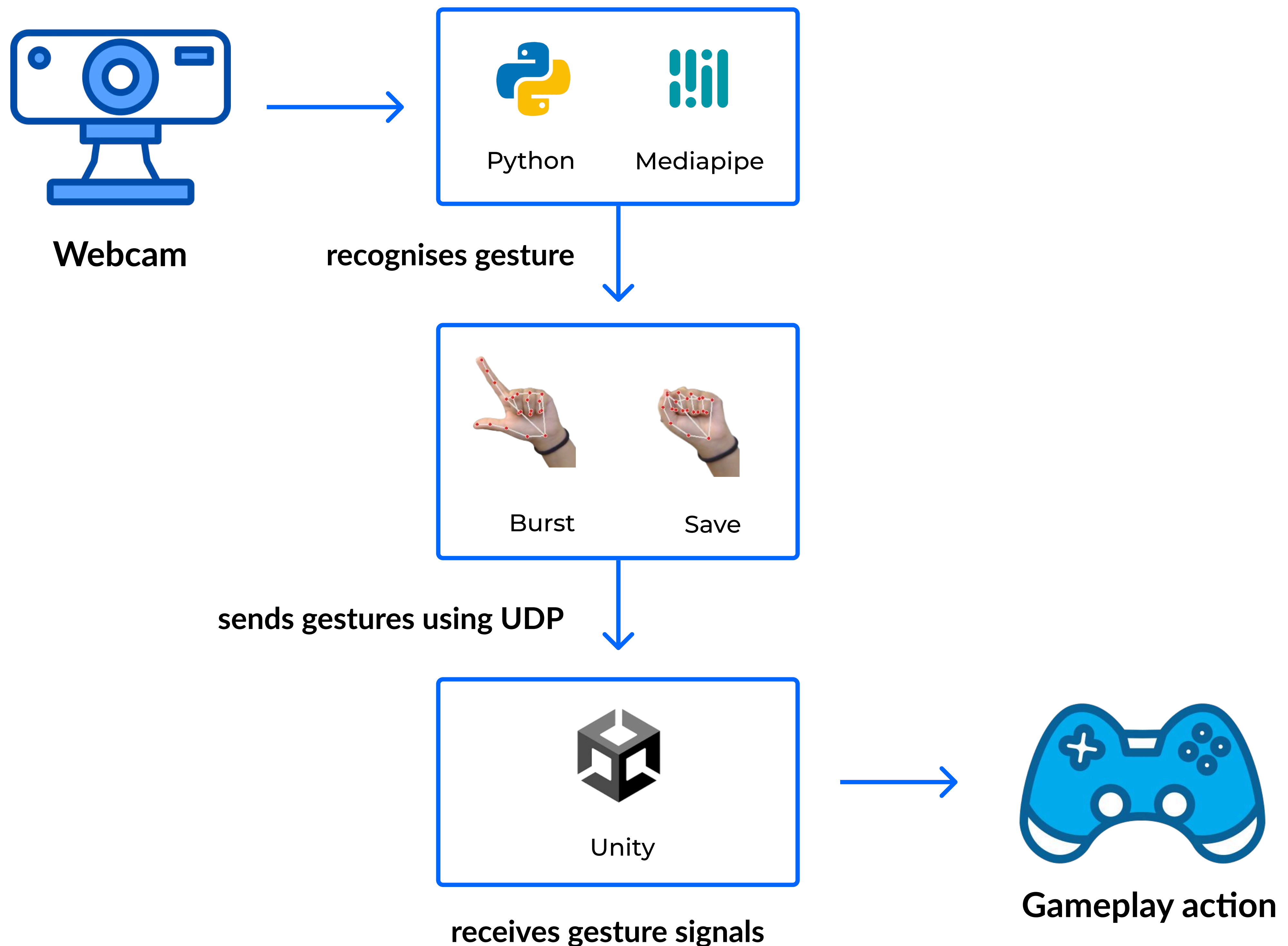
Gesture recognition must be responsive, forgiving, and low-effort.

Clear visual feedback is essential to confirm action and prevent overuse.

Realized the need to limit gesture frequency, pace the gameplay, and build a system that is enjoyable yet efficient for short public interactions.

SYSTEM ARCHITECTURE

The gesture-based advergame was built using a lightweight and modular architecture, combining computer vision, real-time data transmission, and game logic.



GAME ENVIRONMENT

The game was set in outer space, where players encounter a series of incoming enemies and astronauts moving toward the screen. The 3D environment included starfields, nebula-inspired backdrops, and animated particle effects to simulate motion and depth.



The camera was positioned facing the +Z axis, with enemies and astronauts spawning at various X positions along a defined Z-depth and moving toward the player. The interface was intentionally kept minimal so the focus remained on gesture interactions and visual feedback.

CHARACTERS & THEIR BEHAVIOR

The game featured four distinct types of enemies, each with unique movement logic and appearance:



01

Straight Enemies

Moved directly forward toward the camera in a straight line. Served as the baseline interaction type.

Zigzag Enemies

02

Used sinusoidal motion on the X-axis while moving forward. This added unpredictability and required more precise timing from the player.

03

Parabolic Enemies

Followed an arcing path, simulating motion similar to low gravity. Their visual arc made them harder to burst at certain moments.

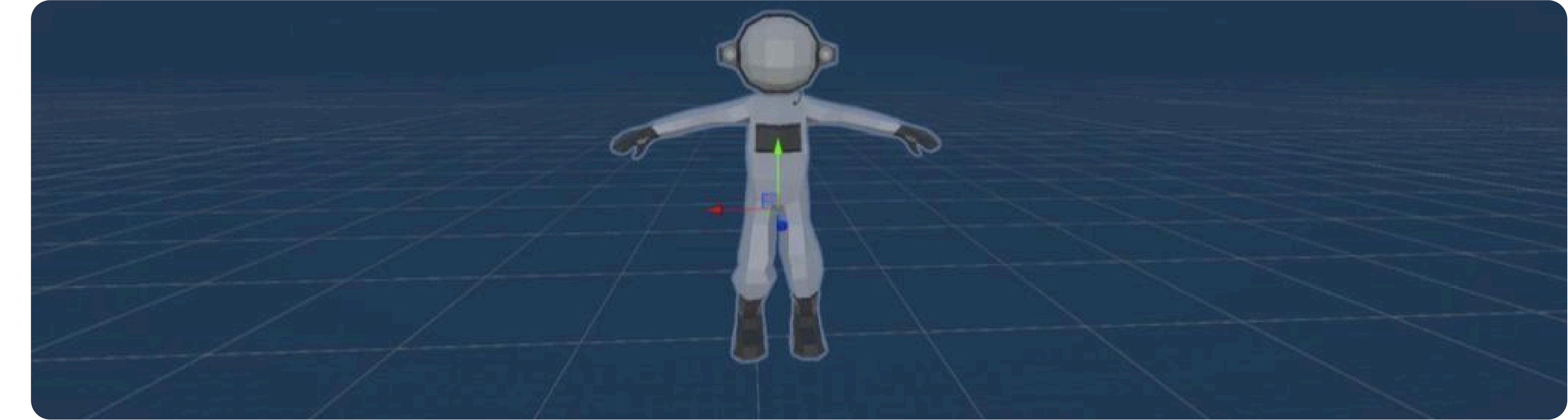
Spinner (Boss Enemies)

04

Rotated continuously while moving forward. These enemies required multiple burst gestures to defeat, introducing a challenge spike and variety in pacing.

To add complexity and moral decision-making, astronauts were introduced as friendly characters. Unlike enemies, astronauts should not be burst; instead, they were to be saved using a different gesture (catch/fist).

Saving astronauts rewarded the player with bonus points, while mistakenly bursting them penalized the player by reducing their score and boosting the enemy’s score creating a high-stakes risk-reward mechanic.



05

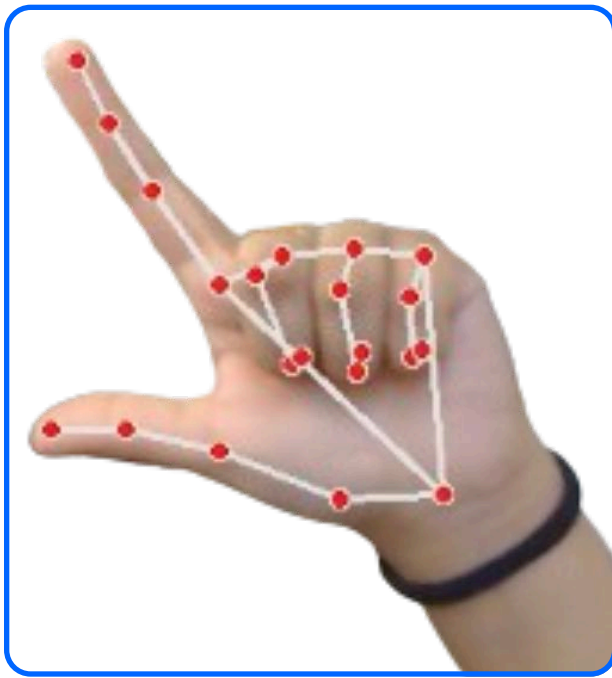
Astronaut Characters (Non-Enemy Targets)

Their behavior mimicked enemy motion but was visually distinct using bright colors, smooth animations, and subtle particle glows.

GESTURE-BASED INTERACTION IN UNITY

All gameplay interactions were driven by gesture input received via UDP from the Python MediaPipe system. Unity scripts processed incoming messages ("BURST" or "SAVE") and executed the appropriate response.

For BURST:

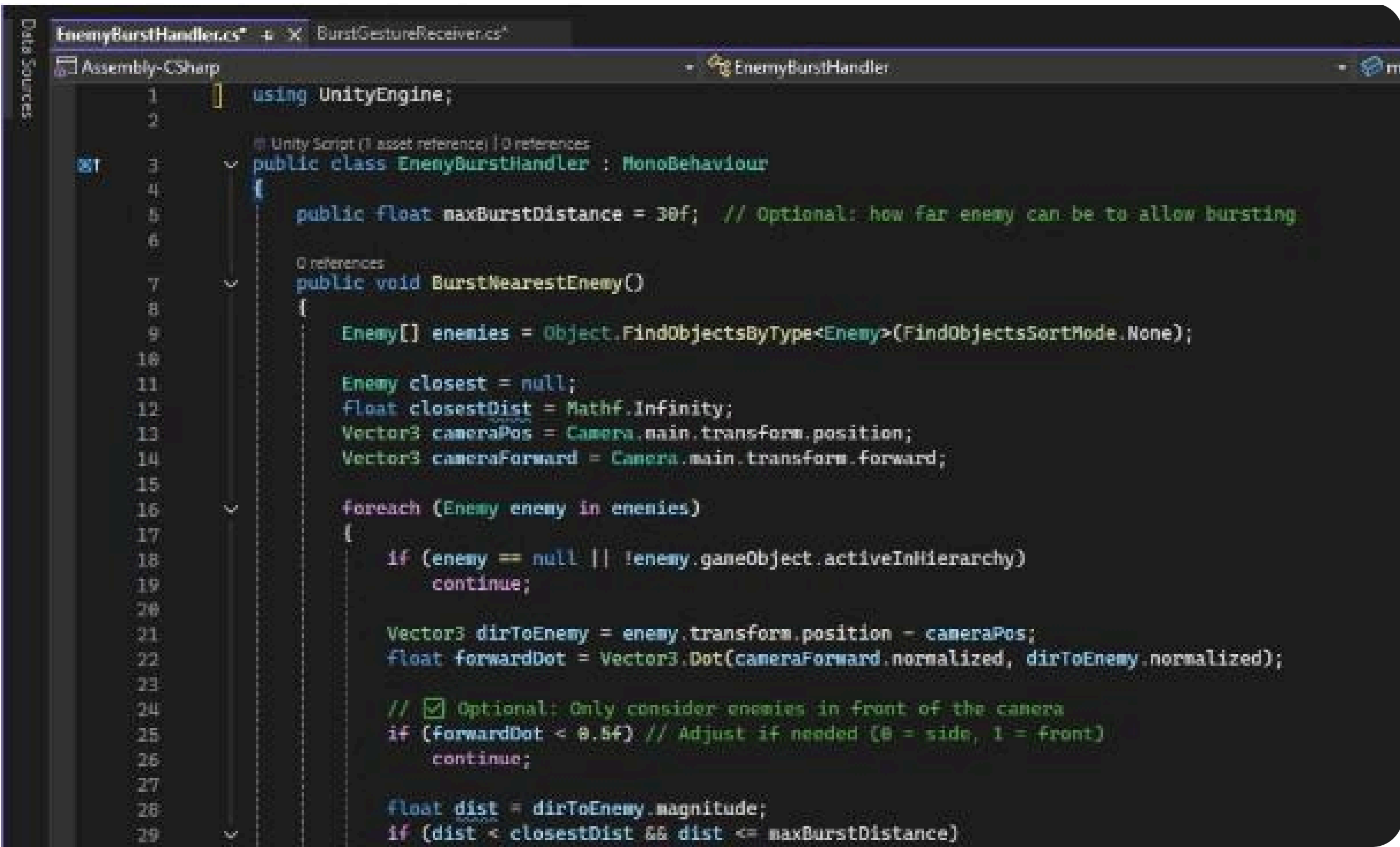
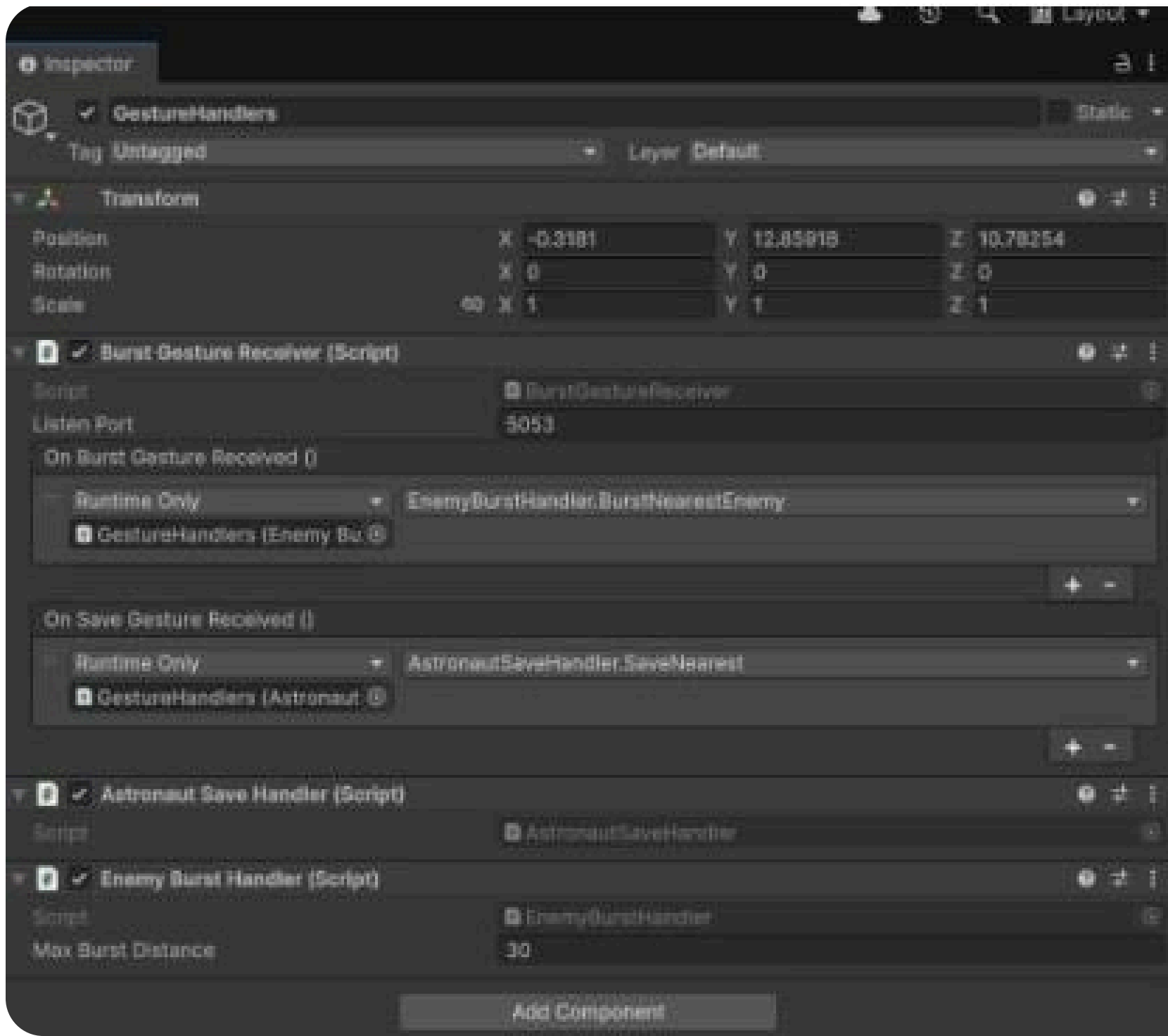


Finger Gun Gesture

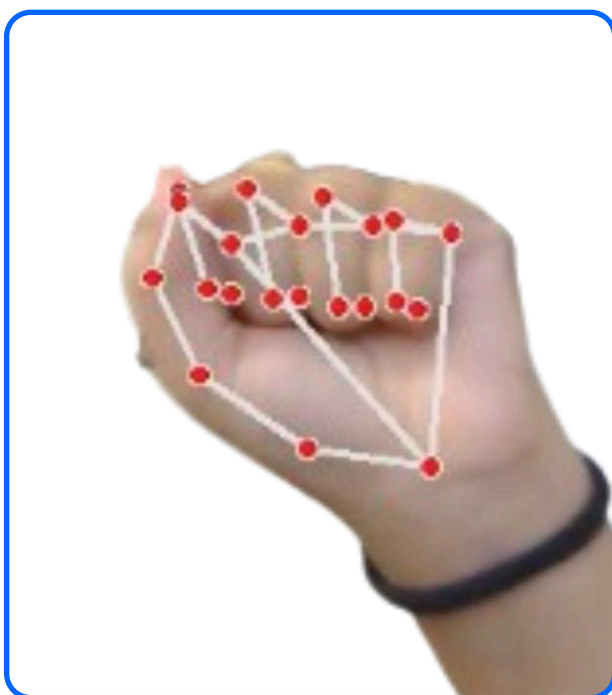
The game checked for the nearest enemy in front of the player using either distance-based or screen-ray methods.

A burst VFX was triggered at the enemy's location, followed by destruction and score update.

Only one enemy was affected per burst gesture, ensuring precision and fairness.



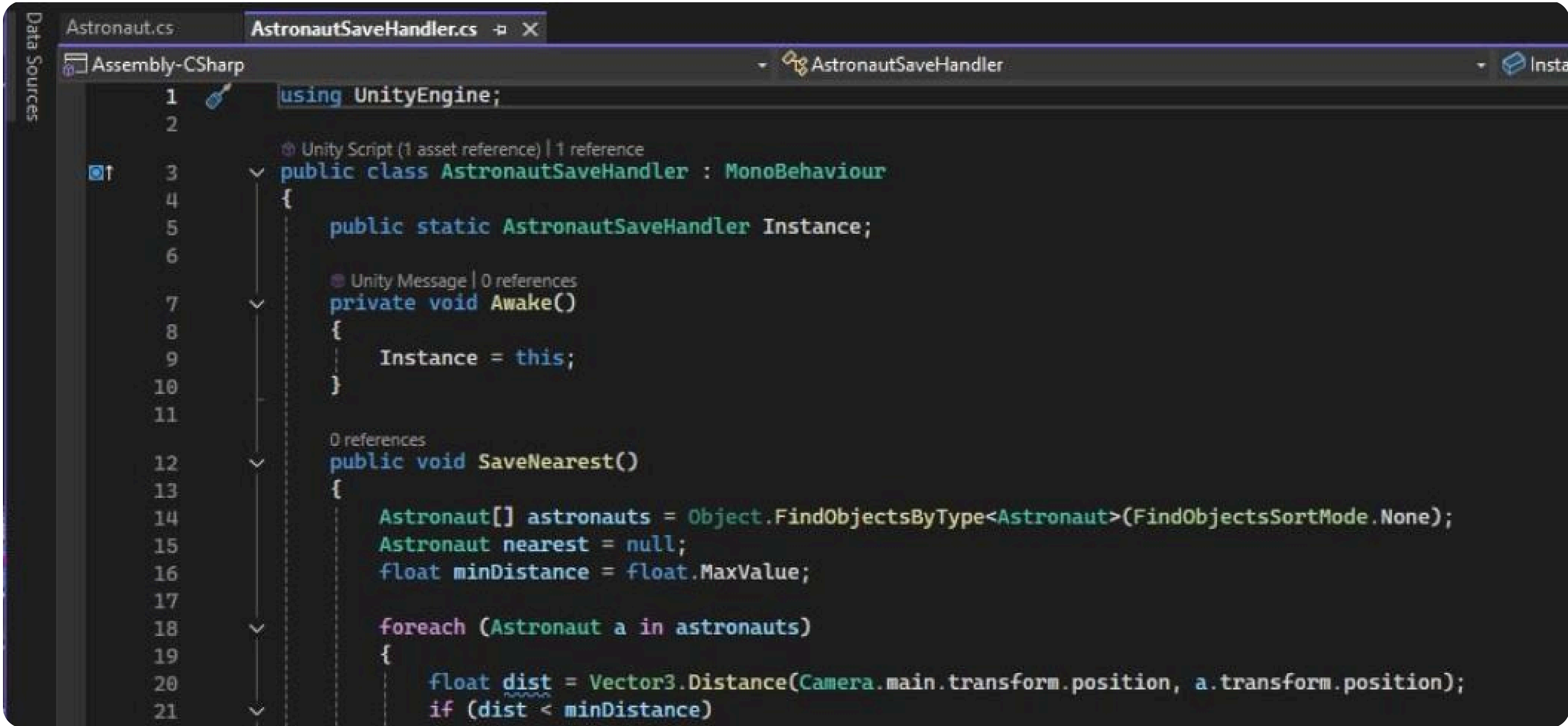
For SAVE:



Open Palm to Fist Gesture

The system searched for the nearest astronaut within a certain radius.

If found, the astronaut was removed with a save effect and the player was rewarded with bonus points.



USER TESTING

To validate the effectiveness of the gesture-based advergame in a public context, on-ground user testing was conducted with diverse participants under semi-controlled conditions.



30 individuals participated in the testing phase.

Participants had no prior training with the system.

Participants ranged in age from 12 to 25 years, including both teenagers and young adults.

Ambient distractions (movement, light, sound) were present to test real-world feasibility.

Participants were asked to fill out a pre- and post-game questionnaire to understand their prior exposure to branded games and their response to the current gesture-based experience. Most of the participants had little to no experience with gesture-controlled games, making this format a novel and engaging interaction style for them. This table shows the data collected:

Age	Pre_Q1	Pre_Q2	Pre_Q3	Pre_Q4	Pre_Q5	Pre_Q6	Post_Q1	Post_Q2	Post_Q3	Post_Q4	Post_Q5	Post_Q6
14	No	Maybe	2	2	2	3	Yes	Yes	4	4	4	5
22	No	No	3	2	3	2	Yes	Yes	5	4	4	5
15	Maybe	No	2	3	2	3	Yes	Yes	4	5	4	4
21	No	Maybe	3	2	2	3	Yes	Yes	4	4	5	5
13	No	No	2	2	2	2	Yes	Yes	5	4	4	5
20	No	Maybe	3	3	3	3	Yes	Yes	5	5	4	5
14	No	No	1	3	2	2	Yes	Yes	4	5	4	4
24	Maybe	Maybe	3	3	3	3	Yes	Yes	5	4	5	5
12	No	No	2	2	2	2	Yes	Yes	4	5	4	5
25	No	Maybe	3	3	2	3	Yes	Yes	5	5	4	5
15	Maybe	No	2	2	3	2	Yes	Yes	4	4	5	4
23	No	No	3	3	3	3	Yes	Yes	5	5	4	5
14	No	Maybe	2	3	2	3	Yes	Yes	4	5	5	4
19	No	No	2	2	3	2	Maybe	Yes	5	5	4	5
13	No	No	2	2	2	2	Yes	Yes	4	5	5	4
21	Maybe	Maybe	3	3	3	3	Yes	Yes	5	4	4	5
12	No	No	2	2	2	2	Yes	Yes	4	5	5	5
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14	No	No	2	3	2	3	Maybe	Yes	4	4	5	4
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13	No	No	2	1	2	2	Yes	Yes	4	5	4	5
24	Maybe	Maybe	3	3	3	3	Yes	Yes	5	4	5	5

IMPACT ON ENGAGEMENT & USER PERCEPTION

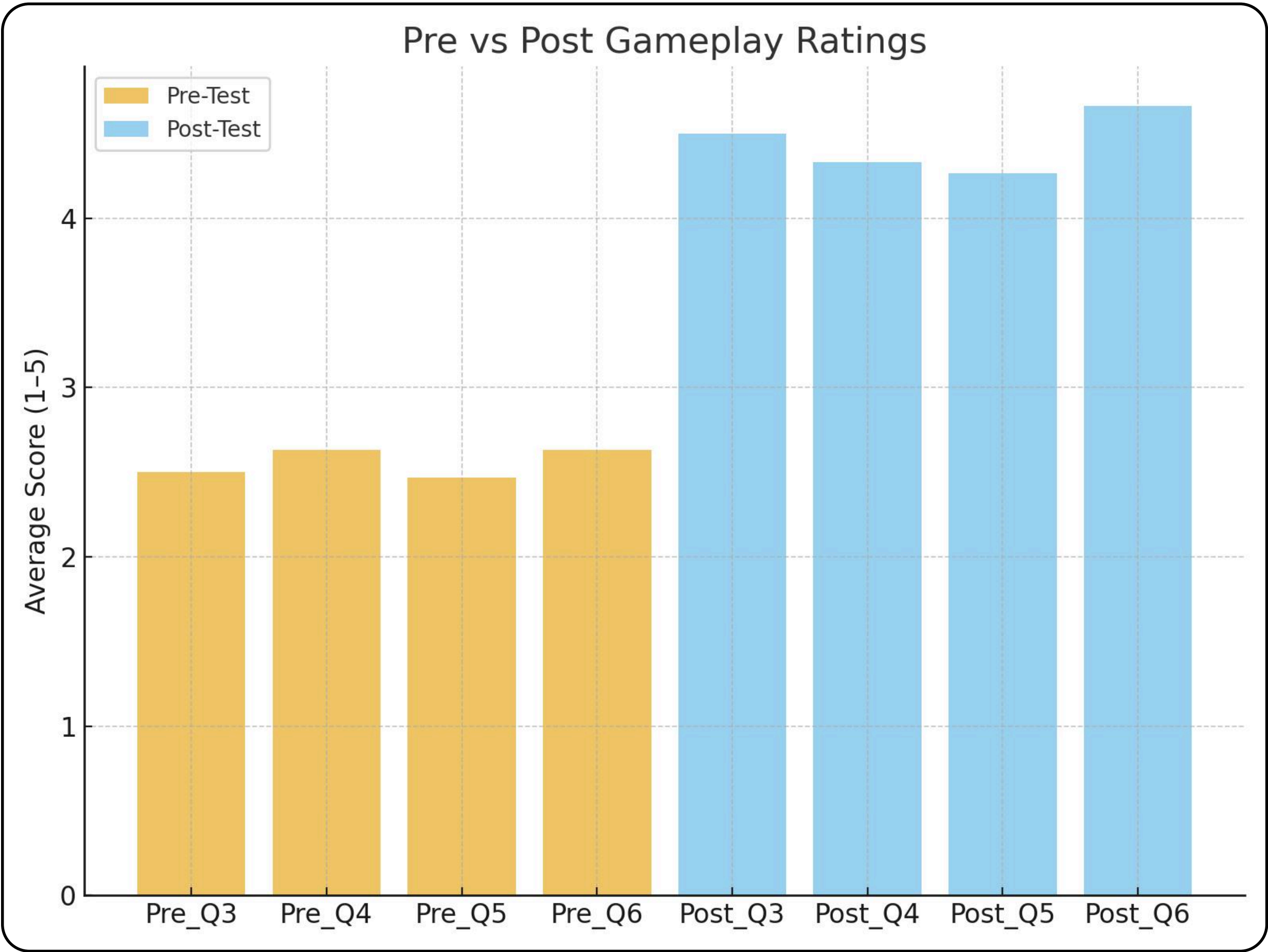
Engagement and Enjoyment

High Engagement Scores:

- Enjoyment → M = 4.6
- Ease of Learning → M = 4.4
- Replay Willingness → M = 4.7

Age Differences:

- Teenagers rated enjoyment & replay willingness slightly higher than young adults → shows playfulness linked to age



Low Fatigue Reports:

- Confirms value of low-effort gestures for public spaces

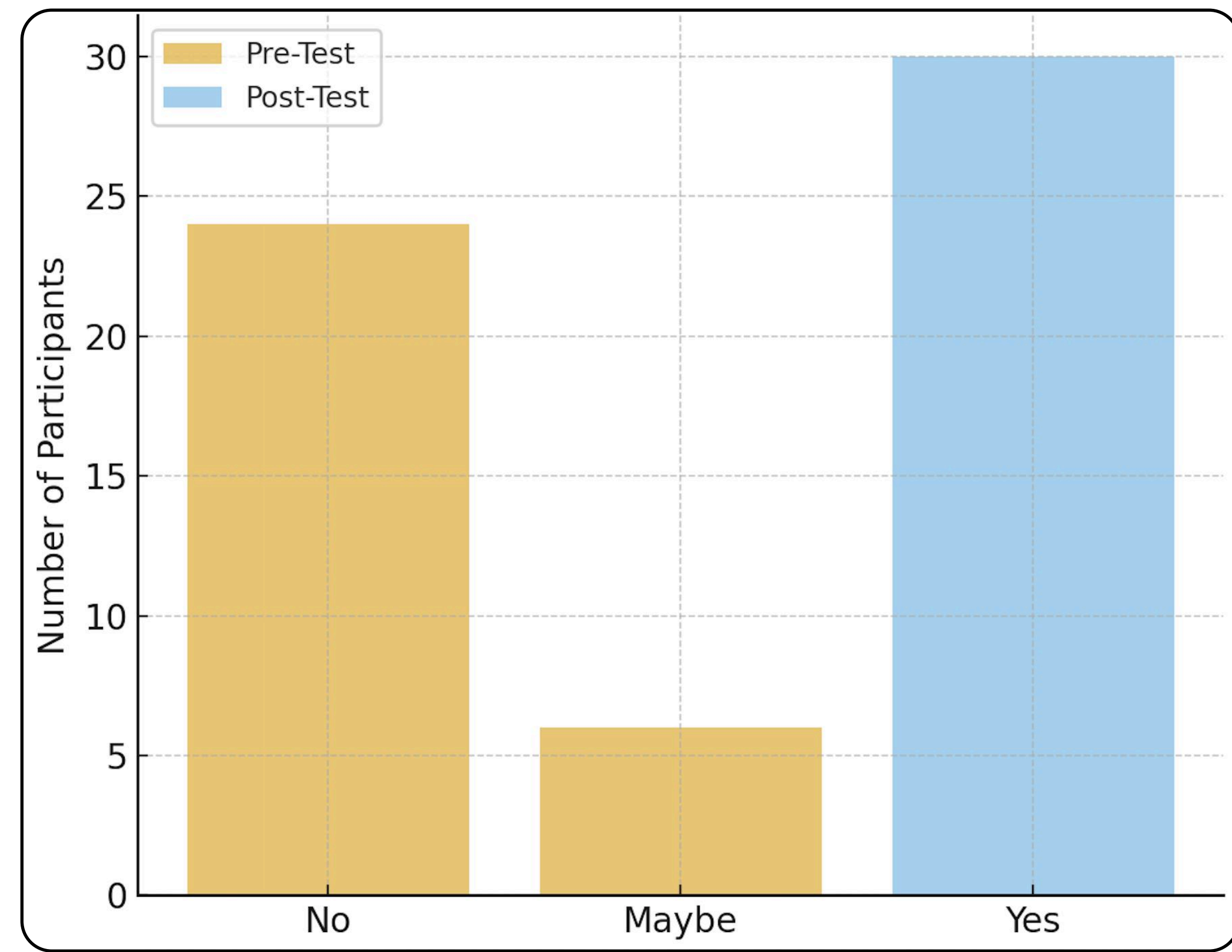
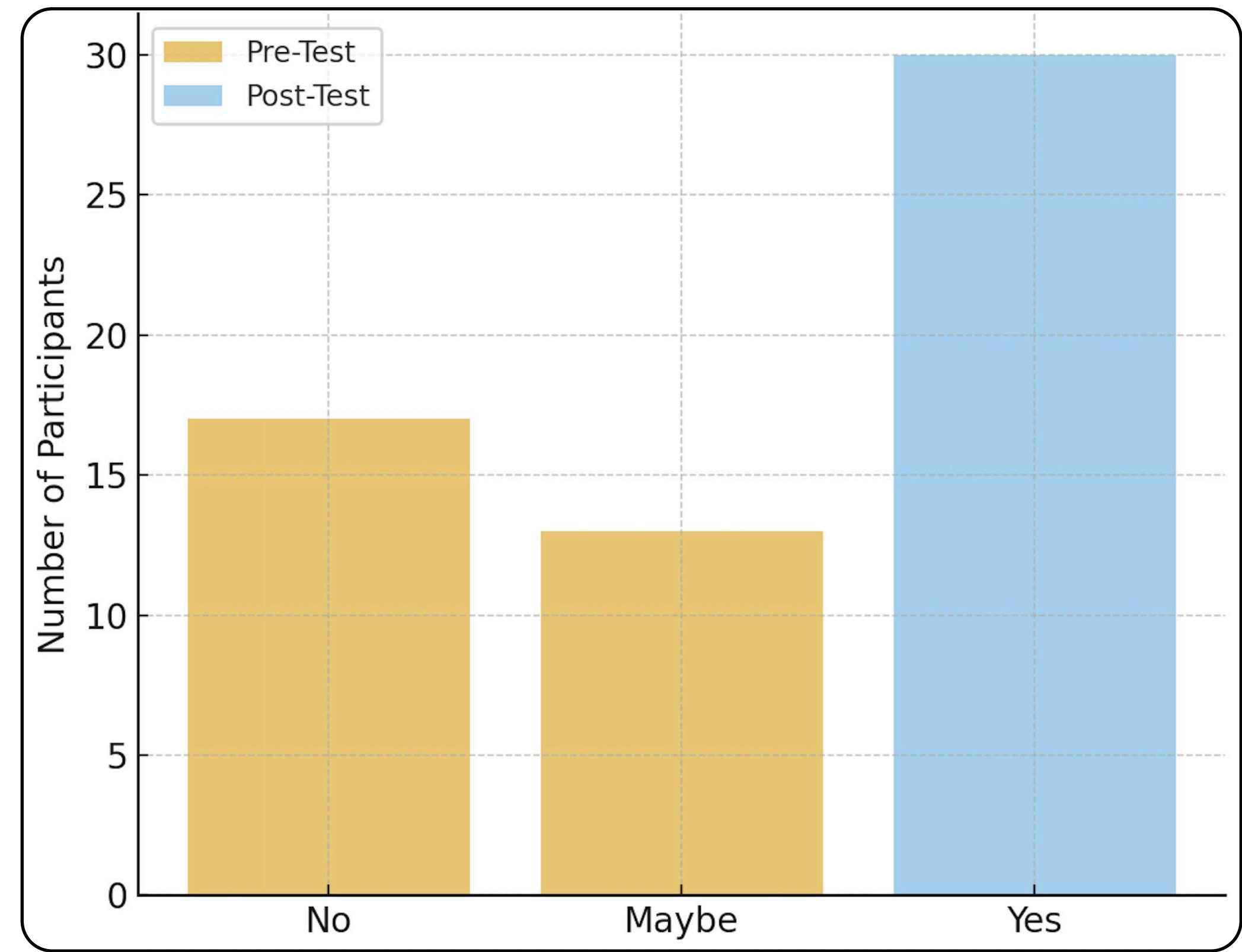
Statistical Improvements (Wilcoxon Tests):

- Enjoyment: 2.4 → 4.6 (p < .001)
- Ease of Learning: 2.5 → 4.7 (p < .001)
- Replay Willingness: 2.4 → 4.5 (p < .001)

Measure	Pre (M)	Post (M)	W	p-value	Result
Enjoyment	2.4	4.6	0	< .001	Significant
Ease of Learning	2.5	4.7	0	< .001	Significant
Willingness to Replay	2.4	4.5	0	< .001	Significant

Overall:

Gesture-based advergame → significant gains in enjoyment, learnability, and replay motivation



Brand Recall

Pre-Test (Static Poster Ad)

- Brand recognition: 41%

Post-Test (Advergame)

- Brand recognition: 87% → ~2x improvement

Key Insight

- Gesture-based interaction strengthened brand memory
- Active engagement captured greater attention & recall

Participant Feedback

- “Playing made me notice the brand more than a poster.”
- “The game made the brand feel more fun and memorable.”

Overall

- Interactive gameplay → higher brand recall & curiosity

Gesture Learnability and Replay Motivation

Participants quickly adapted to the two-gesture system. Ease of learning was rated high (M = 4.4), with most becoming proficient in 30–45 seconds. Replay willingness was even stronger (M = 4.7), showing gestures were intuitive and enjoyable. Players described them as “natural,” highlighting their low entry barrier and fit for public use.

Observational Insights

Field observations confirmed strong engagement: participants adapted within 30–45s, showed spontaneous competitiveness by involving friends, and maintained focus throughout the 3-minute session. This suggests gesture-based advergames not only engage individuals but also foster spectator participation and social interaction.

FINAL OUTCOME

The project resulted in a fully functional, gesture-controlled advergame designed specifically for public urban environments such as malls, metro stations, and exhibitions. It transforms traditional OOH screens into interactive experiences using only a webcam and intuitive hand gestures.



01

Functional & Tested

The game allows players to burst enemies and save astronauts using finger gestures tracked in real time.

Modular & Brand-Agnostic

02

- The system was developed with modular architecture, making it easy for brands to customize:
- Characters can be replaced with brand mascots or products
 - Background environments can reflect campaign themes
 - Visual and audio cues can carry brand slogans or messages
 - For example, a beverage brand could swap the astronaut with a floating soda bottle, turning the act of “saving” into a branding moment.

03

Accessible & Scalable

Requires only a standard webcam—no wearables, controllers, or complex hardware. Easy to deploy in any public space with minimal technical setup.

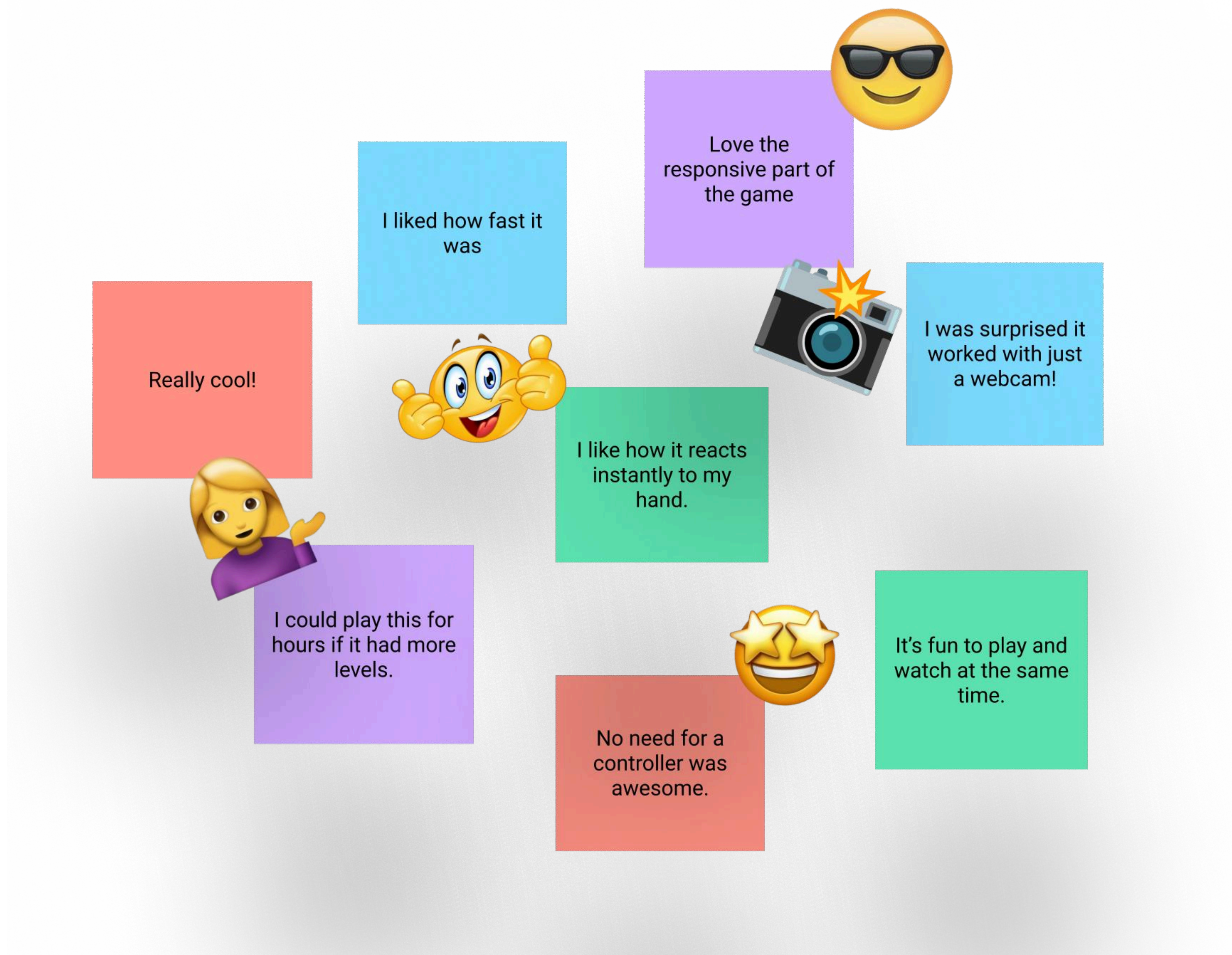
Engaging & Memorable

04

Gesture play adds novelty, emotional involvement, and replayability. Real-time feedback through VFX and sound enhances enjoyment. The game invites curiosity from surrounding onlookers, increasing visibility for the brand

FEEDBACK & OBSERVATIONS

To validate the effectiveness of the gesture-based advergame in a public context, on-ground user testing was conducted with diverse participants under semi-controlled conditions.



Most users adapted quickly, especially to the finger-gun burst gesture.

Participants found the experience fun, interactive, and surprisingly responsive.

Real-time visuals and scoring reinforced continued play.

The installation drew attention from others nearby, proving its public appeal.

FUTURE SCOPE

The current prototype demonstrates the power of gesture-based advergames in attracting and engaging public audiences. Looking ahead:

Brand Partnerships

Deployment in Real Spaces

Multiplayer Modes

Mobile AR Extensions

REFLECTION: BEYOND THE SCREEN

This project provided deep learning as a UX and interactivity designer, bridging creative design and technical systems:

01

Real-Time System Design

Understanding latency, responsiveness, and feedback loops for seamless user interaction.

Public Context Testing

02

Designing for distractions, varied lighting, and diverse participant skill levels.

03

Gesture-Centric Interaction

Balancing physical comfort with accuracy, ensuring gestures feel natural in repeated use.

Playful Advertising

04

Blending entertainment with brand storytelling to create immersive, memorable experiences.

Advertising doesn't just have to be seen —
it can be played, felt, and remembered.

THANK YOU!