



“From Video Game to Digital Playground”

Virtual Reality and Augmented Reality

Hirofumi Motoyama

Eiji Iwata

BANDAI NAMCO Studios Inc.





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Introduction:

Hirofumi Motoyama

Creative Director at BANDAI NAMCO Studios Inc.



*20yrs+ experience as a game designer in the video game/entertainment industry.
Previously worked for NAMCO, UBISOFT, and SEGA.*

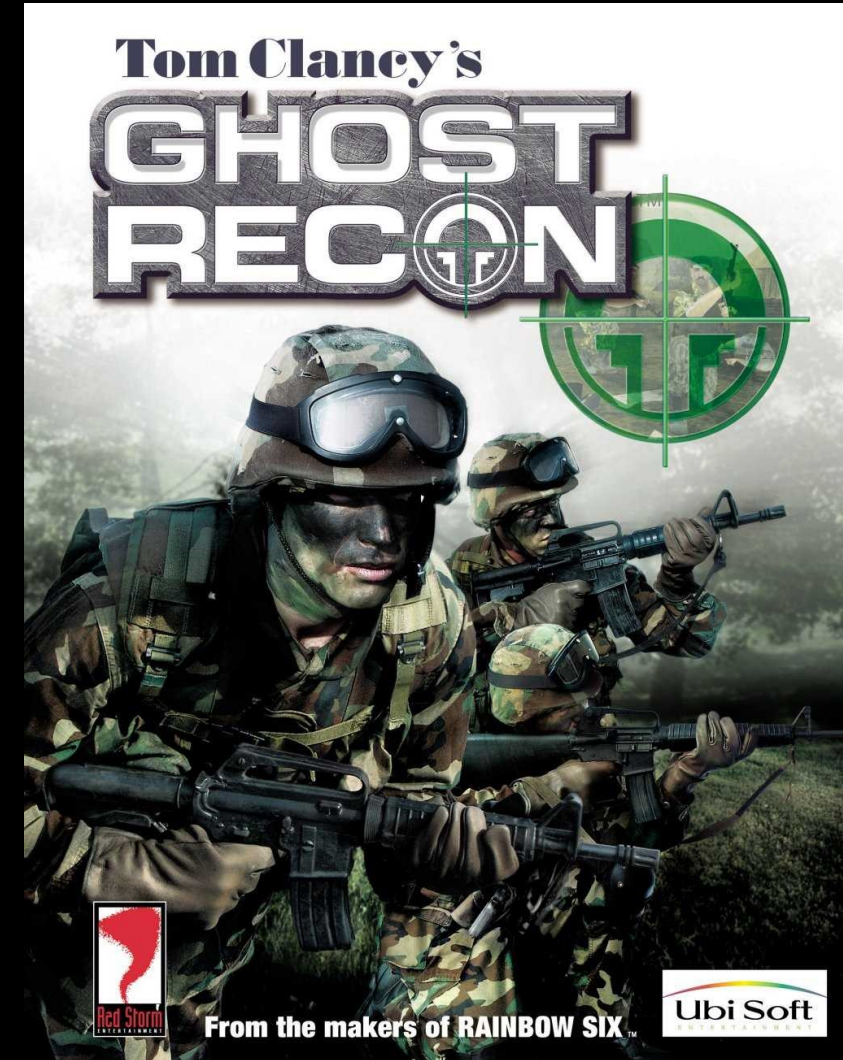
Involvement in **Video Game** Development until 2010



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Involvement in **Digital Playground** Development from 2010 onwards



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Presentation Timeline

Chapter one: The history of video game and XR – 10min

1. History of Video Games & VR/AR/MR
2. Link Between Digital & Real World
3. Digital Content Moving Out of the TV Screen

Chapter two: Digital Playground - The projection based VR – 25min

4. Children & Virtual Reality
5. Design Process - Analog Play & Digital Technology
6. Game Design Which Embraces Human Tendencies

Chapter three: Social Communicator - The HMD based MR – 25min

7. Mixed Reality is “Social Communicator”
8. Social Play = Collaborative Play
9. Amazing Findings

Chapter four: Technical details of MR – Coordinate Engineer – 30min

10. Spatial scan On-site & level design After simulation
11. Methodology & application of coordinate related factors
12. Empowerment On-site

Chapter five: Our vision of the “Playful World.” – 10min

13. The Magical Moment
14. Conclusion: The world we live in is a “Playful world”

Q&A – 5 min

TOTAL: 105 min

IMPORTANT!

Supplementary materials

Updated course notes will be available at
<https://www.slideshare.net/hirofumimotoyama>
or please ask to
h-motoyama@bns-g.com

Chapter one:

The history of video game and XR

The physical connection between the digital and the real world through the user interface and the world outside of the TV monitor.

1. History of Video Games & VR/AR/MR

In this section, I'm going to explain the history and the evolution of video games along with VR/AR & MR technology from a game designer perspective providing a brief background of the transition of platform devices and graphics.

These will be basic knowledge for participants to understand the underlying context of this presentation which I'll go through in detail.

Video Game



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Video game console

https://en.wikipedia.org/wiki/Video_game_console

VR/AR/MR - REALITY

VR (Virtual)



Immersive experience in a computer-generated world

AR (Augmented)



Overlay of CG contents in the real world
AR – If real world and CG are not able to respond to each other

MR (Mixed)



MR – Merging of real and virtual worlds

2. Link Between Digital & Real World

In this section, I would like to talk about how the digital world and people were connected in the history of gaming which I covered in the previous section focusing on user interface.

Video Games – Monitor x controllers



Joy Stick

PAC-MAN™&©BANDAI NAMCO Entertainment Inc.



Imitation

Game controller

https://en.wikipedia.org/wiki/Game_controller



Touch

https://en.wikipedia.org/wiki/Multi-touch#/media/File:Aldea_Digital_2013_01.jpg

3. Digital Content Moving Out of the TV Screen

In this section, I would like to explain the evolution of video games and digital entertainment made possible outside of the monitor with the advent of VR and projection technology.

From Video Game

TV Screen



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From Video Game to Digital Playground

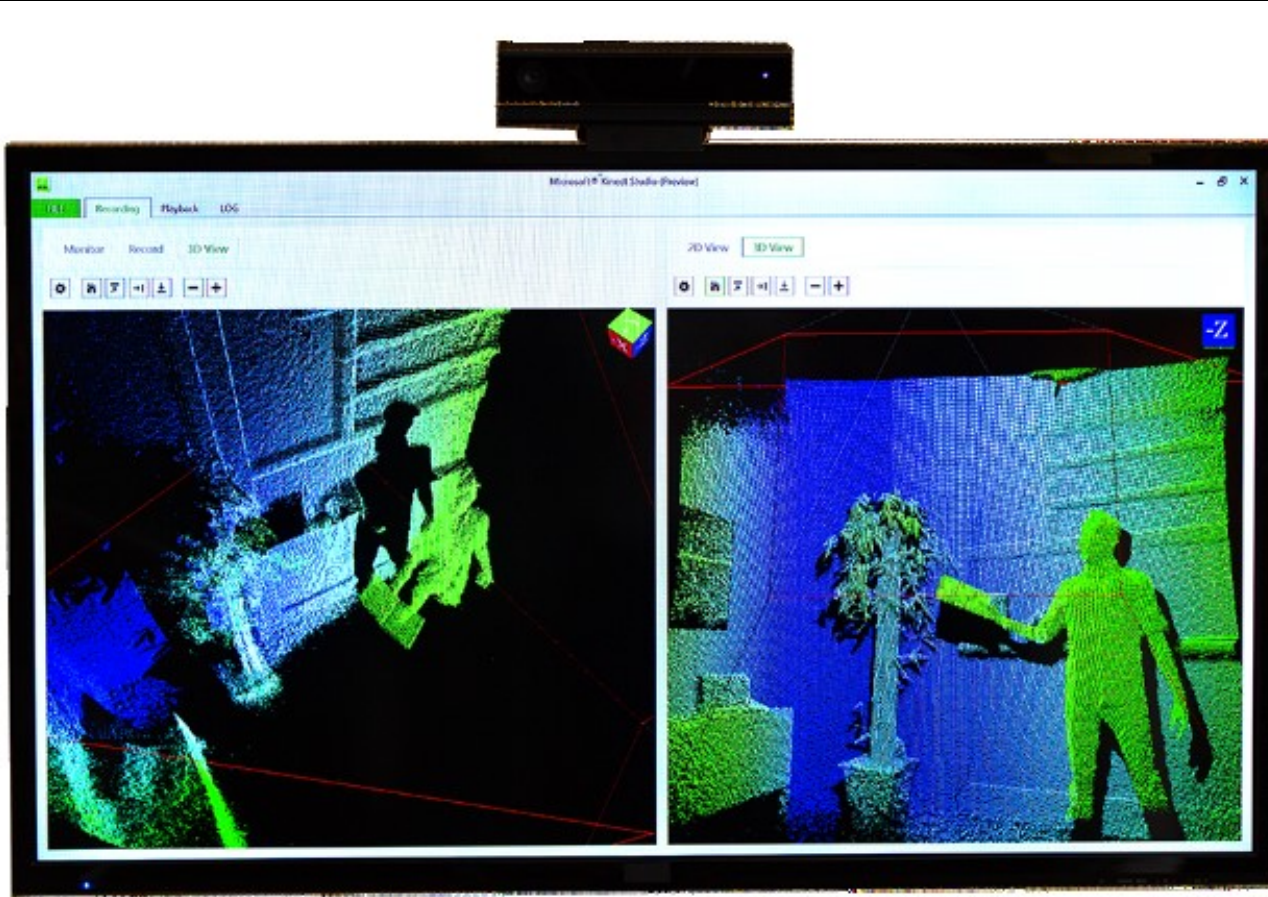
outside of the monitor” experience ~~TV Screen~~



Kid's Beach

<https://www.oculus.com/go/>

Sensing Technology didn't work well for “in-monitor” experience

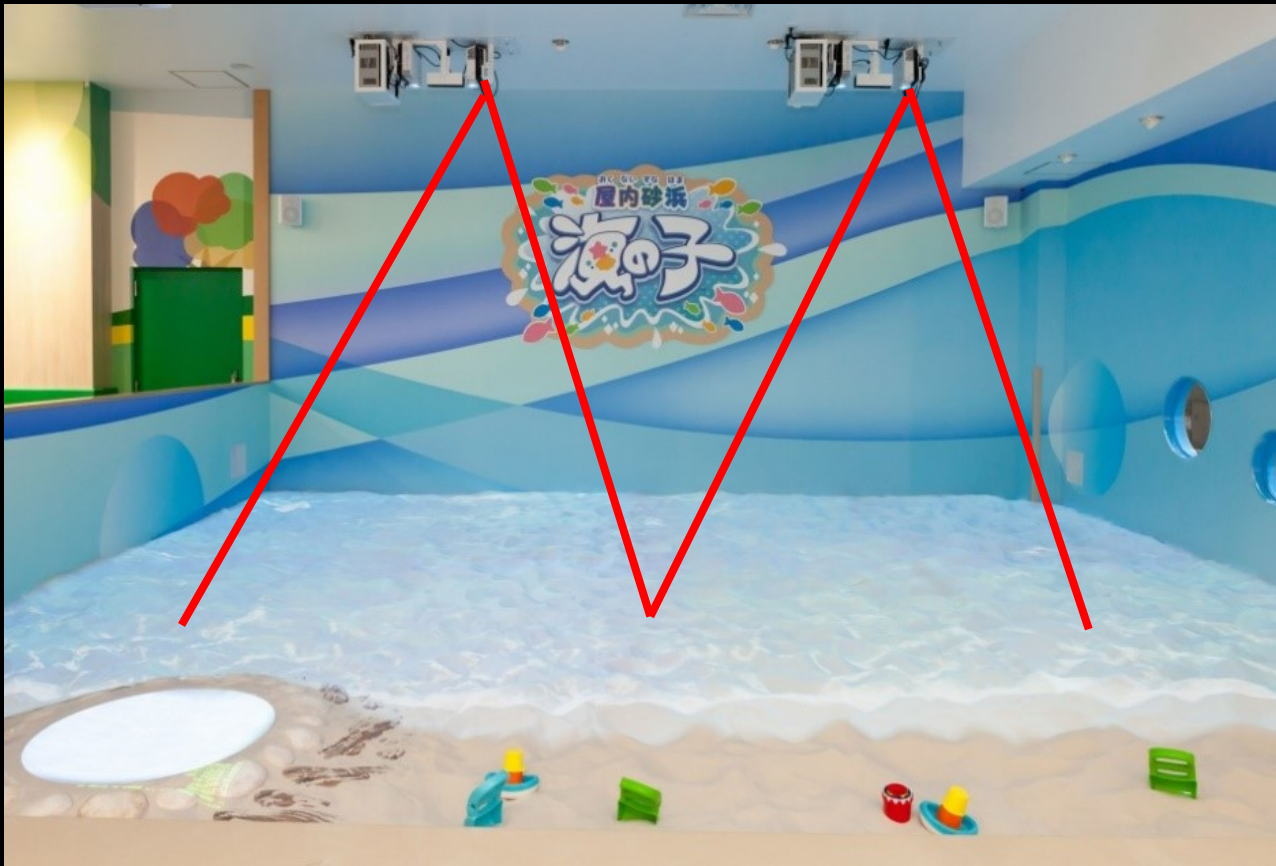


Microsoft, Kinect is a trademark of Microsoft Corporation.

Sensing Technology worked well for “outside of the monitor” experience



Kid's Beach



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Chapter two:

Digital Playground - The projection based VR

The interaction between children and VR, and the mixture of playground equipment and digital technology.

4. Children & Virtual Reality

In this section, I'd like to cover how children and virtual reality interacts using our product "Kid's Beach".

Project “Kid’s Beach” Video

<https://www.youtube.com/watch?v=3e7DT2KMb7M>

In JAPAN



In UK



(Image: Handout, Publicity Picture)

<https://www.birminghammail.co.uk/whats-on/family-kids-news/indoor-beach-launched-tamworth-just-12330438>

Game Concept “Kid’s Beach”

The attraction consists of a sandy beach with emerald blue water.

The concept is to relax, listen and experience the sound of birds singing and the calm waves going back and forth as if the experience is real.

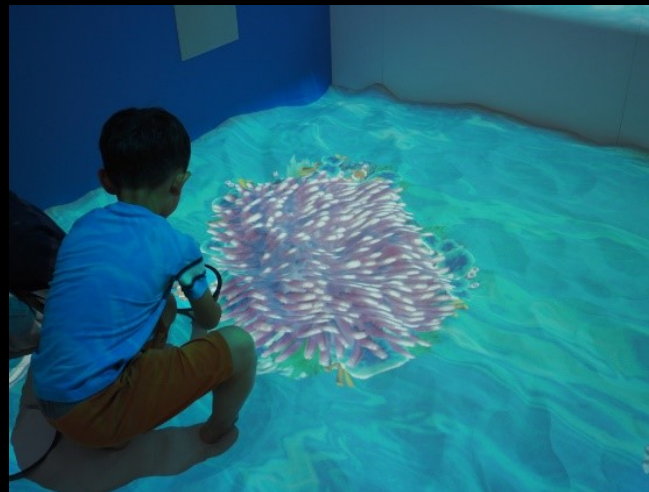
Feel the transition of high and low tide. You may be able to discover different types of fish, sea creatures and sea shells in the tide pool.

Beach simulation projection mapping installation replicating a tropical beach environment.

By stepping afoot into “Kid’s Beach” the amusement will lead players to think they are really on a beach. The participants are able to chase and capture sea creatures.

“Kid’s Beach”: Play Content Overview

- Fish scooping
- Playing with water or tide pool
- Phase transition from shallow water – low tide – storm surge – whale jump
- Interaction with sea creatures such as anemone and fish
- Background screen with special effects portraying immersive ocean experience such as whale jumping (*limited to venues with back screen)



Product Features



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Sandbox

4.5m×6.5m

Sand Volume

Approximately **6.5 ton!**

No. of Projectors

9 - 10 (Back screen, fish preserve
(*available/not available))

PC

5-6 (Backwall screen *available/not available)

Sensors

4 (Kinect V2)

Interactive Surrounding Sound

VSSS - Virtual SoundScape System
(developed by Bandai Namco Studio)
8 Speakers (4 for each upper and lower area)

Fish Scoop Bowl

80 bowls - 1 sensor can detect 20 bowls

Development Time Frame

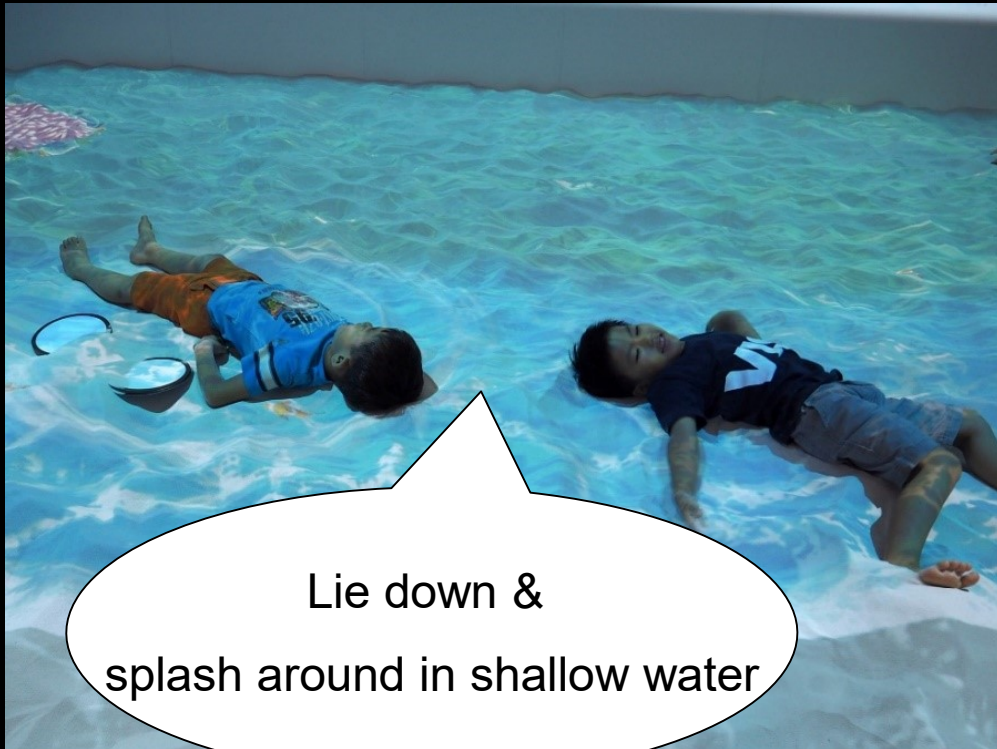
½ year

I want to share what our team learned about children and virtual reality from “Kid's Beach.”

- Virtual Reality **without HMD** (head-mounted display)
- “**EASY**” to enjoy with “**MANY**” people
- Linking real experience and body by taking the **first step** into the content
- Reality enhanced by “**real things**”
- Reality acquired through the “**whole body**” by sensing and surround technology

Virtual Reality without HMD (head-mounted display)

- HMD is age restricted and many challenge awaits developers when creating a large scale VR content aimed for children.
- “Kid’s Beach” uses multiple projectors to project tropical ocean and beach environment on a sand box measuring 4.5 m × 6.5 m and backwall (*limited to few venues).



“EASY” to Enjoy with “MANY” People

- The creators face many challenges when developing an HMD content for people to enjoy simultaneously. In “Project Uminoko” we have successfully developed an amusement content where approximately 20 people can enjoy the content in a space of 4.5m x 6.5m at the same time.



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“First Step” into the Content - Linking Immersive Experience to the Physical Body

- The participant's “first step” stepping afoot into the content is crucial when entering virtual reality from the real world
- Most HMD VR contents starts off from a pitch black screen transitioning into the VR world
- “Kid’s Beach’s “first step” is not limited to visuals. They are required to step into the content barefoot to physically feel the sandy beach



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Impressiveness Further Enhanced by “Actual Things”

- Virtual reality contents can be more immersive through the use of actual things/props
- Although we did not use water for “Kid’s Beach,” we decided to use beach sand so the participants will be able to feel haptic stimulation on their foot and hand. This was well received by the participants of the content.



Adults and children alike
are seen feeling the sand

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Reminiscing childhood
memories
Fun times playing at the beach

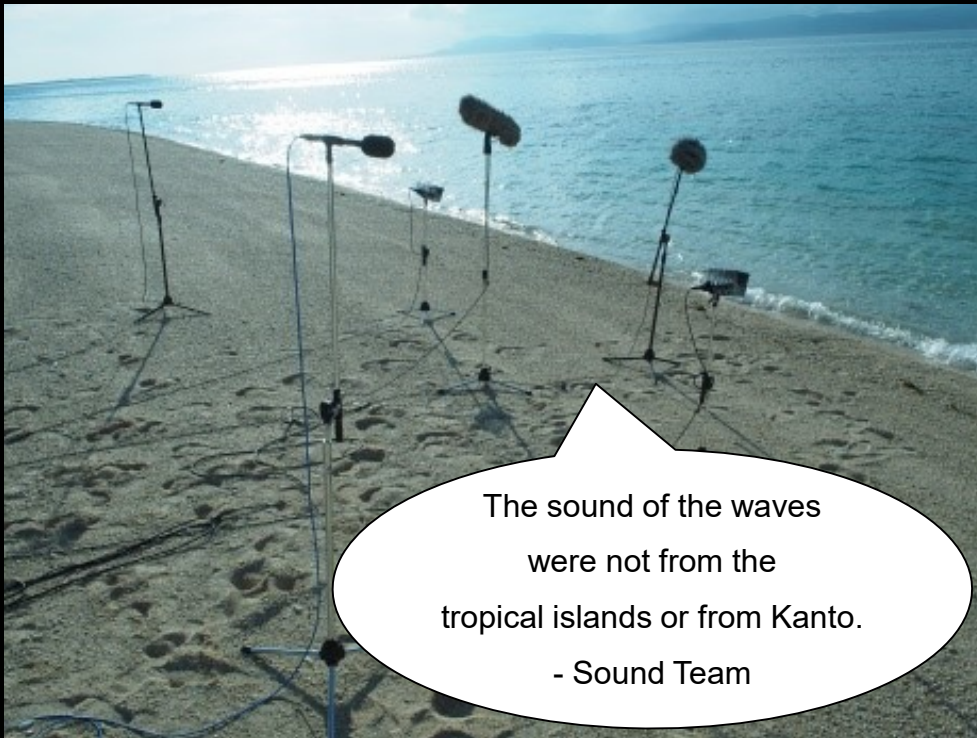
Fish Scooping Bowl (Paper Fan Type)



© 2015 BANDAI NAMCO Entertainment Inc.

Reality Experienced Through The Whole Body

- In addition to the haptics felt by bare feet and hand through direct contact with sand, we made sure to enhance the immersiveness through “sound stimulation”
- “Kid’s Beach” was the first project to implement the interactive surround system VSSS (Virtual Sound Scape System)



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5. Design Process - Analog Play & Digital Technology

In this section, I'd like to explain our observation of what a playground equipment is and how digital technology can be applied onto it.

Playground Equipment as an “Universal Language” Pt. 1

- In CEDEC 2009, the most prominent game developer’s conference in Japan, a game that can be enjoyed globally was defined as below:
 - Video game is a form of **universal language**
 - People regardless of their background will **play fun** and interesting games
 - Although there are differences in language, culture, and environment, through gaming, players descend their soul down in the **same world**.
 - Worldwide products does not mean video games targeted towards the US and European territories but also consists of elements that can be **enjoyed globally**.

Playground Equipment as an “Universal Language” Pt. 2

- When “games” are replaced by “playground,” the same principle can be applied
- Children tend to discover infinite ways to have fun and play from long time ago.



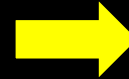
https://commons.wikimedia.org/wiki/File:Pieter_Bruegel_the_Elder_-_Children%E2%80%99s_Games_-_Google_Art_Project.jpg

“Analog” & “Digital” Entertainment

- “Kid’s Beach’s predecessor, “Indoor-sandbox” was originally a popular content in Namco and made its comeback as “Kid’s Beach” adding digital technology to the preexisting concept.
- As the setting evolved from a playground’s sandbox to a sandy beach environment, all factors of development focused on resolving urban dweller’s never-ending distress of “wanting to go to the beach but can’t due to inaccessibility.” By resolving this frustration, this product could in turn improve people’s quality of life. This was the most unique selling point of this amusement.

Analog

Indoor Sand box



Analog & Digital

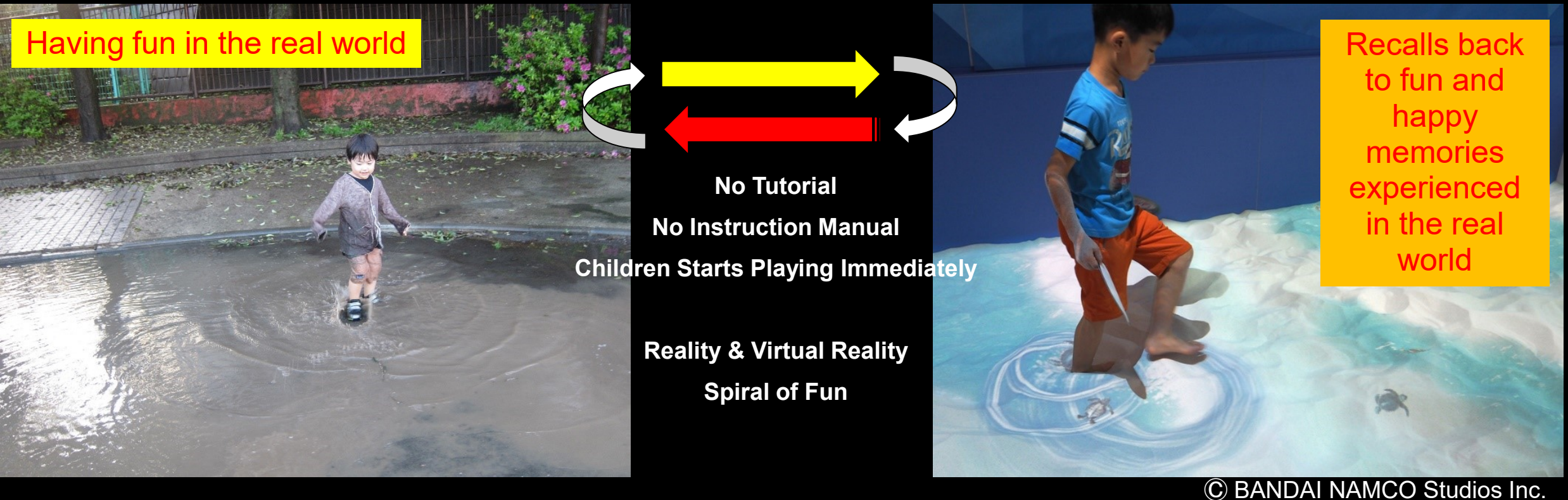
Interactive Indoor Beach



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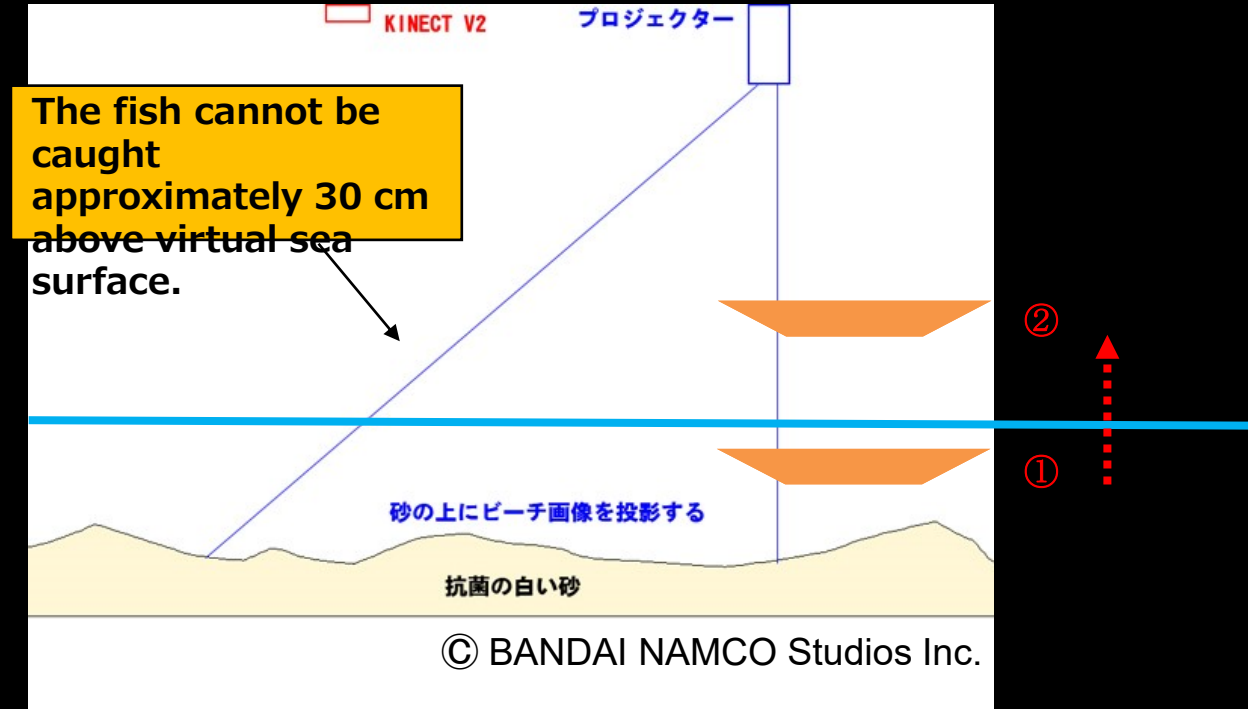
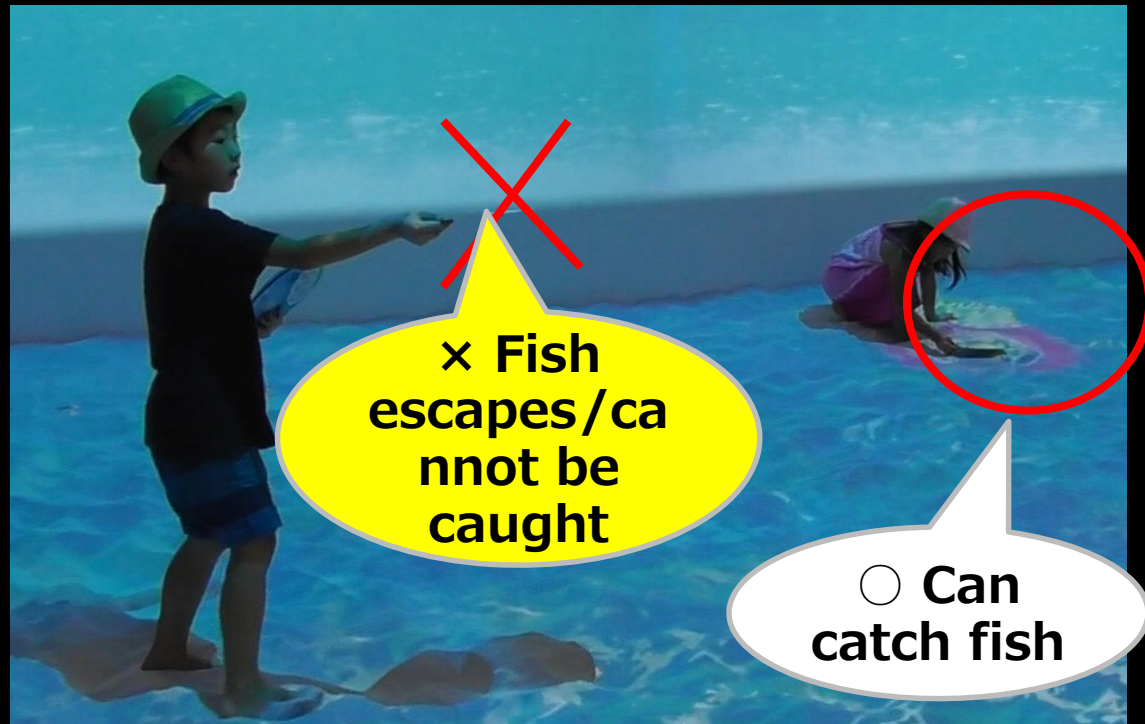
“Primitive Interaction” Brings Back Fun & Happy Memories Pt. 1

- The inspiration for “Kid’s Beach” derived from children playing in the water puddle during rainy season.
- This project was originally a rhythm action game designed for children to jump around the puddle rhythmically.
- Children are geniuses when it comes to discovering many ways to entertain themselves. Most of the time they engage in “primitive interactions” such as running playfully within the water puddle, When reality is replaced by virtual reality, what most often happens is children “recall back to fun and happy real life memories” and imitates the same type of action. When similar reactions can be seen as a result, children continue to engage in the same action.



“Primitive Interaction” Brings Back Fun & Happy Memories Pt. 2

- The same idea applies to the fish scooping aspect of the entertainment. It is designed to mimic realistic experience of scooping a fish to link past memories to the virtual experience. The virtual sea surface is designed so it's set 30cm above the sand. If the player tries to scoop the fish above the set sea level, it would scare off the fish and as a result, the player will not be able to scoop the fish. If the same action is performed underwater the player can scoop the fish just like in the real world.



What Defines “Real”?

- People feel the experience is real when they are able to link the present experience with personal memories.
- For example, when a person feels the sand is cold with their bare feet along with an image of the ocean, they can connect their memories playing on the beach.



5. Game Design Which Embraces Human Tendencies

In this section, I'd like to cover issues correlated with the abundance of digital contents and its relation to the player's "presence."

Why I believe a new type of genre will make its appearance.

“Digital Playground”

Game Design Which Presumes Human Instinct of Losing Interest

- Game designer's biggest nightmare is for the player (in this case children) to lose interest towards the game content. However, "Kid's Beach" is designed so "losing interest" does not affect the amusement
- To be exact, the "Kid's Beach" is designed so children won't be able to engage in one type of play. The ocean sequence transitions in intervals, which limits the amount of information children can gather so they will naturally find another type of play style
- As I believe children are geniuses when it comes to finding ways to entertain themselves, project "Kid's Beach" was designed so that it's natural for people to lose interest in one content from the get-go and move onto something that interests them more.



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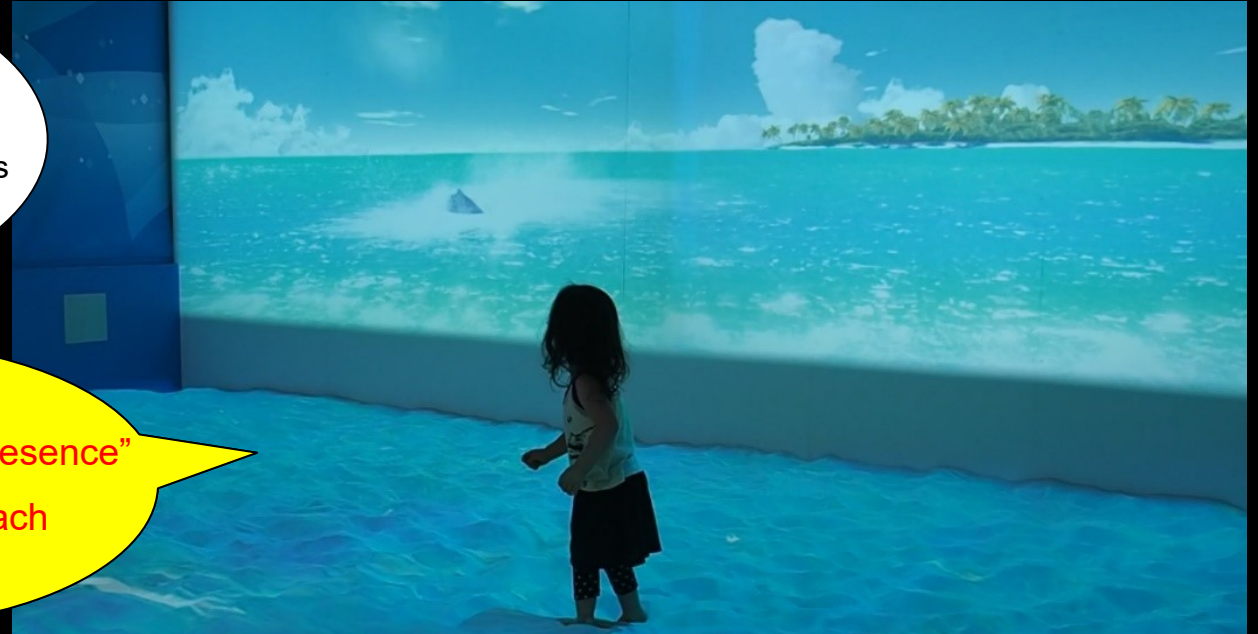
Feeling of “Presence” Solidified Through Limiting Digital Content

- “Kid's Beach's main concept centers around providing an experience that they are actually at the beach. We have minimalized standard game gimmicks which usually are essential factors of a normal game content
- The definition of “game gimmick” mentioned above is the motivator encouraging players (children) to compete against one another (e.g. number or size of fish caught). It may be a crucial element to ensure user engagement for normal games, but we want to prioritize “Kid’s Beach's main intension: being present at the beach.



“Kid’s beach”’s design is to replicate a oceanic environment so the number of fish/marine animals are fixed.

Prioritize the “physical presence” of playing at the beach



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New Type of Game Design

“Combining analog amusement with digital technology”

“Understanding & accepting human nature of losing interest”

“Bringing back playful memories through primitive senses”

“Removing competitive game mechanics to add focus on the physical “presence” of playing on the beach”

With every factor considered above, I'd like to refer to this new type of game design as...

New Game Genre

“Digital Playground”



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Chapter three:

Social Communicator - HMD based MR

The fusion of the real and the digital world.

7. Mixed Reality is “Social Communicator”

What is the smartphone?



iPhone unveiled 9th January 2007

Source:

UPDATEJANUARY 8, 2017

iPhone at ten: the revolution continues

<https://www.apple.com/newsroom/2017/01/iphone-at-ten-the-revolution-continues.html>

Image:

<https://www.apple.com/newsroom/2017/01/iphone-at-ten-the-revolution-continues/?imgid=1483642528978>

Smartphone is **Internet** Communicator



“Widescreen iPod with touch controls”

“Revolutionary mobile phone”

“Breakthrough Internet Communicator”

Image:

<https://www.apple.com/newsroom/2017/01/iphone-at-ten-the-revolution-continues/?imgid=1483642528978>

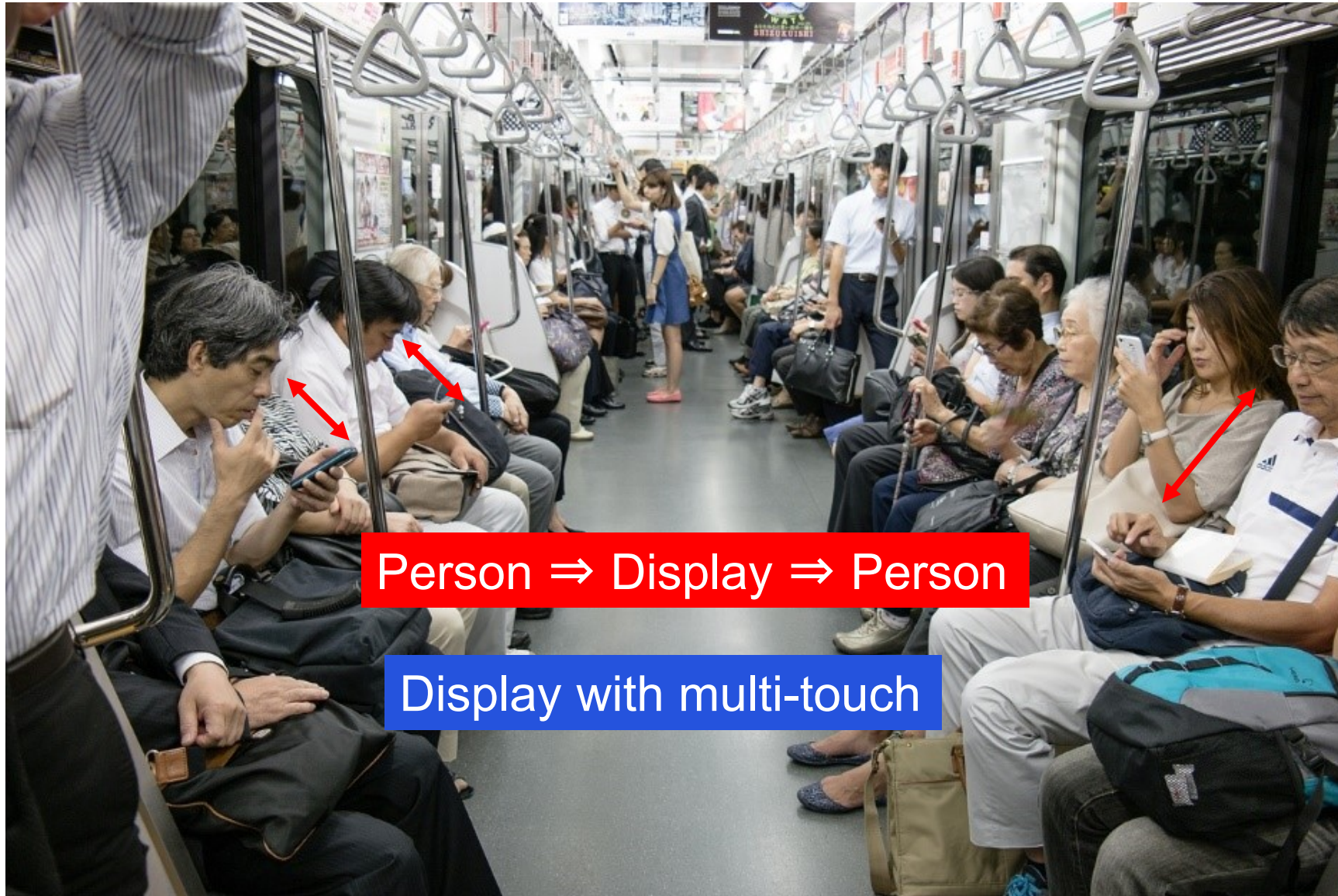
Internet communicator with Multi-Touch UI



出典: https://en.wikipedia.org/wiki/Multi-touch#/media/File:Aldea_Digital_2013_01.jpg

Innovation, through Creativity

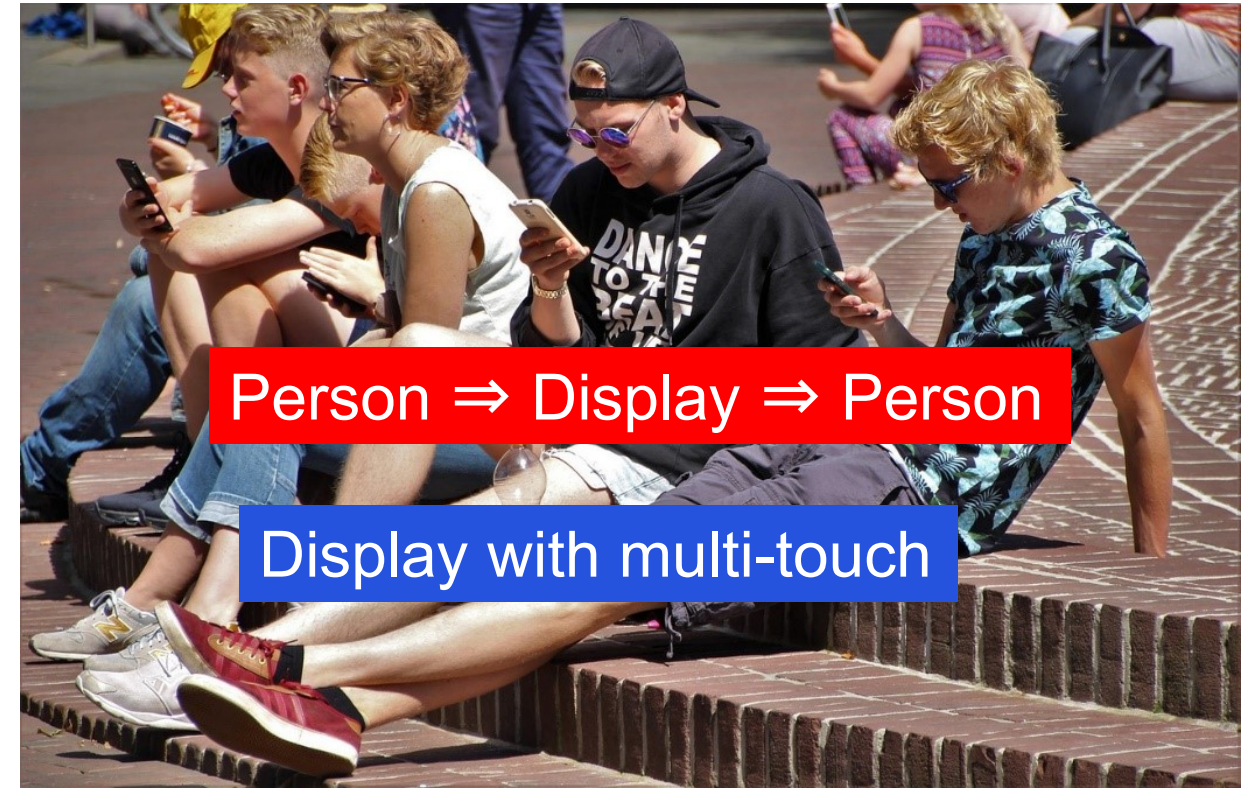
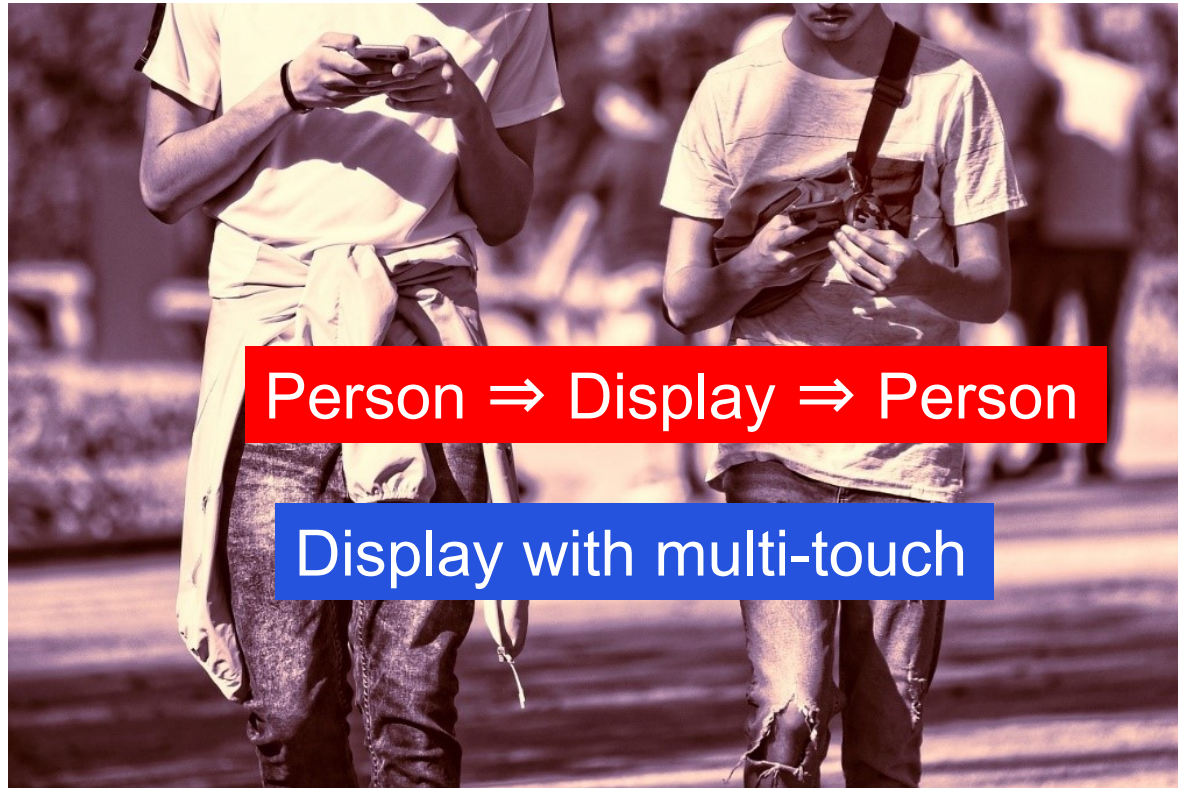
“Breakthrough Internet Communicator”



Person ⇒ Display ⇒ Person

Display with multi-touch

“Breakthrough Internet Communicator”



Entertainment is same. Everyone is gathering, but everyone is watching the display.

Mixed Reality device is,
Internet Communicator
↓
Social Communicator

Smartphone VS Mixed Reality Glass

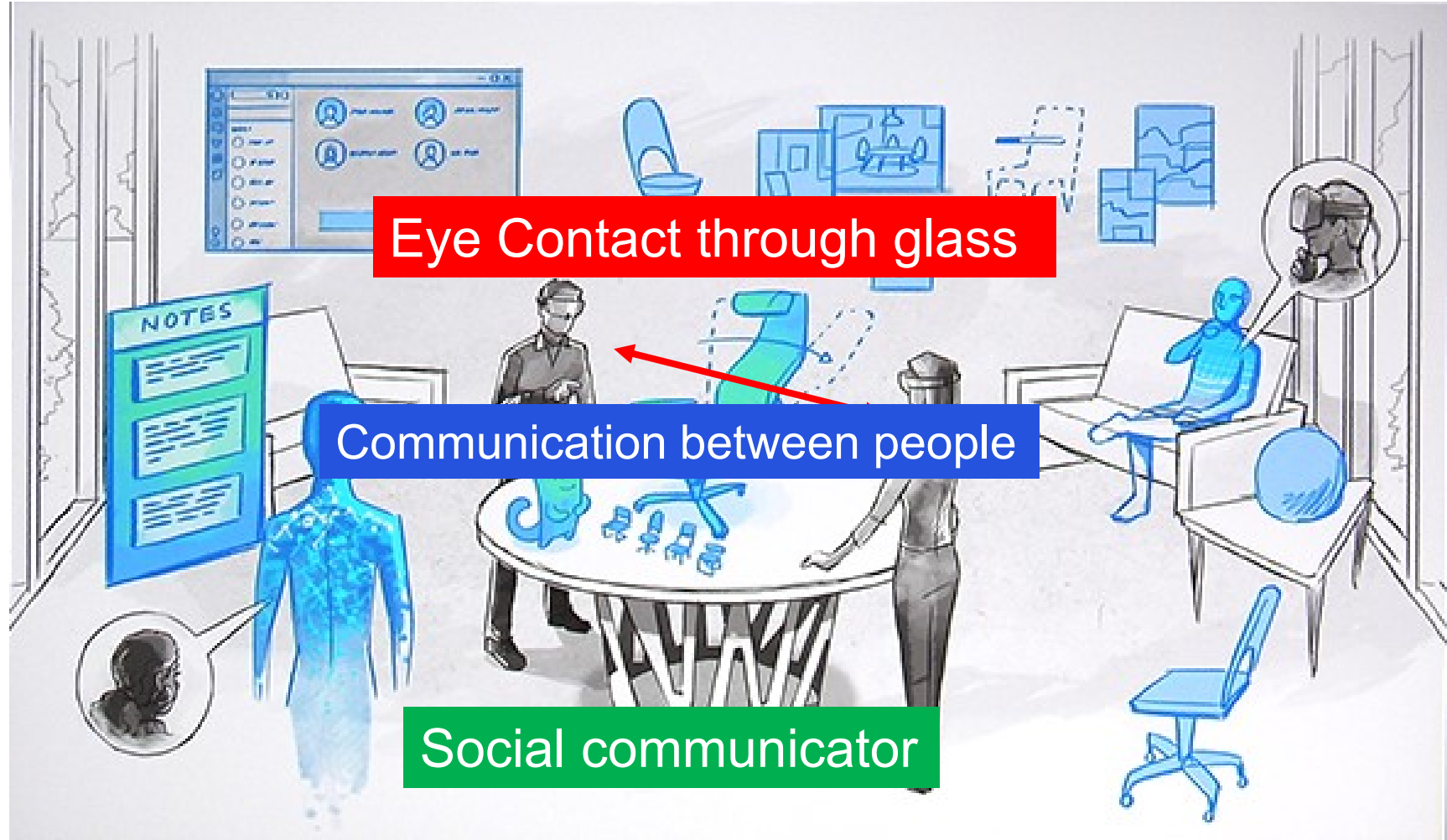


Person ⇒ Display

Display with multi-touch



Internet Communicator



Eye Contact through glass

Communication between people

Social communicator

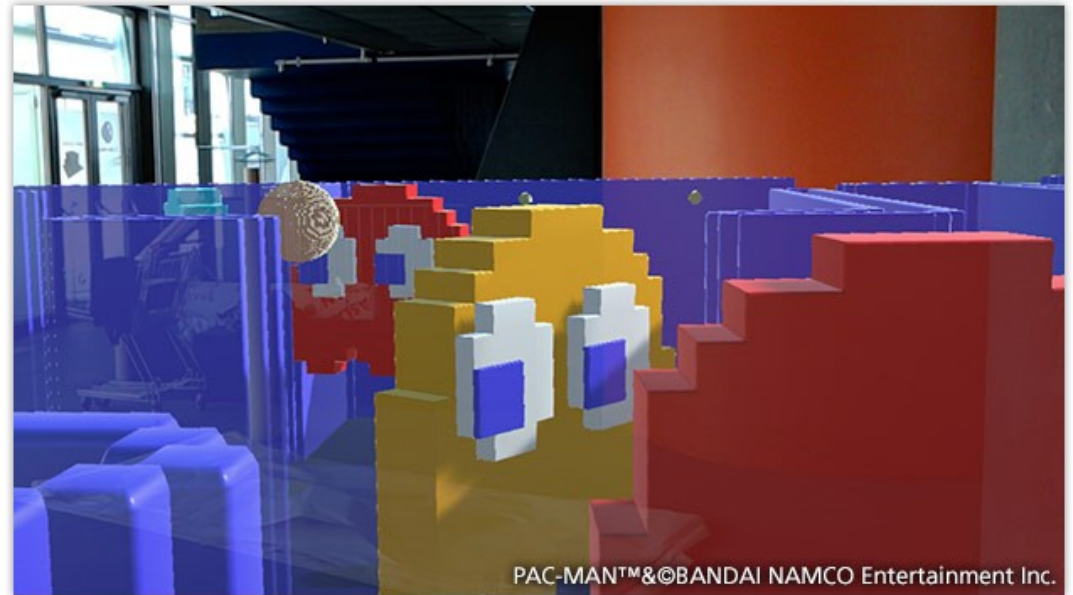
Image : de:code 2017 JAPAN keynote http://www.atmarkit.co.jp/ait/articles/1706/08/news018_3.html

Social Communicator becomes “Social Play”

Social Communicator



Social Play = “PAC in Town” in real world



Innovation, through Creativity

8. Social Play = Collaborative Play

In this section I would like to explain **Social Play = Collaborative Play** based on our MR project “PAC IN TOWN”

About Namjatown x MR Project

This is the first project in Japan to introduce an **attraction for theme parks** in Namjatown (Ikebukuro, Tokyo) that utilizes the latest MR (Mixed Reality & Complex Reality) technologies that combine real-world and digital technologies.

Bandai Namco Amusement collaborated with Microsoft Japan Co., Ltd. and created an amusement content using “Microsoft HoloLens.” BANDAI NAMCO Amusement Inc. produced the theme park & operation and the R&D was done by Bandai Namco Studios.

Namjatown x MR Project Pt. 1

Real PACMAN Attraction “PAC IN TOWN”

[Limited Exhibition: Jan 15th (Mon) 2018 – May 6th (Sun) 2018]



“PAC IN TOWN” Video

BANDAI NAMCO Holdings Inc. (JP), Hakuhodo Inc. (JP), Ars Electronica Futurelab (AT)

HoloLens: Representative Example of MR Device



©BANDAI NAMCO Amusement Inc.



Microsoft, HoloLens is a trademark of Microsoft Corporation.

Three Core Pillars

1) Real world:

8 square meters playfield at ARS Electronica Center Lobby

2) Centering theme - Real People & their Interaction:

3 Players equips a HoloLens and interact with each other by high-fiving to change role (to PAC-MAN).

3) Diversity:

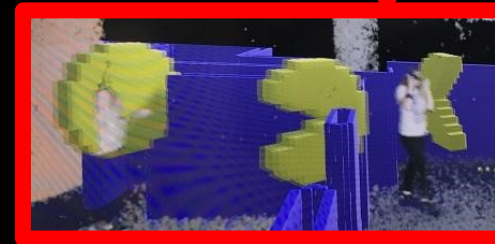
Each player is assigned to a specific role (PAC-MAN, CHERRY or a POWER PELLET).

The rule is different compared to the **classic PAC-MAN game**

3 players will transform into PAC-MAN to consume 100 PAC-DOTS within a set limited time.



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PAC-MAN™&©BANDAI NAMCO Entertainment Inc.

A frequent question that's asked about "PAC-MAN HoloLens" is...

"Why wasn't this game designed as single player just like the original PAC-MAN?"

"Why is there a need to support three players?"

Collaborative Play



“MR is the future of computing and the era will shift from personal computing to collaborative computing.”

(Alex Kipman) **de:code 2017 Keynote**

http://www.atmarkit.co.jp/ait/articles/1706/08/news018_3.html

Through collaborative gameplay, communication becomes a key element



*Mixed Reality works best with **COLLABORATIVE PLAY**
and it is extremely **FUN!***



There are three key benefits of Collaborative Play .

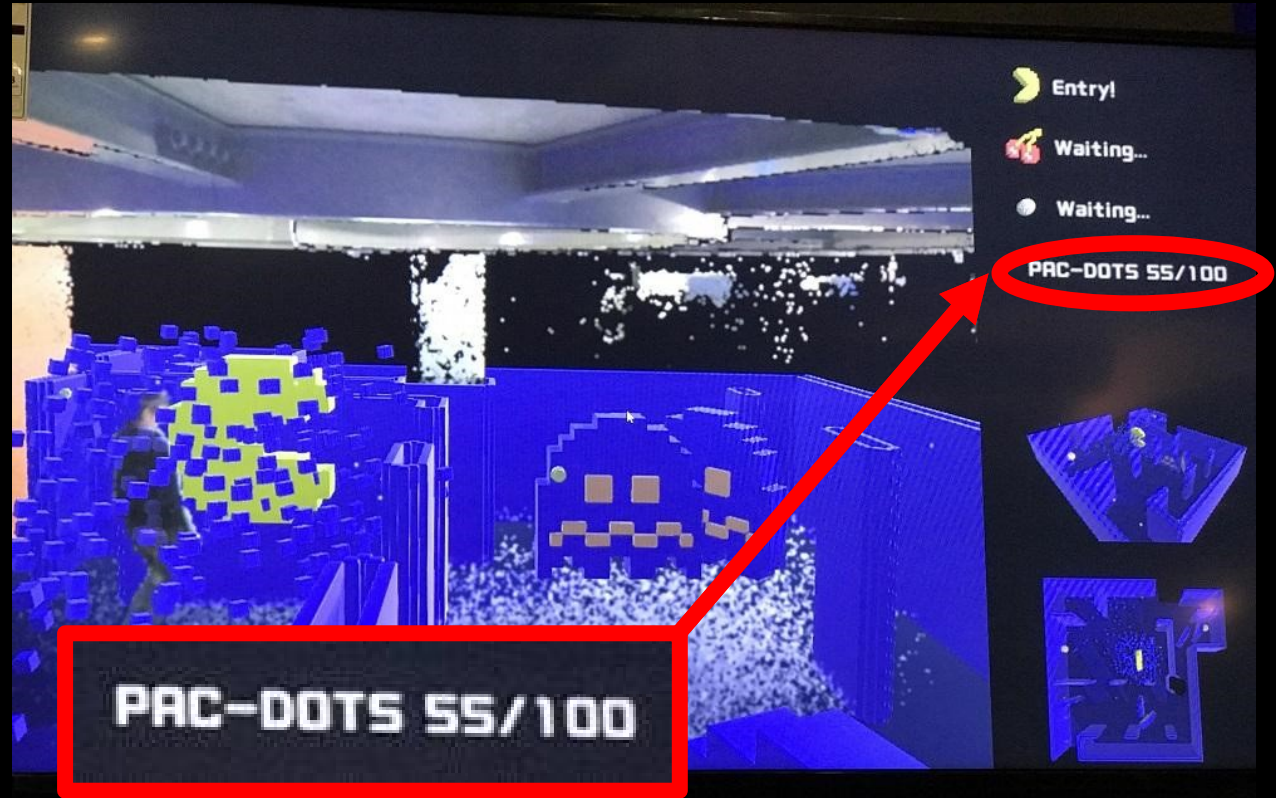
Benefits of MR 1: Naturally starts communication

“Our human instinct” when given a common goal is to communicate and work together.



**Everyone will sharing
an experience**

©BANDAI NAMCO Studios Inc.



PAC-MAN™&©BANDAI NAMCO Entertainment Inc.

Benefits of MR 1: Naturally starts communication

Play Video

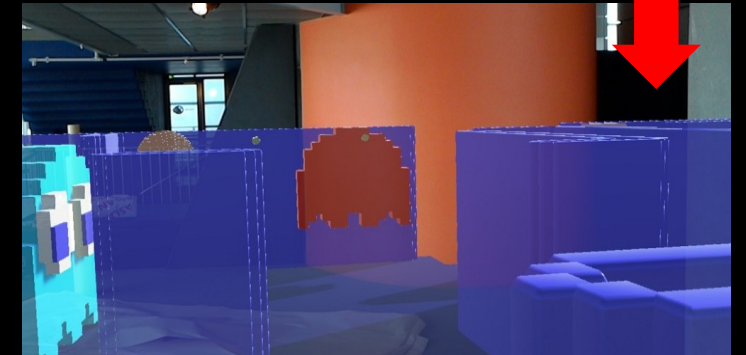
Benefits of MR 2: Players start teaching / advising one another

As teamwork is crucial to completing the game.

the player who are more into playing game starts teaching and giving advices for those who do not.



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PAC-MAN™&©BANDAI NAMCO Entertainment Inc.



PAC-MAN™&©BANDAI NAMCO Entertainment Inc.

Benefits of MR 2: Players start teaching / advising one another

Play Video

Benefits of MR 3: Sports factor

players are given the freedom to move around just like playing a sport.

It's safe & accident-free because players see the real people and real world.



©BANDAI NAMCO Studios inc.



©BANDAI NAMCO Studios inc.

Benefits of MR 3: Sports factor

Play Video

Collaborative Play is FUN!



©BANDAI NAMCO Studios inc



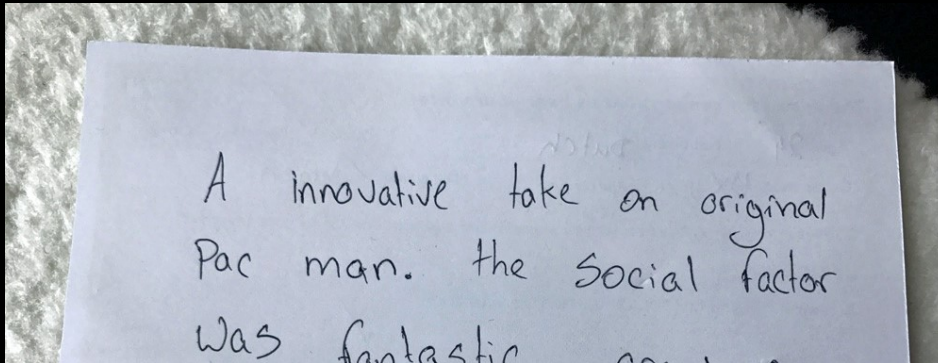
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Mixed Reality provides a unique platform which enhances human interaction.

9. Amazing Findings

In this section, I would like to share our observations of “Collaborative Play.”

Mixed Reality has potential in “encouraging sociability” through entertainment



"An innovative take on original PAC-MAN. The social factor was fantastic. Great way to experience playfulness with strangers."

©BANDAI NAMCO Studios Inc

This message alone sums up Mixed Reality's uniqueness and what it has to offer to the players.

Three Core Pillars

1) Real world:

- 8 square meters playfield at ARS Electronica Center Lobby

2) Centering theme - Real People & their Interaction:

- 3 Players equips a HoloLens and interact with each other by high-fiving to change role (to PAC-MAN).

3) Diversity:

- Each player is assigned to a specific role (PAC-MAN, CHERRY or a POWER PELLET).

how the "PAC IN TOWN" alone triggered interaction between people who were complete strangers before the game.

Mixed Reality has potential in “encouraging sociability” through entertainment



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©NAMCO LIMITED.

Chapter four:

Technical details of Mixed Reality – “Coordinate Engineer”

covering technical details from an engineering perspective stressing an important role which I refer to as the “Coordinate Engineer” who plays a vital role in the precise placement of digital object in the real world.

Introduction:

Eiji Iwata

Research Engineer at BANDAI NAMCO Studios Inc.





Eiji Iwata (Engineer)

2011: Joined Bandai Namco Games.

2013: Started development of AR/MR games on AR smart eyeglass Moverio.

CEDEC 2014: Session lecturer "Unearthing New Entertainment with Binocular AR Glass."

2015: Participated in tech demo for "Summer Lesson." PlayStation VR

Current: Developing MR games on HoloLens

Chapter 4 Content

- **Mixed Reality Attraction using HoloLens Technology**
 - ✓ **Spatial scan On-site & level design After simulation(Project Mosquito)**
 - ✓ **Methodology & application of **coordinate** related factors**
 - ✓ **Empowerment On-site (Common Topic: Especially PAC IN TOWN)**

Goal of the Chapter 4

- Application and advantage of location scanning and simulation
- Measures taken to avoid coordinate related errors
- Key factor for successful MR content
= Everything On-site

10. Spatial scan On-site & level design After simulation

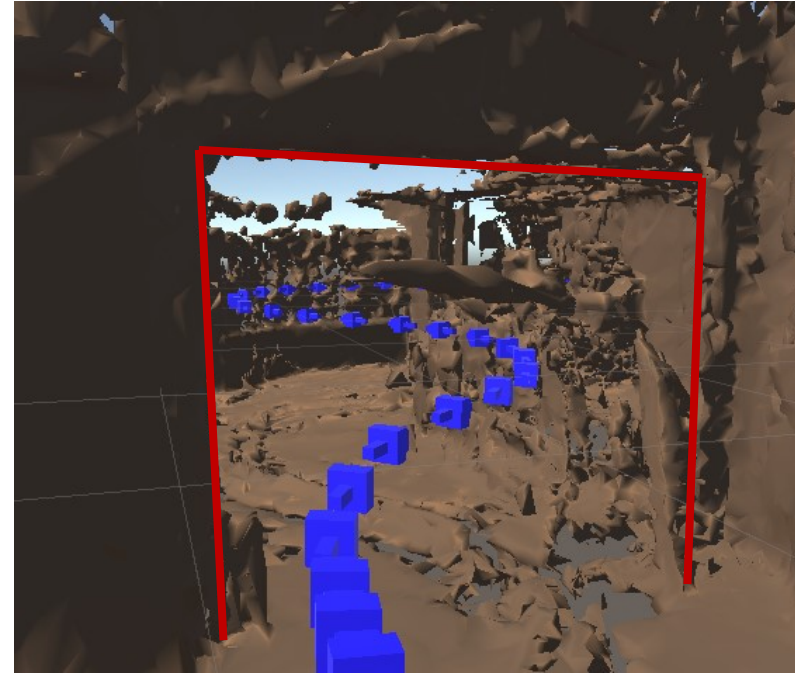
About Project Mosquito

Explosion! Mosquito Battle, the popular attraction since 1996 when the NAMJA TOWN was opened, has dramatically evolved into a new attraction thanks to the Microsoft HoloLens.

In this attraction, players beat off ferocious mosquitoes swarming toward them using the “Shock Wave” by clapping their hands. Very exciting and exhilarating.

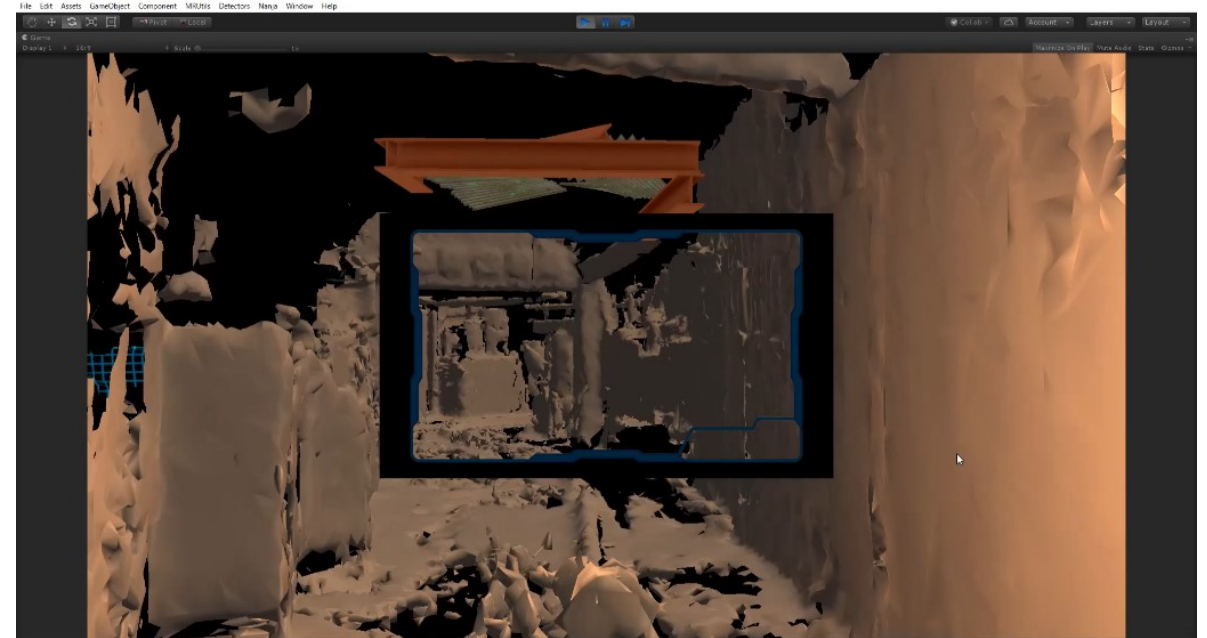


Creating On-site Spatial Environment with Unity



Recreating on-site environment at the office

Comparison of Simulation on Editor & Actual Location Attraction



Tasks Required to Recreate Location Environment

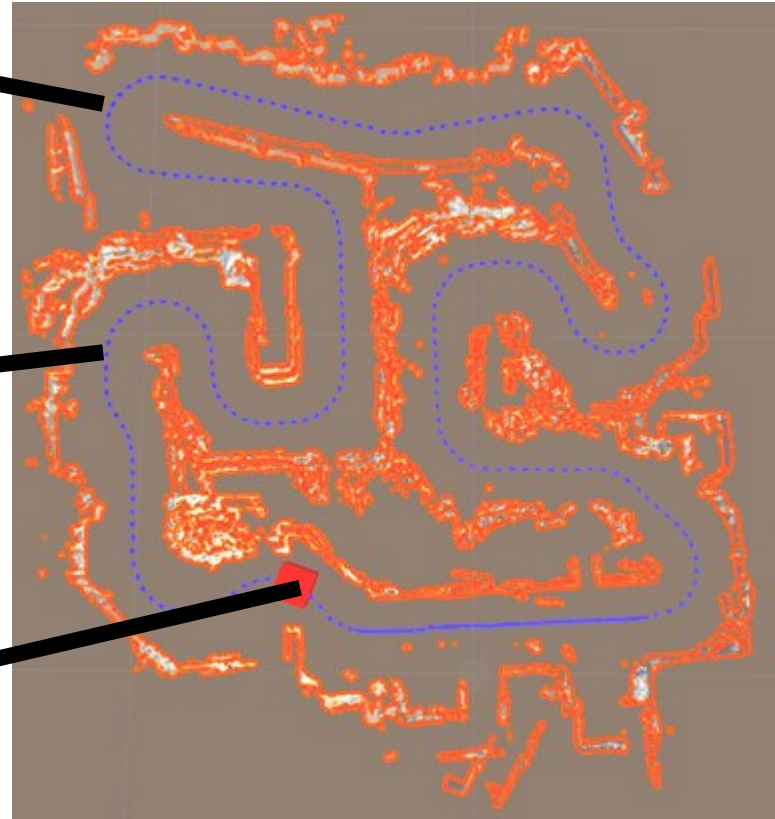
- Simply record logs such as spatial map and position of the view camera!
- ✓ Adjustments such as aligning the coordinate origin and position of environmental layout must be conducted if multiple scan is performed.
- ✓ The data would need to be optimized to remove unneeded data if the scan data is too large.

Complete Scan of On-site Environment

Track of the ride
using HoloLens

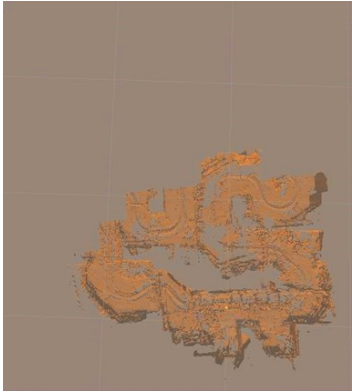
Wall and placed
objects scanned by
HoloLens

Marker indicating
position of attraction
ride

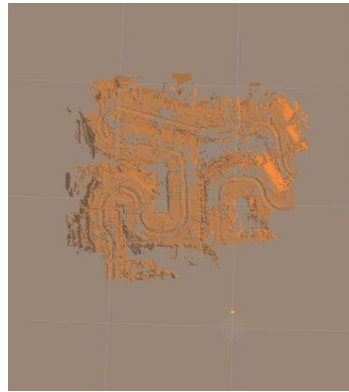


Integration of Scanned Data

Mesh: Lower half
portion

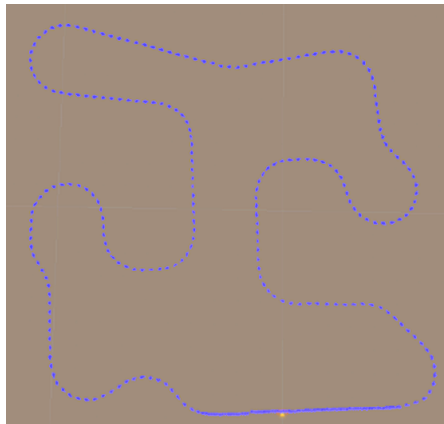


Mesh: Upper half
portion



Integration
Optimization

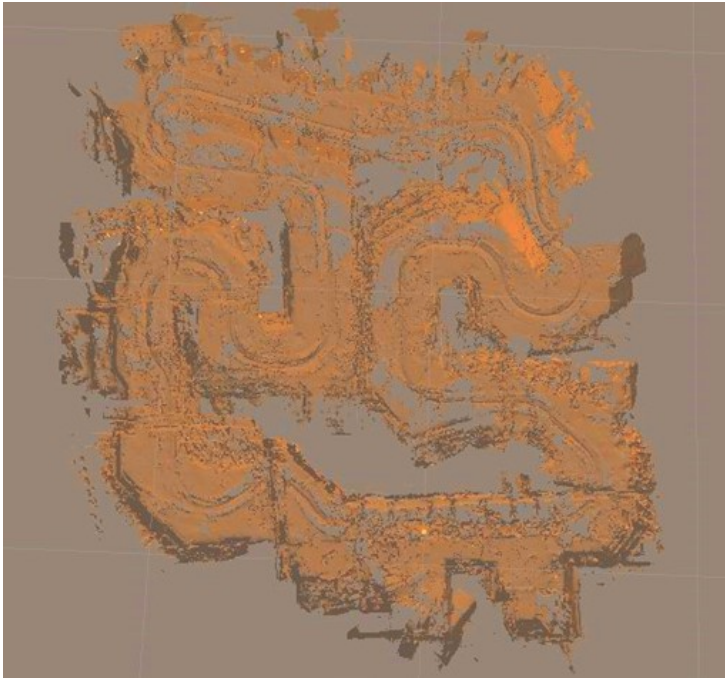
Track line of the amusement ride



Integrated data of the real
environment



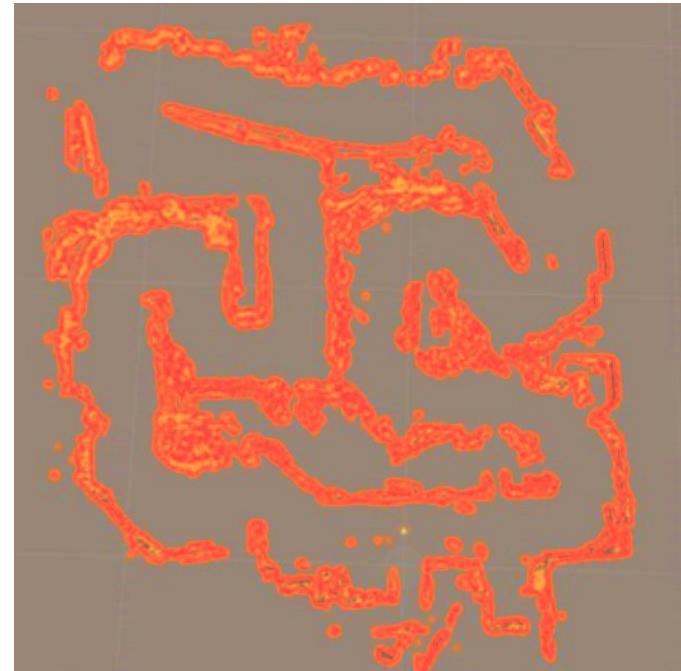
Mesh before
processing



1. Deleting floor
and ceiling

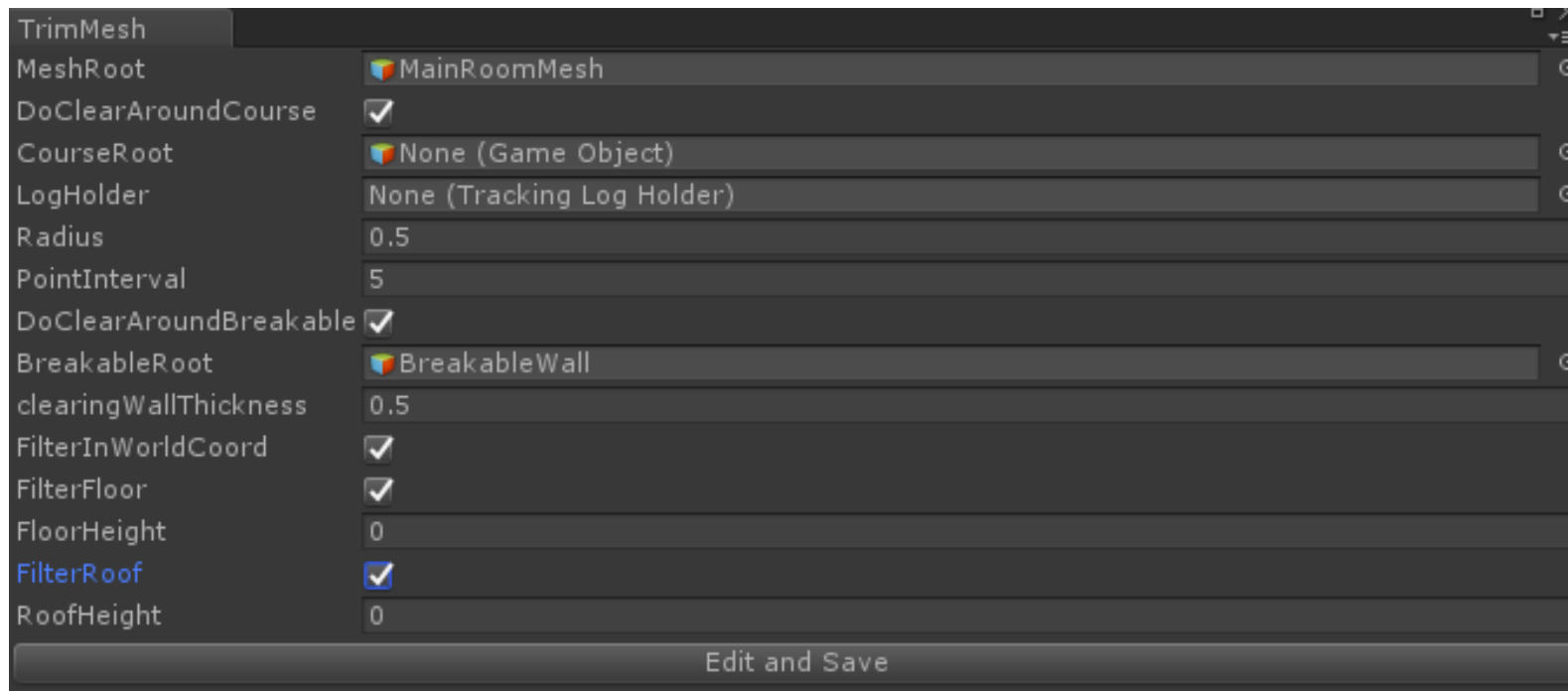
2. Delete
unnecessary
mesh deriving
from the ride
and human
body

Mesh after
processing



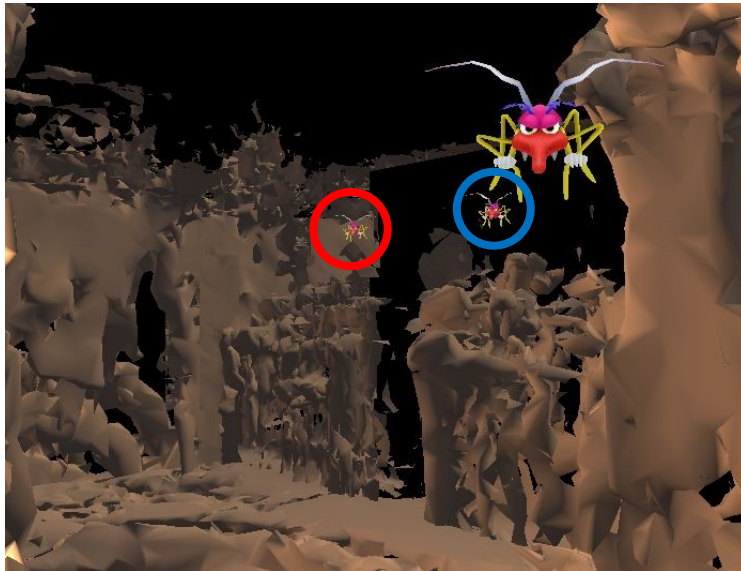
Methodology for Optimizing Scanned Data

1. Retrieve maximum height and index from MeshFilter acquired from Spatial Map
2. Data optimization is conducted under fixed condition
 - Delete mesh outside of a defined area from the course track to secure optimal field of vision
 - Trim surrounding mesh to avoid objects placed by Unity from being hidden
 - Mesh acquired from the floor and ceiling will be deleted as it may obstruct the view

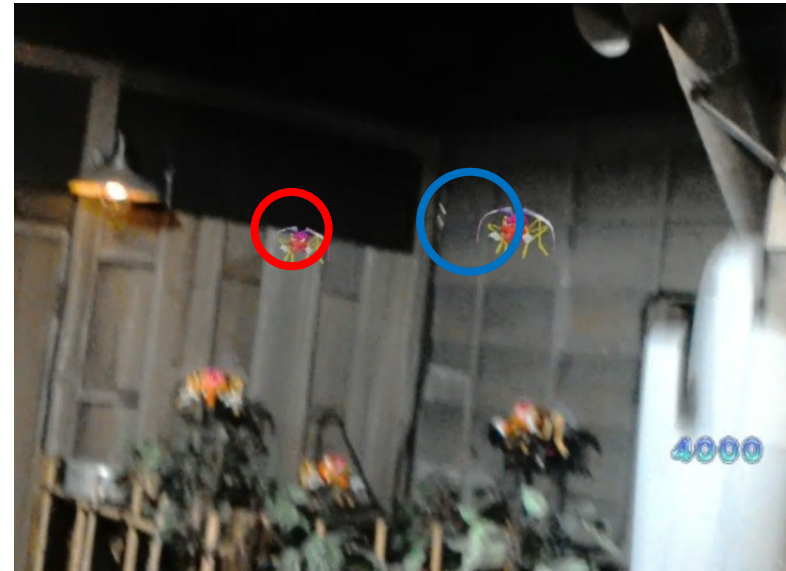


Example 1: Level Design of Actual On-Site Location Created on Unity

Unity screen



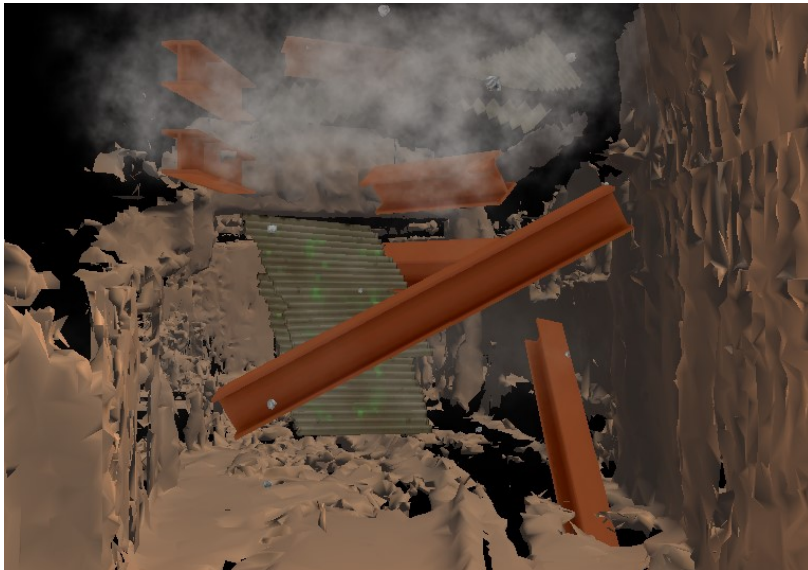
HoloLens field of view



Placement of enemy characters in a specific position

Example 2: Level Design of Actual On-Site Location Created on Unity

Unity screen



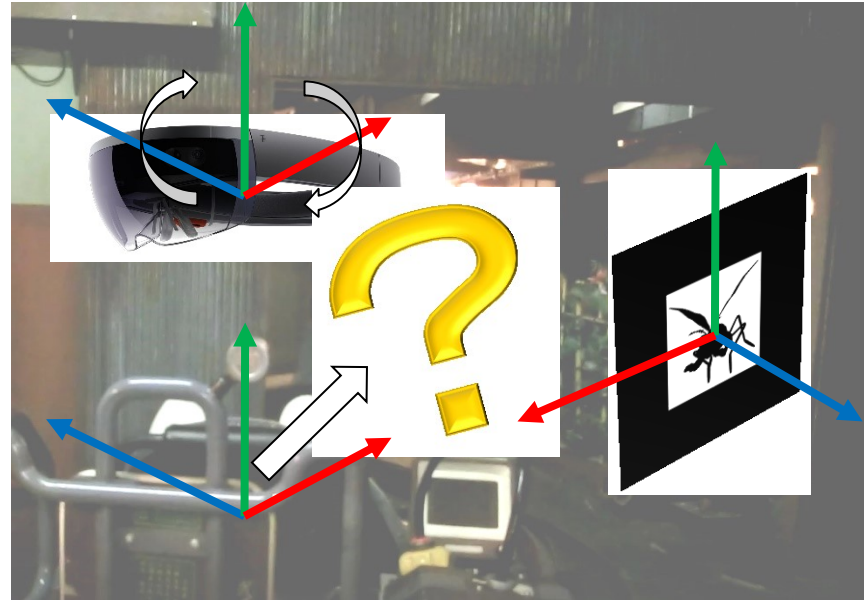
HoloLens field of view



Place events at specific points of the track course

11. Methodology & application of coordinate related factors

Why is coordinate a topic of discussion?



Critical risk factor which may deter MR content development, operation and experience.

Various Factors to Determine System of Coordinates

Placement of objects in proportion
to the height of head

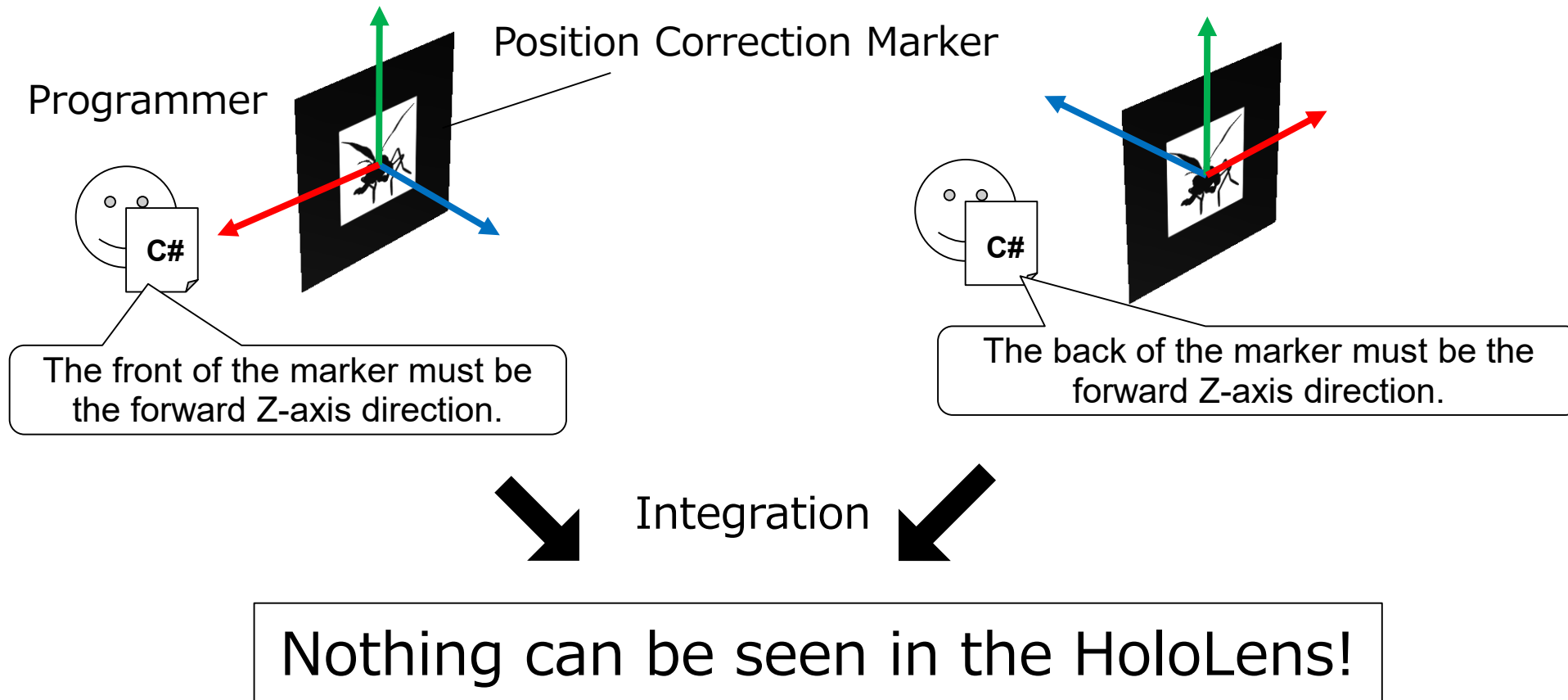
Whether the camera view or object
should move

How coordinates should be treated
after Tracking Loss

Which coordinates should be the
starting point of each scene

All decisions surrounding the system of coordinates should be consistent.

Examples of Misunderstandings/Confusions of Coordinates



PAC IN TOWN – Spatial Sharing



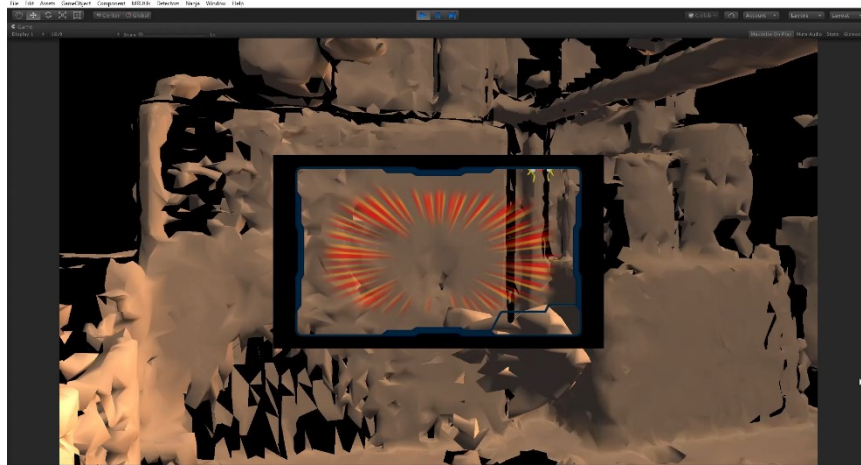
- Unity World Coordinate
 - View Camera Coordinate
 - Location Venue Coordinate
 - Kinect Coordinate
 - Coordinates of two players
- System of Coordinates of the amusement venue is determined by marker recognition.
- The coordinates of 3 players are shared through the network per frame.



- Unity World Coordinate
 - View Camera Coordinate
 - Amusement Venue Coordinate
 - Amusement Ride Coordinate
 - Estimation of simulation and tracking *
 - Head of the person on the ride
 - World coordinate of subscene (special sequence)
- * **We realized SLAM may not track consumers riding the attraction due to darkness**
 - Worked around the issue by ignoring position estimation via tracking during the ride and replace the system by position estimation simulation.

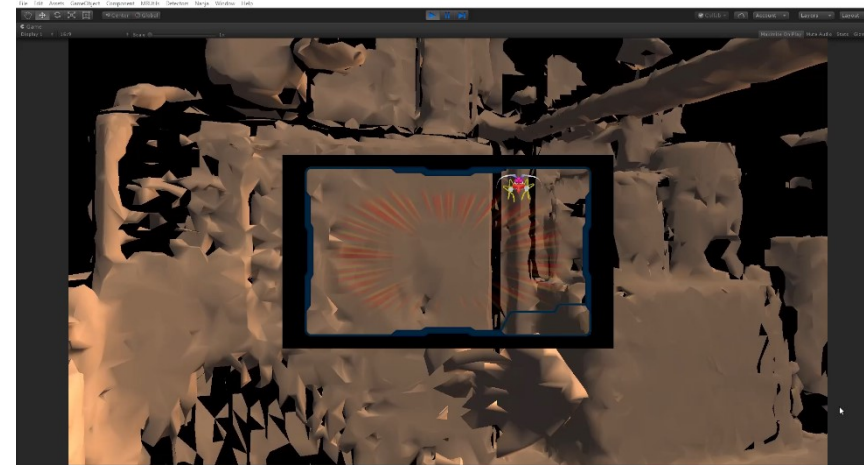
Two Coordinate System Modes: Internal Development Mode & On-site Mode

On-site Mode



Directional view is dependent on HoloLens' feature but is fixed on the editor

Internal Development Mode



The directional view follows the direction of the ride.

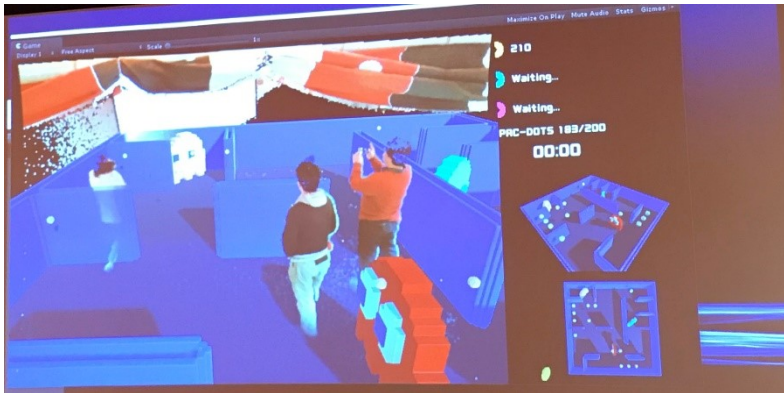
Adopted Strategies

Decide the direction of interface and level edit which does not put a restriction on all aspects related to coordinate during the early stage of development and assign one person (Coordinate Engineer) for implementation.

- ✓ Implementation of systems relating to coordinates with multiple people was disregarded from the beginning.
- ✓ Continuous efforts should be made when applying “patches” to fix coordinate related problems while balancing/tuning the content.

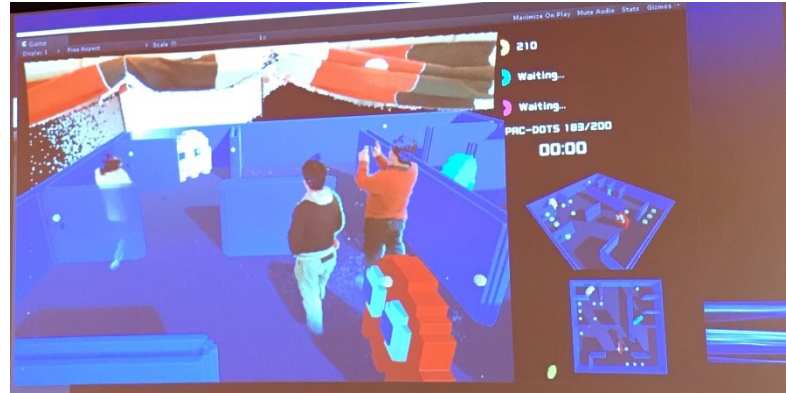
12. Empowerment On-site

Notes about Audience View



- Pixel-by-pixel of depth and color obtained by Kinect V2 are spatially placed.
- Alignment of position is performed manually by the person who is recording and checking the position of the character.
- Extension cable is needed.

Unexpected Results of Implementing the Audience View



- Initial Aim:

To share MR experience with audience and the player.

- Unexpected Merit:

Broadened operational measures to alleviate the pressures off of the operation team to make the MR experience efficient and better.

Additional Creative Ideas Born During Operation

- The marker was covered by a cloth after a successful calibration/marker recognition through the Audience View.
- Sharing gameplay through the Audience View with the MC played a big role in hyping the attraction.
- Implementing a panel which prompts each player equipped with the HoloLens to check for their clarity of view.

Promoting creativity on-site

=

Increasing information that could be checked on-site

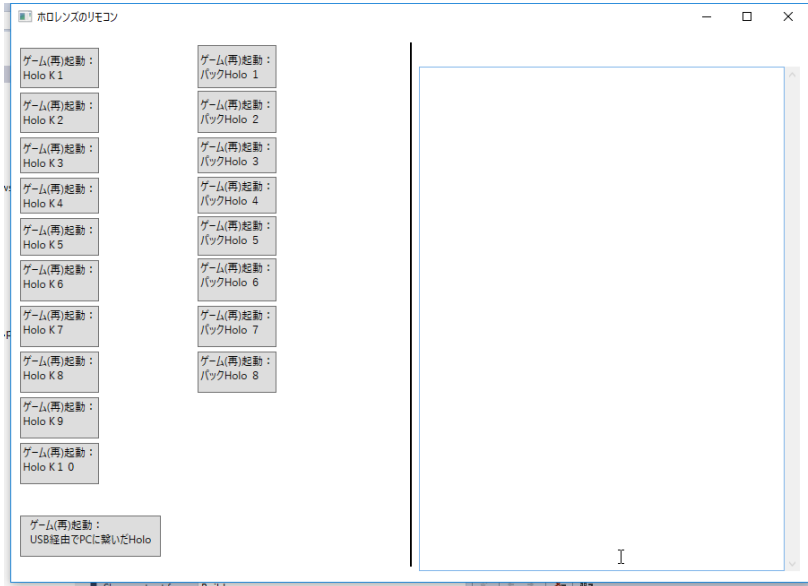
Support Tool Developed for On-Site Operation

Specification:

- When a button is pressed, the corresponding HoloLens game starts.
- A trouble shooting sequence will be displayed when there's an issue.

Merits:

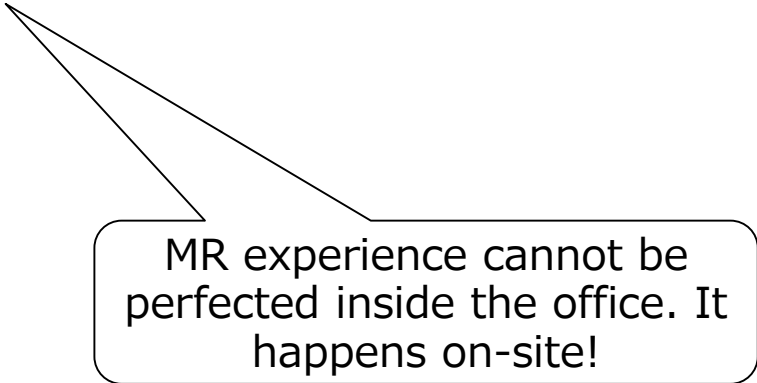
- People who were not familiar with the HoloLens was able to easily use the device.
- The tool withstood an extremely busy operation.



Efforts were made to remove heavy on-site operation of AMR on-site.

- MR content is perfected based on information gained from on-site.
 - ✓ A realization of issues that is completely unique on-site cannot be identified just by working from the office.
 - ✓ Some solutions can only be recognized on-site.

Valuing and placing high importance on every factors on-site!

A callout box with a black border and a tail pointing towards the underlined text above it. It contains the text: "MR experience cannot be perfected inside the office. It happens on-site!"

MR experience cannot be perfected inside the office. It happens on-site!

Chapter five: our vision of the “Playful World.”

Sharing our views on the future of XR entertainment and our vision of the “Playful World.”

13. The Magical Moment

In this section, we are going to cover what I recall as the Magical Moment – Batkid and how hybrid world of real and digital can make this miracle happen.



Gotham City Chronicle

Friday, November 16, 2012 | PRINTED ON RECYCLED PAPER | B101

BATKID SAVES CITY

Hooded hero nabs Riddler, rescues damsel in distress

By Clark Kent

Gotham City was saved from apparent ruin Friday when a vigilante superhero saved the city from myriad public enemies.

Although cloaked in dark armor, a cape and pointy-eared mask, this new

hero burst into the Nite Hill neighborhood just in time to rescue a woman from the Hyde Street cable-car tracks.

This reporter has learned that obviously, the masked crusader—dubbed “Batkid” due to his spunky nature and unusual attire—also stopped a billion daytime bank rob-

bers, saving the infamous Riddler as he attempted to make off with the loot savings of Gotham’s citizens.

“There are not the daring acts of just any hero,” Mayor Ed Lee said. “This is clearly the work of a SUPER hero, one that we are proud to call a resident of Gotham.”



The elusive Batkid caught on film.



The Penguin’s plan to hide among the penguins at the Academy of Natural History was promptly foiled when Batkid recognized the villain’s green armband.

Penguin can’t hide from the Batkid

Kidnapper’s hideout discovered in plain sight



By Lois Lane

The myth of Batkid continued to swell Friday when, after a morning that included a failed robbery and rescuing a helpless citizen, the police chief was forced not again to call on the legendary figure to fight Gotham’s crime.

Chief Greg Gable told The Chronicle he could find no officer on staff that could compete with Batkid’s prowess when the city’s most beloved vigilante was kidnapped by the notorious Penguin.

Lois Lane, mascot of the Gotham City Gazette, was freed by Batkid shortly after her abduction. A crowd of hundreds gathered to cheer as they watched the

“I knew there was only one person who could be up to such a monumental rescue.”

Chief Greg Gable

Batmobile chase the kidnapper, who will be arraigned Monday on charges of racketeering the baseball season, kidnapping, overall made innocent and had body odor.

“I know there was only one person who could be up to such a monumental rescue,” Chief Gable said. “Thank you, Batkid, for saving the Gazette’s long war-

Caped crusader crushes crime

By Brenda Starr

The crime wave that has

haunted fear in every man-

ner of Gotham’s population

seems to have ended, as

Batkid continues to catch

vicious criminals.

More months ago, mothers

reported finding toy cars

to go to the supermarket to

buy ice cream for their chil-

dren. But since Batkid’s

emergence on the scene, ice

cream sales around the city

have skyrocketed—a fact

local shopkeepers attribute

to safer streets.

“I used to be scared to

open my windows at night.

Now, thanks to Batkid, I

don’t have to be scared.

“Thanks, Batkid!” said J.

Josephson, 34, of Pacific

Heights.

Murders, burglaries,

assaults and home-work

reports seem to have ceased

to other, superhero-free

cities, like Los Angeles.

Crime overall has dropped

lower percent—a dropping

number never before seen in

U.S. history.

Batkid’s secret revealed at last

By Perry White

The truth of Batkid’s true

identity has eluded police

and newspaper reporters

since—well, now.

“On the night Mayor Ed

Lee presented Batkid the key to

the city for his heroic deeds,

sources revealed to The

Chronicle that the masked

crusader is none other than

Miles, a 3-year-old kinder-

gartener from Northern

California.

“By day he is a pretty

thing goes wrong, Miles

disappears and Batkid

emerges,” said a friend, who

speaks on the condition of

anonymity. “It’s more than a

coincidence.

“I have no idea how he

makes all these cool things

he does as Batkid. He must

really pay attention at



Batkid moment.

This reporter has also learned a shocking truth—that Miles has leukemia. “I don’t know if all that superhero help has him into a superhero, but it certainly didn’t hurt,” said Dr. White, an oncologist at the hospital who treated Miles.



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Weather
Clearing clouds.
High: 60-64.
Low: 50-52.
A10



'Bat Kid' gets his dream day as SF transforms into Gotham City

<http://www.irishtimes.com/news/world/us/bat-kid-gets-his-dream-day-as-sf-transforms-into-gotham-city-1.1597694>

Miles' wish to be Batkid

<http://www.youtube.com/watch?v=Gw3aWPxtpfE>

HOW ONE GAME DESIGNER HELPED BATKID'S DREAM COME TRUE

<http://www.pixelkin.org/2013/12/22/how-one-game-designer-helped-batkids-dream-come-true/>



How one ex-game developer helped grant Batkid's wish to save Gotham City

Polygon

<https://www.polygon.com/2013/12/14/5208764/batman-eric-johnston-batkid-make-a-wish-san-francisco>



"The planning team was small, starting with a core of five people. We went to the locations, threw around ideas, talked to awesome SFPD folks, and tried to think of people we knew who wouldn't mind getting arrested for things like bank robbery and baseball-mascot kidnapping."



"We knew that Miles really liked the gadget side of the Batman character," said Jen Wilson. "EJ took that to heart and thought about it, trying to make that part of the experience ... We wouldn't have been able to do anything like that without him."



"Everything that I did, Sue and I worked on together," EJ said. "She has all the really good shop tools and the experience using them. Everything we ever do is a collaboration."

<https://www.instructables.com/id/Batkid-Tech-1-Riddlers-Device/>



The adventure ended with a commendation from Mayor Edwin Lee and the adulation of thousands of grateful citizens. "Batkid Saves City!" read the headline of the Gotham City Chronicle, a faux newspaper front page designed for Miles' day.

<http://pixelkin.org/2013/12/22/how-one-game-designer-helped-batkids-dream-come-true/>

XR entertainment has just begun.

**It's a lot of fun because you can "realize" your
childhood dream in the real world.**

**Again, mixed reality is social communicator and it has
potential in "encouraging sociability" through
entertainment like magical moment - "BatKid".**

Social Play - collaborative play becomes

"The player is the star"

14. Conclusion:
The world we live in is a “Playful world”

Summery

“From Videogames to Digital Playground”

I would like to conclude this presentation by providing a brief summary of this course and share my vision of a playful world where the real and digital world coexist in the near future.



Thank you FOR YOUR TIME!

Questions?

Hirofumi Motoyama
Eiji Iwata



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