VRDC @GDC 2018

PAC-MAN HoloLens - Developing a Mixed Reality Game for a Broad Audience

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Introduction:

Hirofumi Motoyama

Creative Director at BANDAI NAMCO Studios Inc.

BANDAI NAMCO Studios

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

Presentation Timeline

1) ***Overview*** *of "PAC-MAN HoloLens" (6 min)*

2) ***Exploring*** *Mixed Reality Content Design (10 min)*

3) ***Operating Efficiently*** *with a Small Team (6 minutes)*

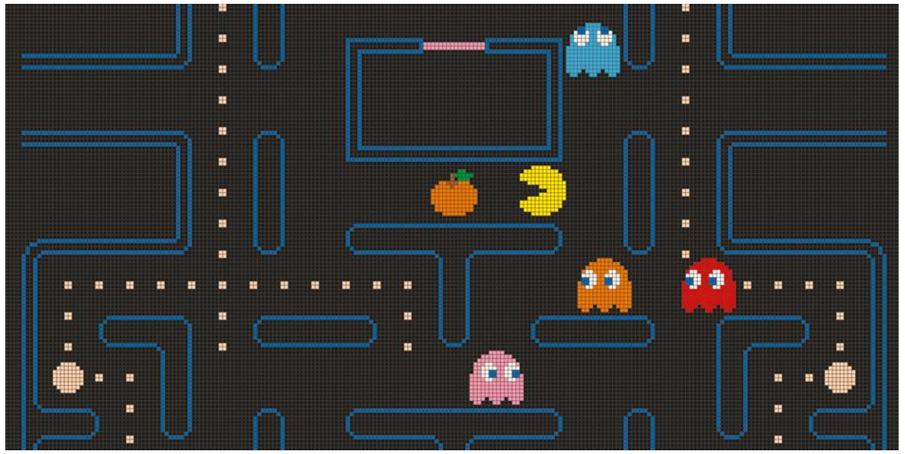
4) ***Amazing Findings*** *of Mixed Reality (6 minutes)*

1) Overview of "PAC-MAN HoloLens"

"PAC-MAN HoloLens" was developed for Pacathon in 2017.

Pacathon was our adventure to explore new implementations of PAC-MAN using "innovative technology" @ ARS Electronica Festival.

400 people experienced in 5 days.



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

"PAC-MAN HoloLens" was featured as MR Attraction in early 2018.

We also developed another Mixed Reality game called “Mosquito”.
First installment of "Microsoft HoloLens" in a Japanese theme park.

8,000 people have played just this year alone

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JAPAN ONLY

http://panora.tokyo/53151/

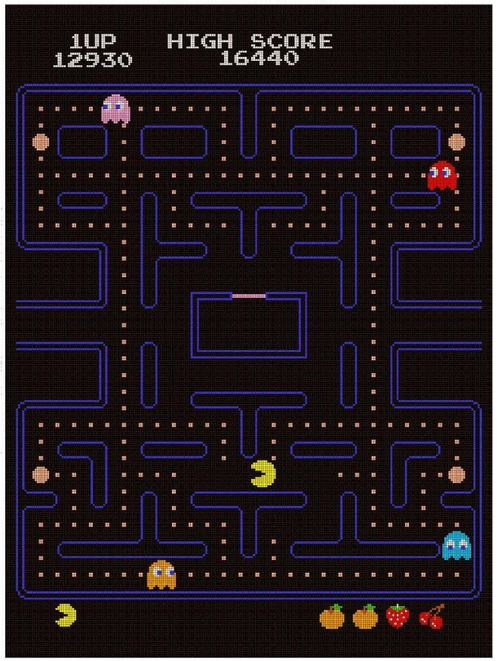
The Fee is 7 USD or 17 USD for night passport (3 attractions in theme park).

PAC in Town

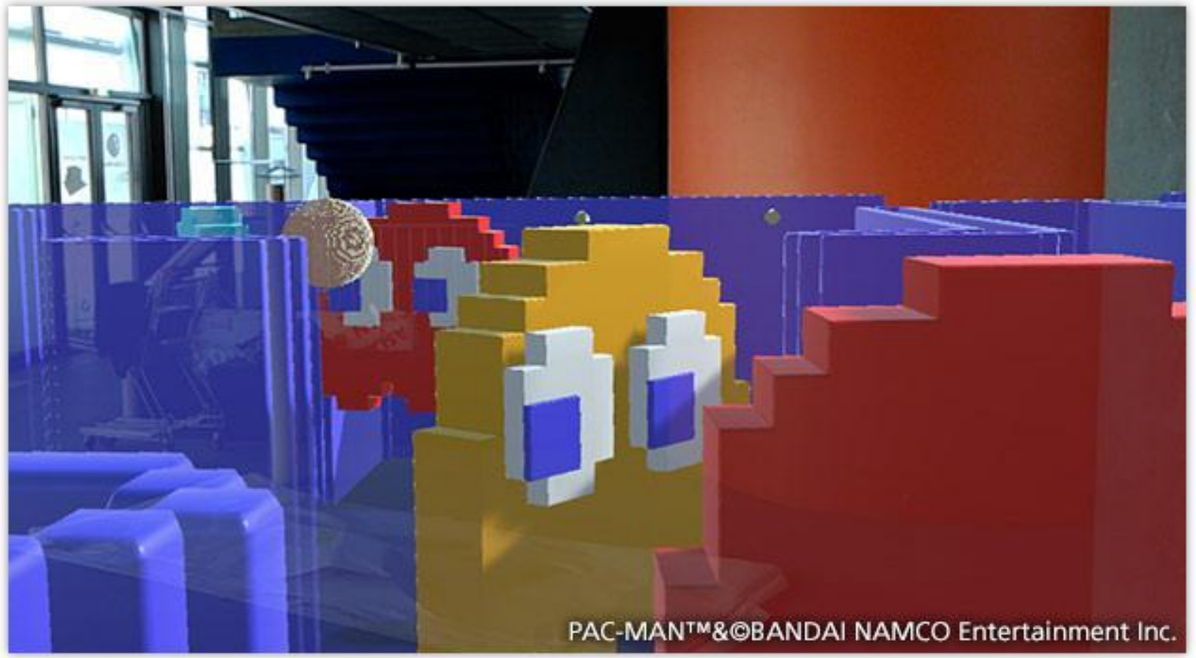
Can PAC-MAN change a public space
to a play ground?

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

“PAC-MAN HoloLens” is a life-sized PAC-MAN game which takes place in the real world.



1980



2017

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Finally! Thanks to Microsoft HoloLens, *We accomplished to make a life-sized PAC-MAN experience that* ***PAC-MAN fan had a dream since 80s!*** ☺

仲間と協力！リアルパックマンアトラクション
PAC-IN-TOWN
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2) Exploring Mixed Reality Content Design

General Overview

- **3 developers** (creative director, programmer and artist)
- **1 month for development** (using Unity & tools from the MOSQUITO project)

- ***8 Microsoft HoloLens (3 for gameplay, 3 for standby, 2 as a backup)***
- ***1 Kinect V2 (for audience view)***
- ***3 markers on play field***

Development Schedule

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2017 May — August — September — 2018 Jan

- MOSQUITO project: 3 months
- **PAC-MAN HoloLens Prototype: 1 month**
- optimized for attraction: 1 month
- **GOES LIVE!**

Development Process

- *We leaned from XR (VR/AR/MR) start-up companies.*
- *Development process should be fit for the fast environment.*

Start-ups (half a year – a year)

SET a Target → **Prototyping** → **Selection** → **Investment**

August — September — November — December — Jan 2018

Prototype: 1 month →

→ Optimize: 1 month →

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only 5 months *from start development to open the attraction*

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).

Working around “Limited FOV“

…After the core pillars were set, we faced a BIG CHALLENGE for design.

Our design approach

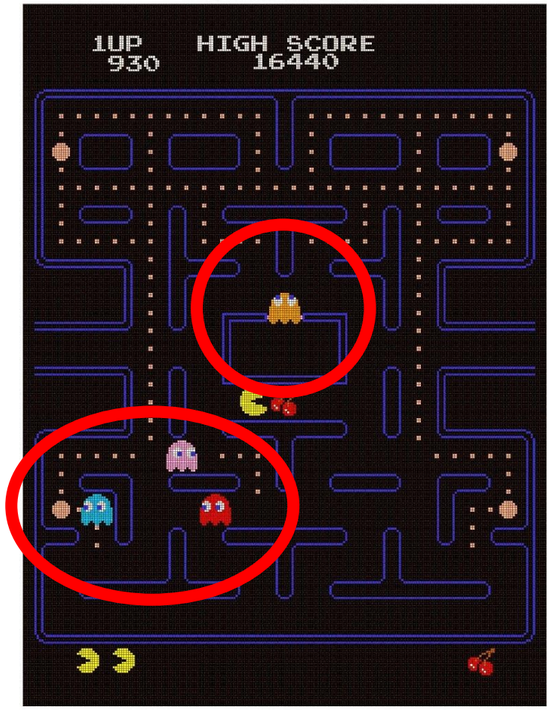
1) ***Creating Space for Visual Observation***

2) ***In-Game Object Placement***

3) ***Optimizing a game design***

1) Creating Space for Visual Observation

We changed the Ghost's behavior from chasing PAC-MAN to patrolling an area.



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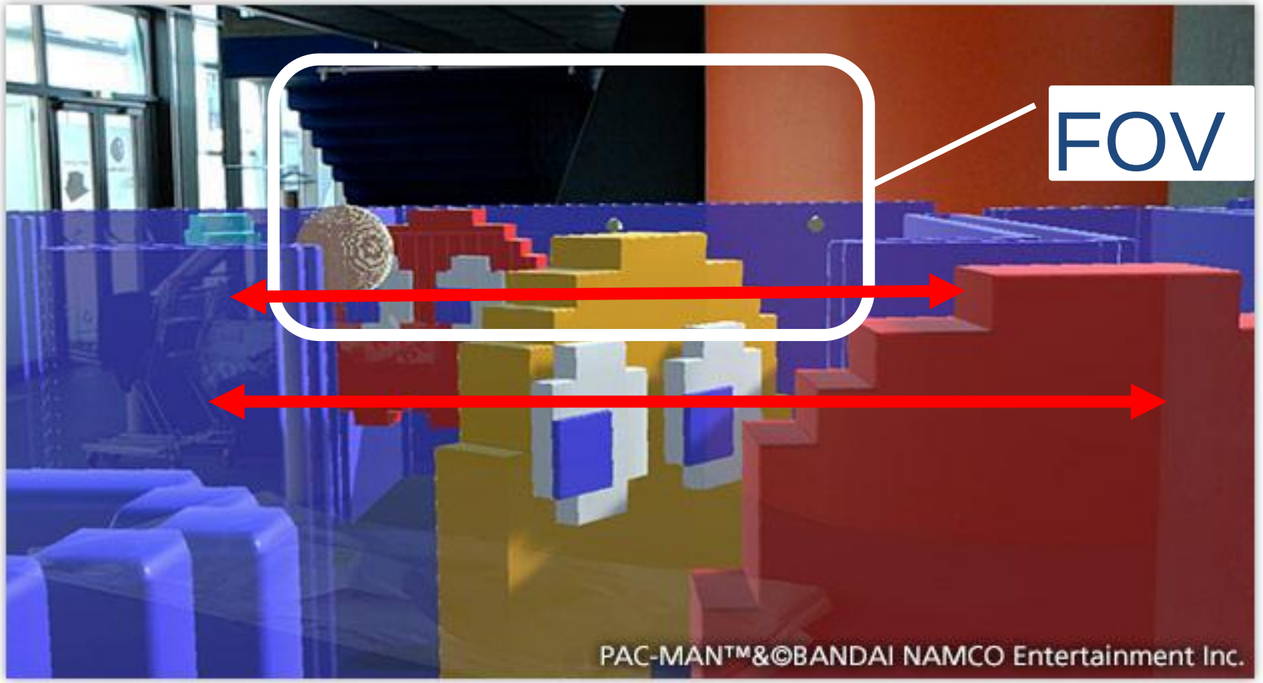
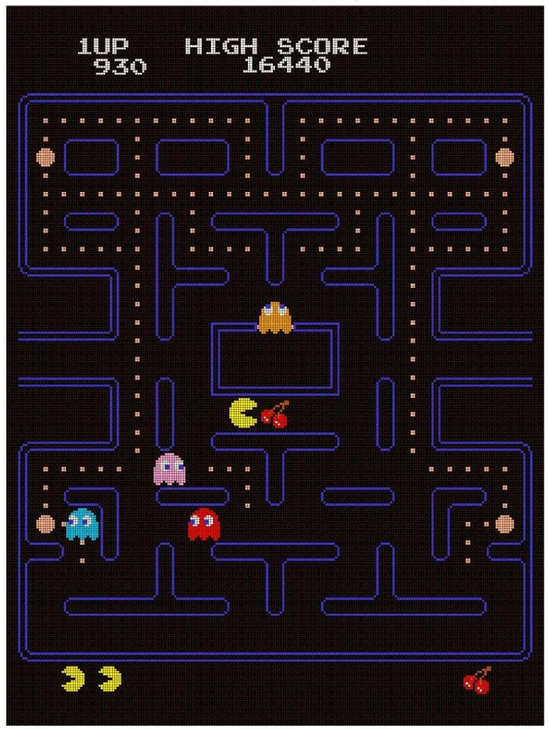


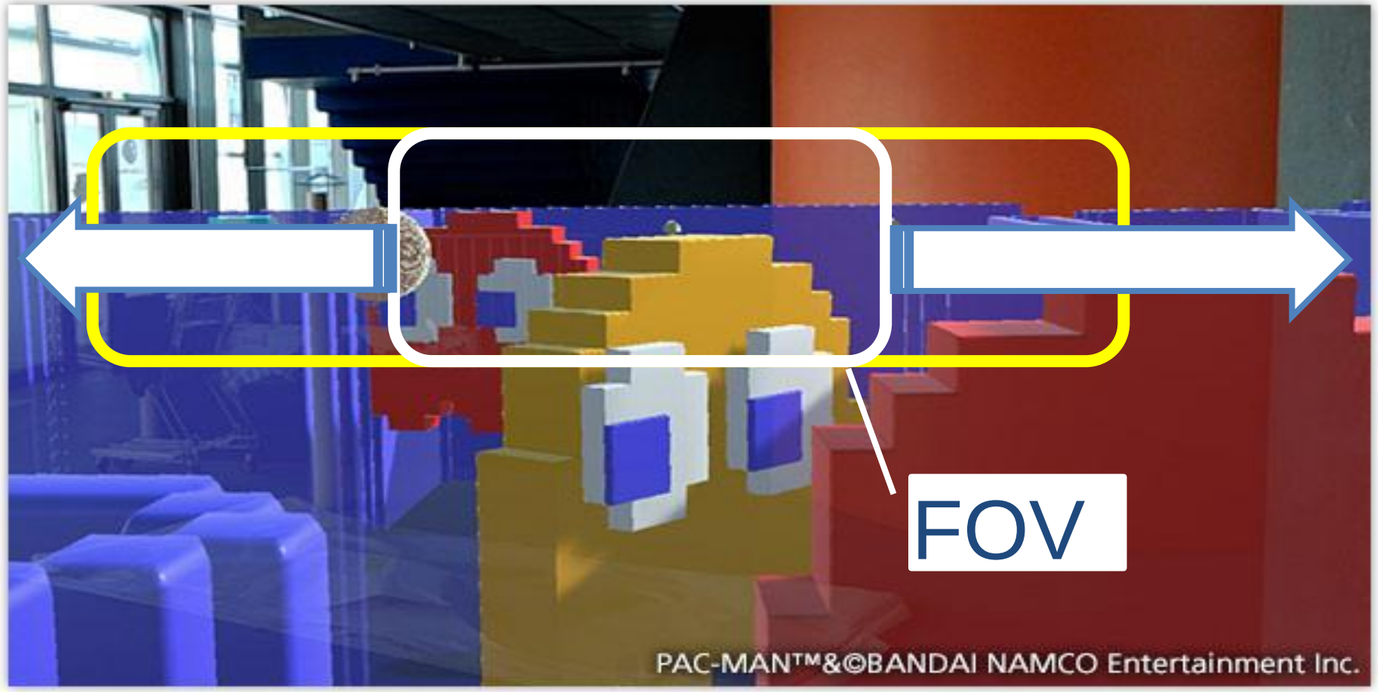
Player is provided "ample time and space" to see the GHOSTS for strategic thinking.

2) In-Game Object Placement

By placing all in-game objects on the same height, *the players will be able to see all in-game objects by* ***simply moving their head horizontally****.*



TILTING PAC-MAN's 2D maze to **90 degrees**.



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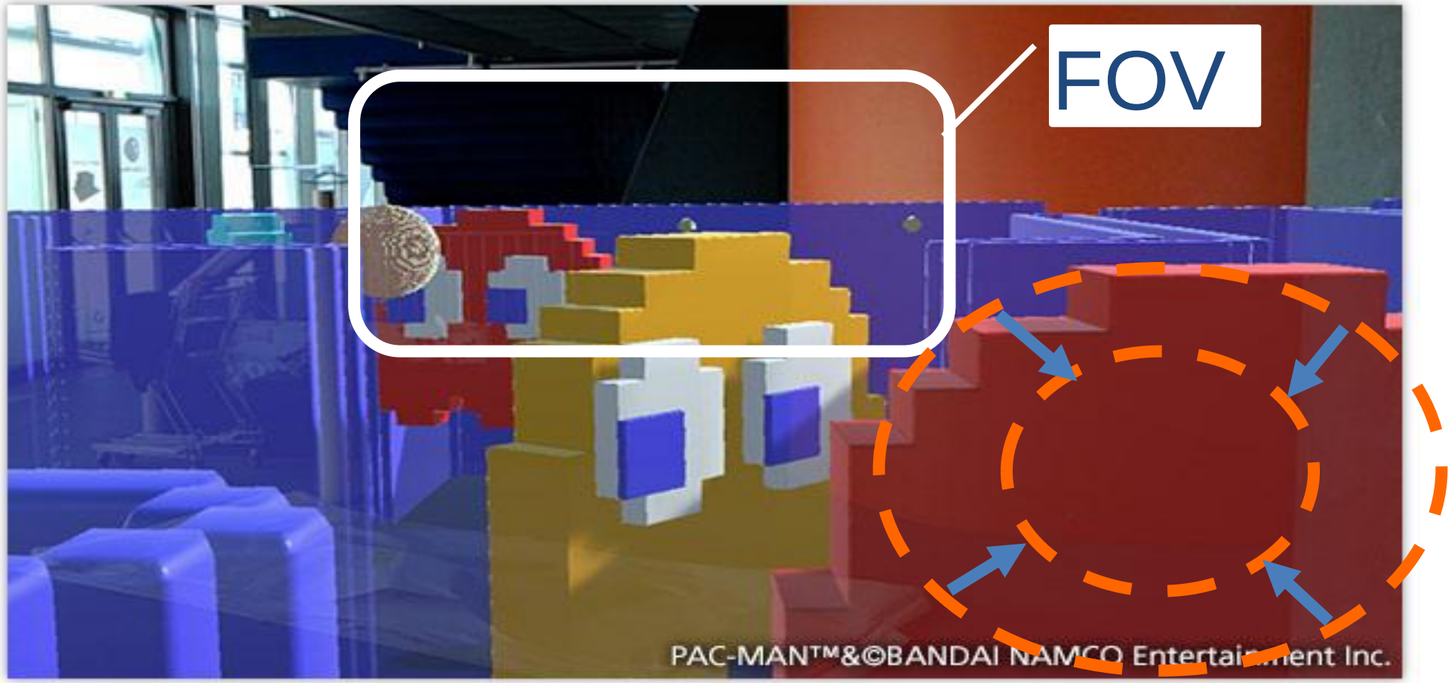
3) Optimizing a game design

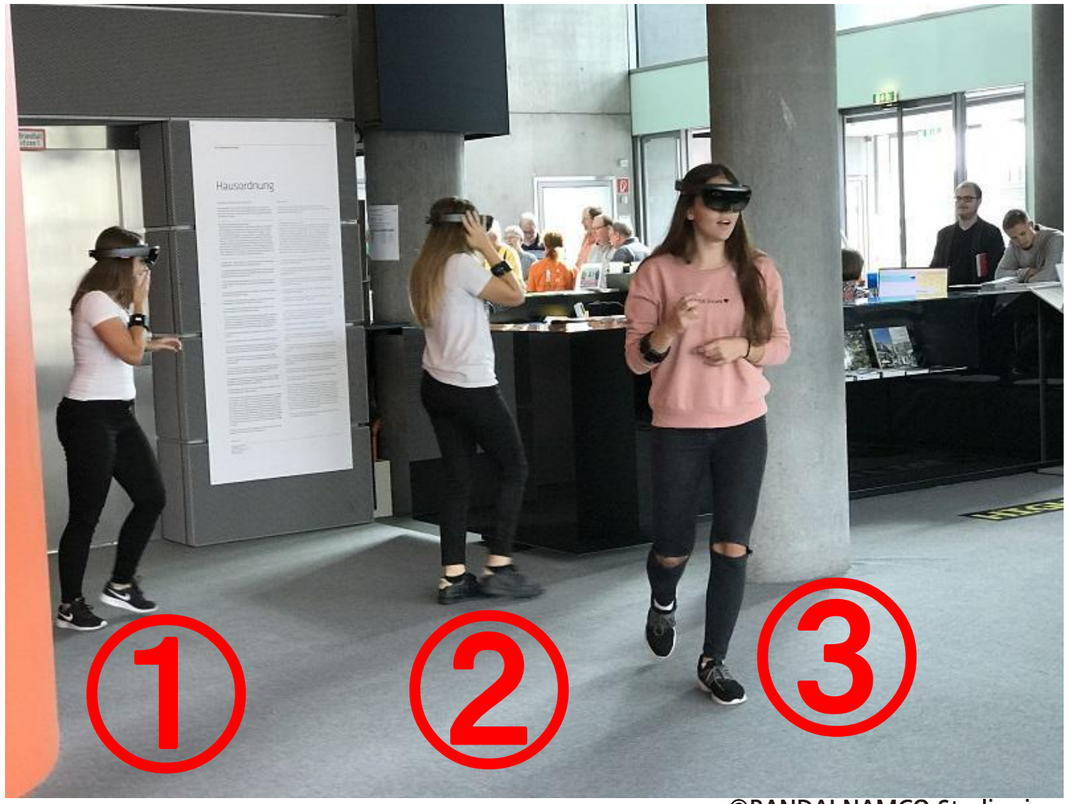
If players cannot visually see this**, making their gaming experience **extremely stressful.



Reduced a hit collision for GHOSTS

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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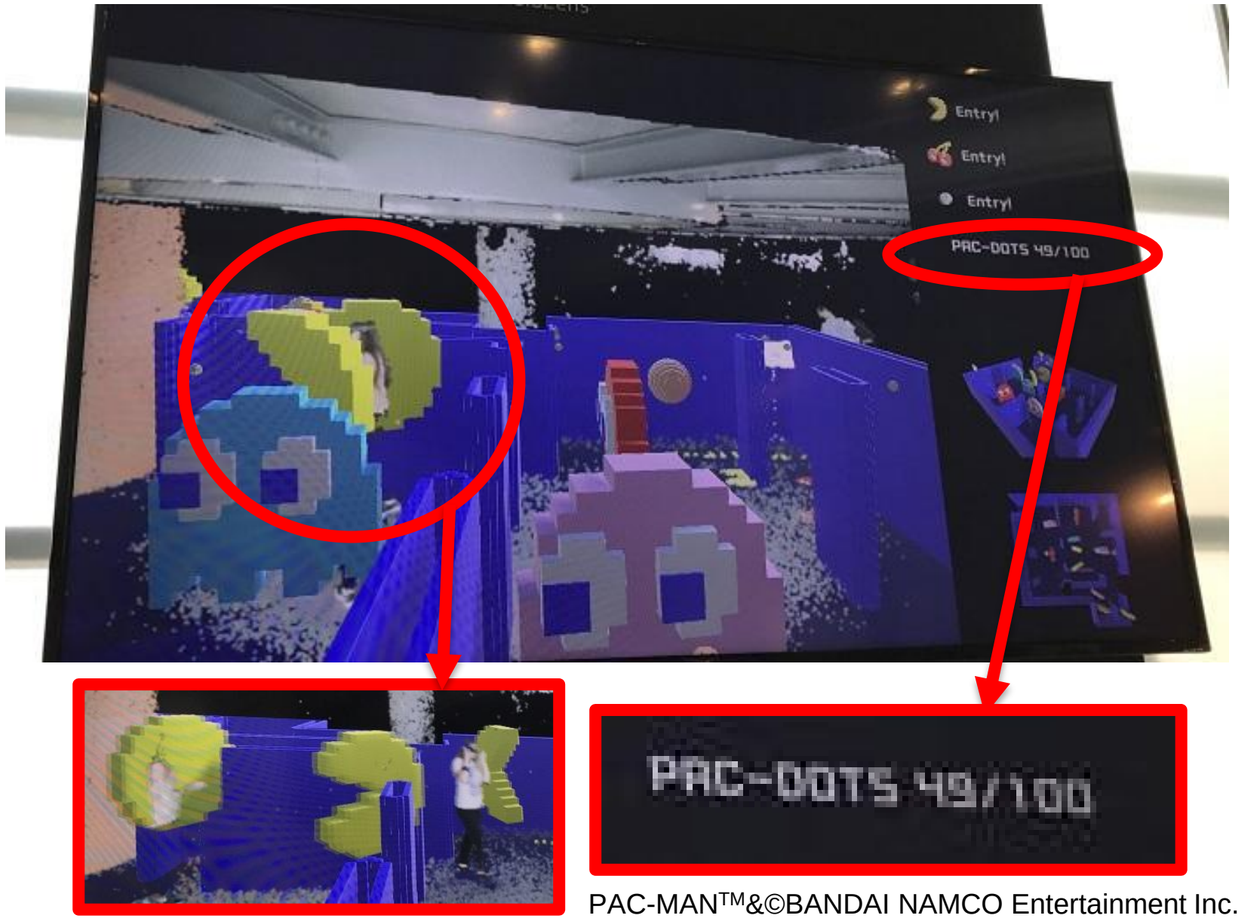

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A common question that comes up about "PAC-MAN HoloLens" is…

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

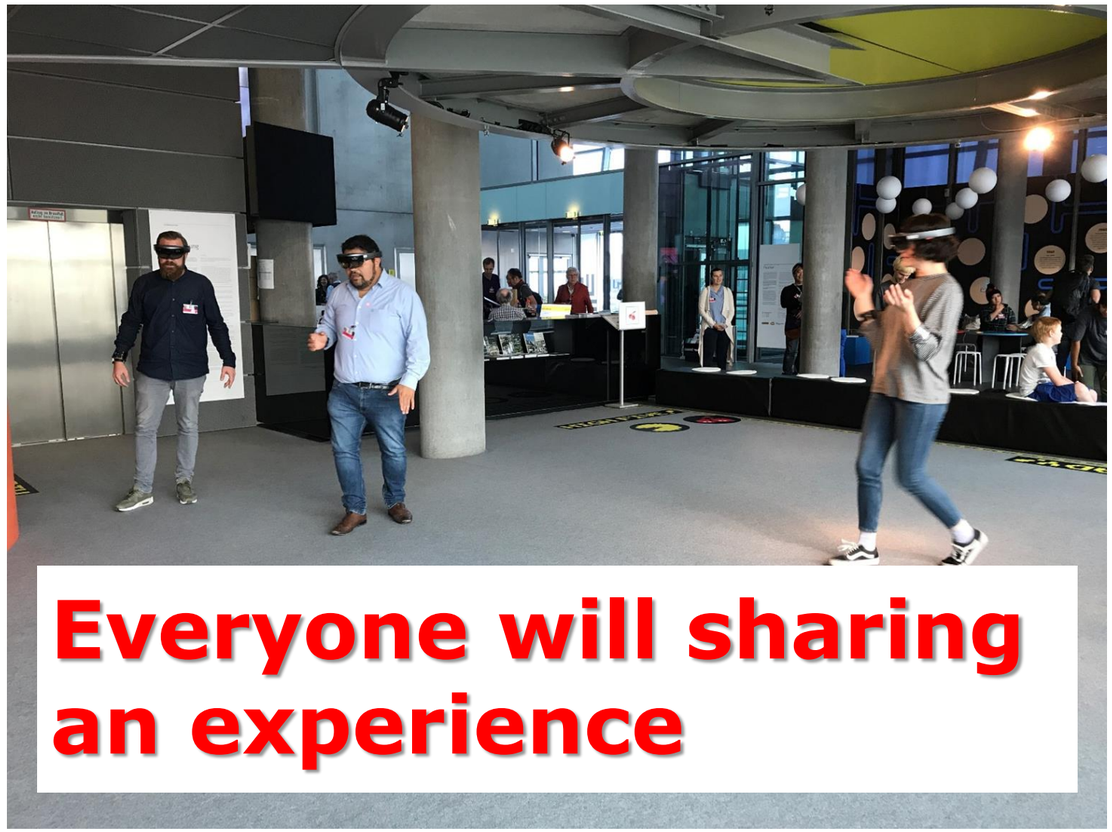
"Why is there a need to support three players?"

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.



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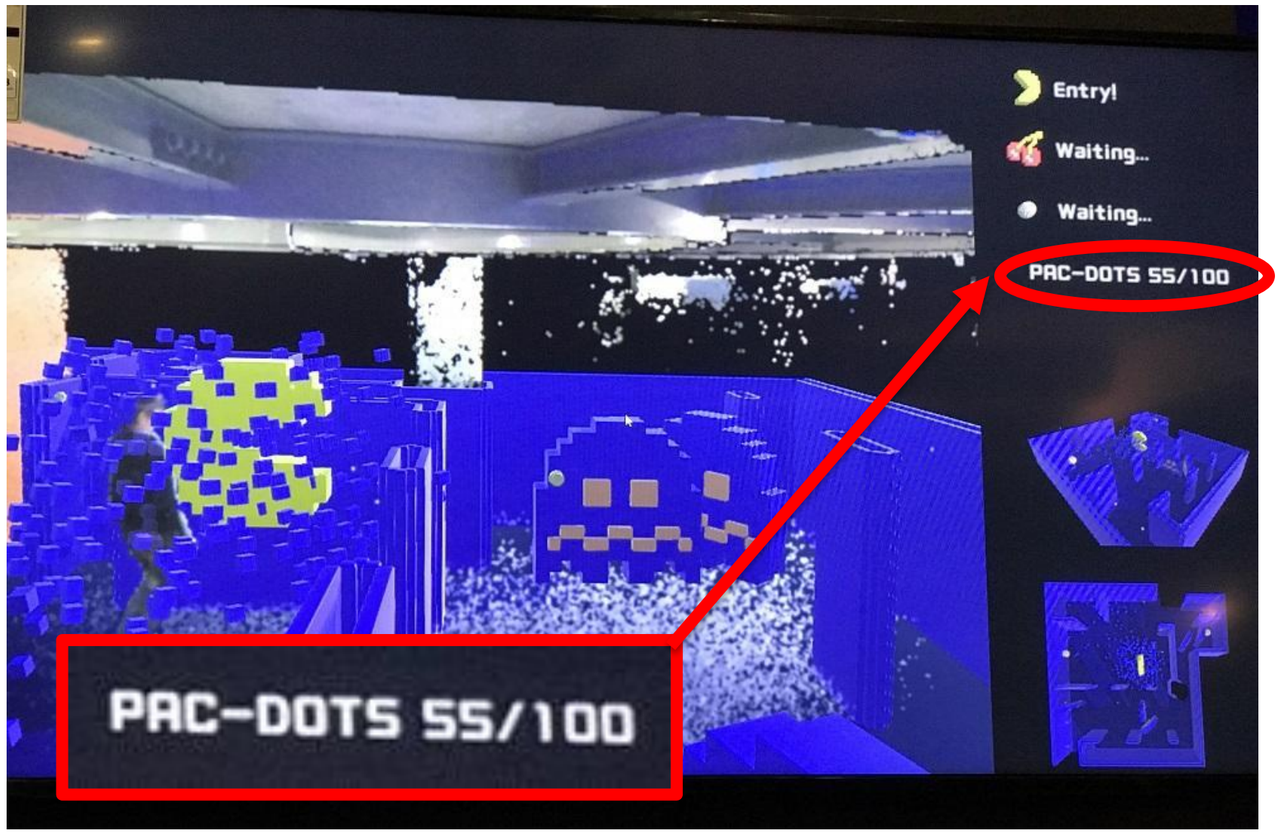

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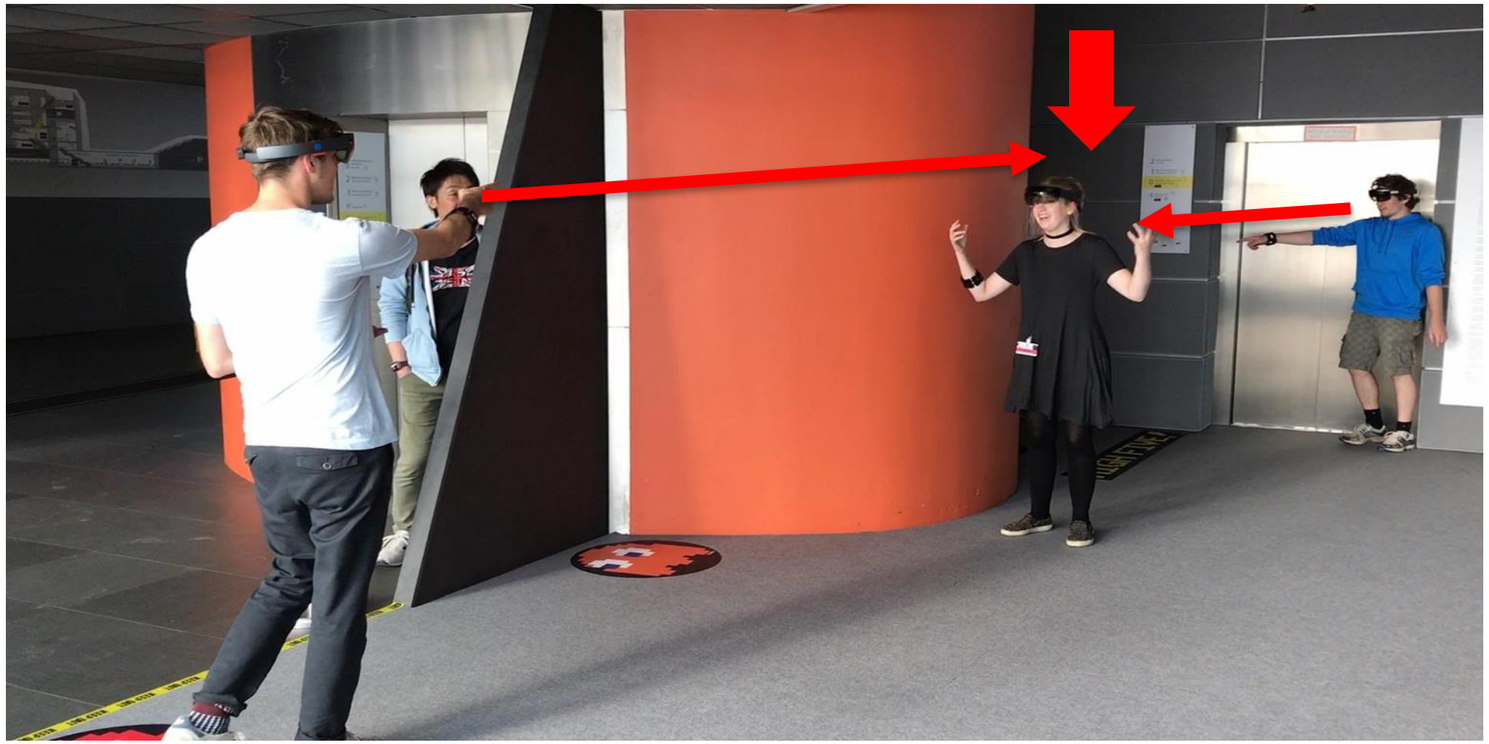
Benefits of MR 1: Naturally starts communication

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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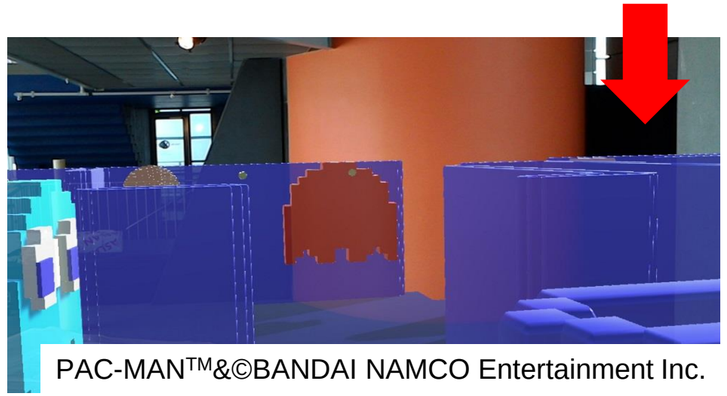

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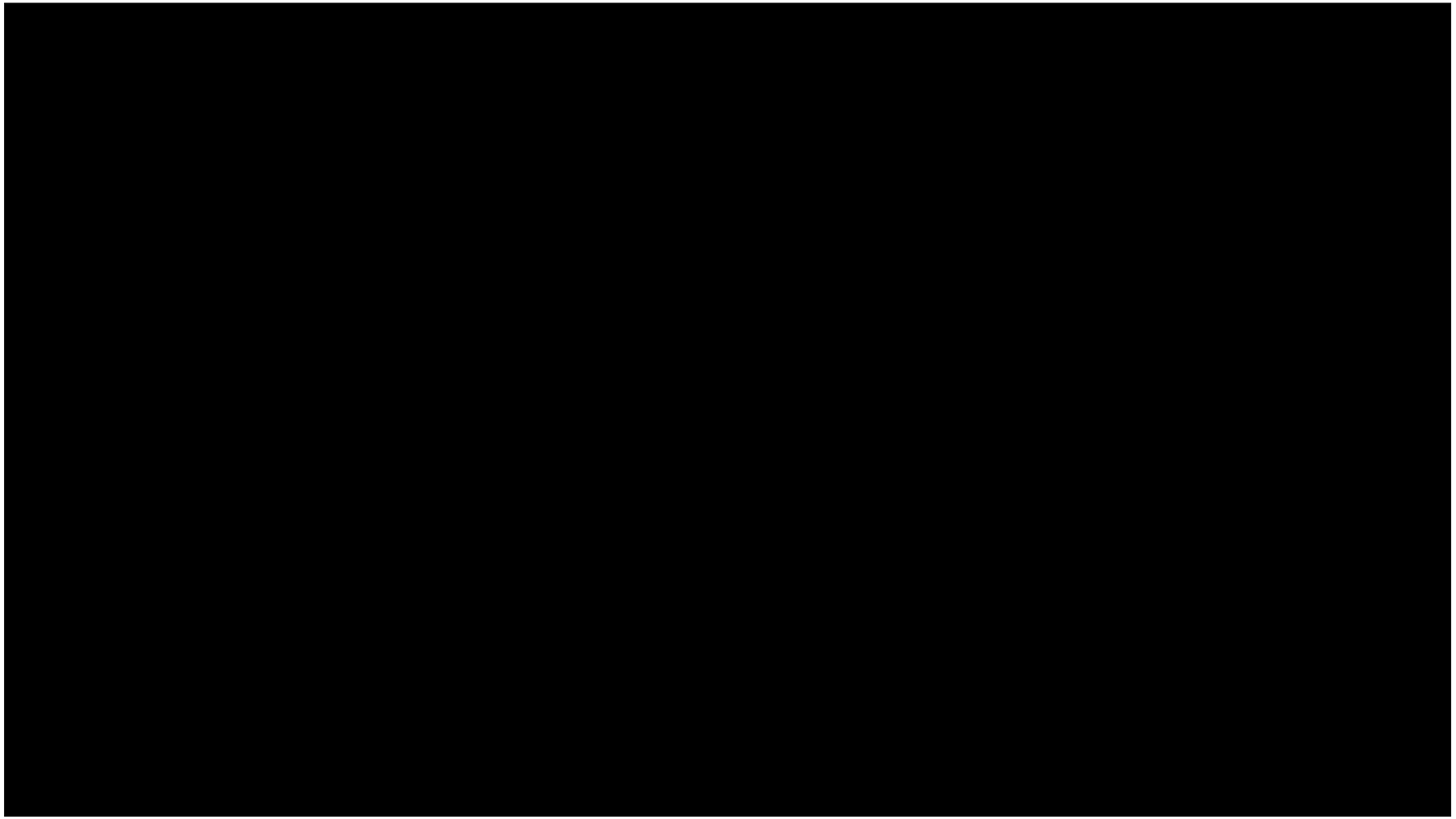
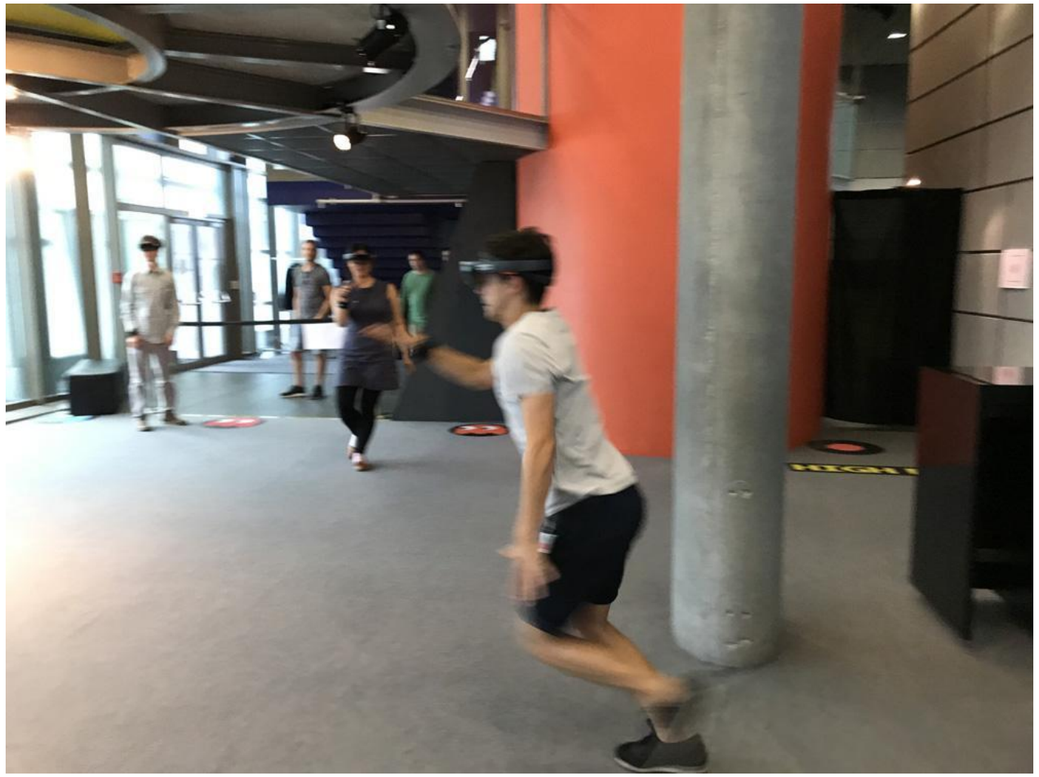
Benefits of MR 2: Players start teaching / advising one another



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.



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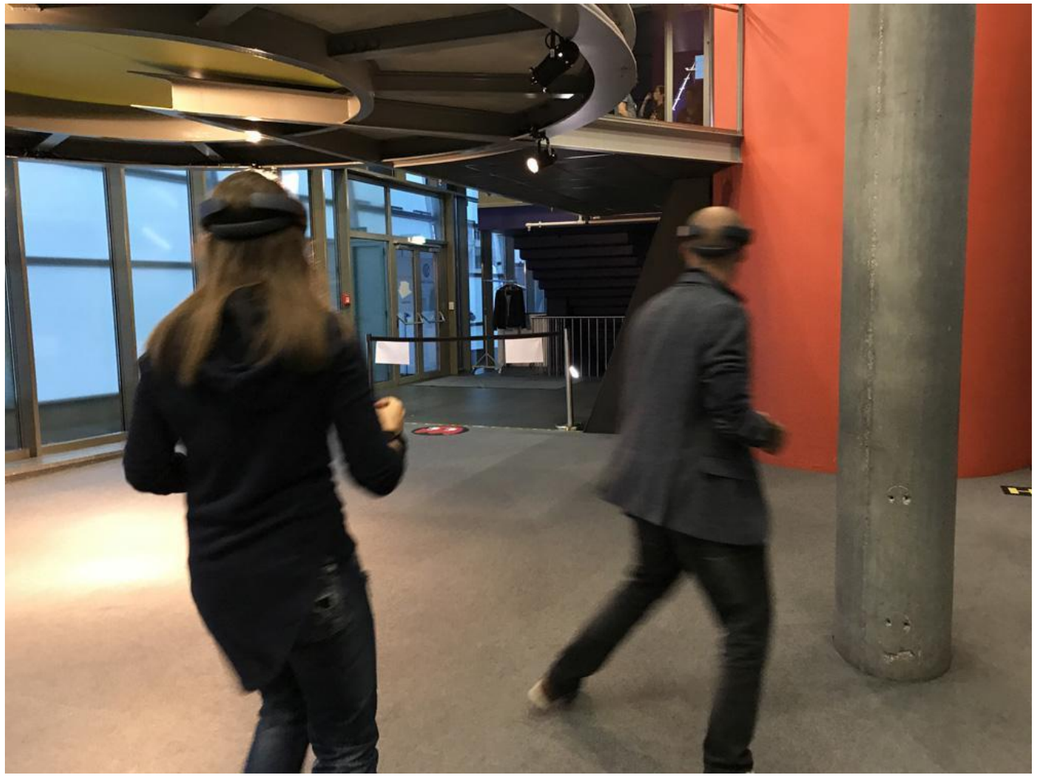

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Benefits of MR 3: Sports factor

Collaborative play is FUN!

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*Mixed Reality provides a unique platform which **enhances human interaction**.*

3) Operating Efficiently with a Small Team

4 Factors which needs to be considered:

1. *"HoloLens view" cannot be viewed by the operators and the audience.*
2. *Most players have never experienced the HoloLens.*
3. *The noisy issue for the theme park and big scale exhibitions.*
4. *It takes a long time equipping the HoloLens until game start.*

Factor 1: "HoloLens view" cannot be viewed by the operators or the audience.

To run successful, everyone should be sharing a same feeling of game.

Solution: We prepared an "audience view" for the audience and operators.

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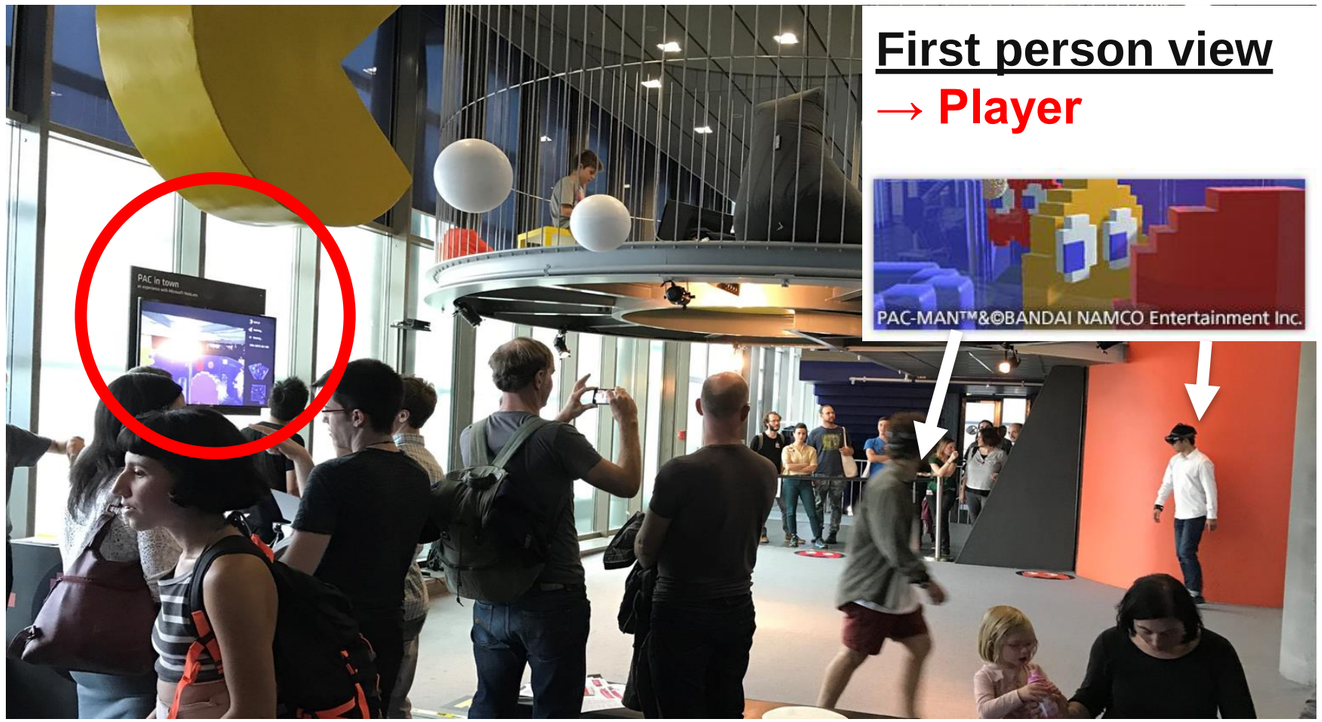

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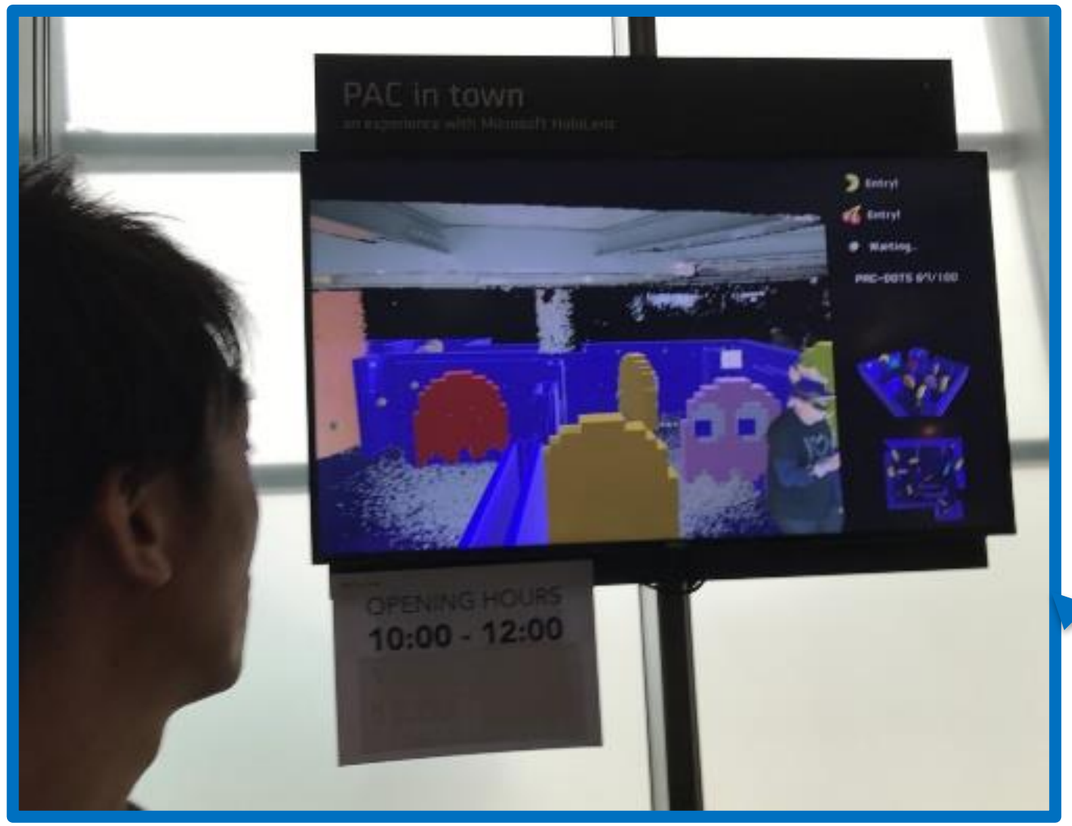
Solution: “audience view”



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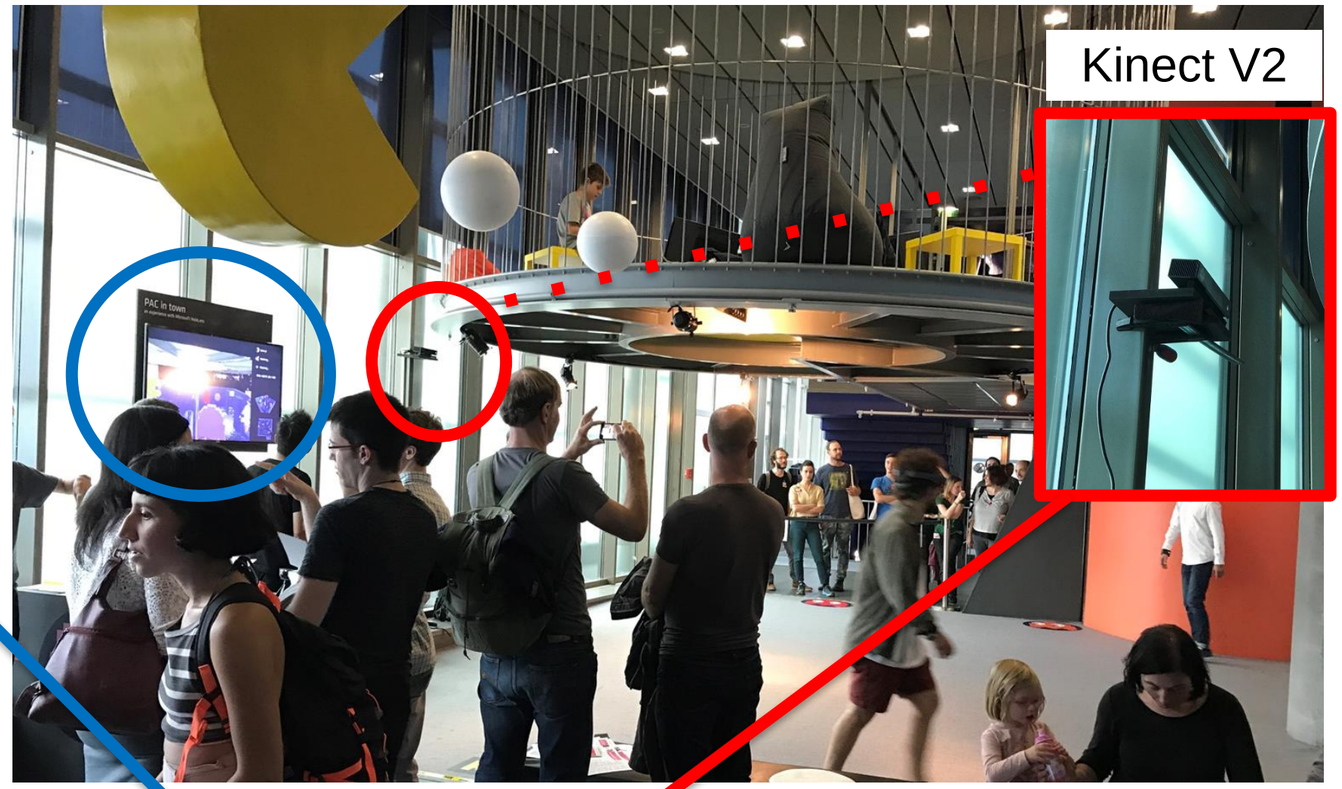

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HoloLens

HoloLens

HoloLens

Wifi AP

System: Audience View

Audience View

*The digital image and the player's actual image is **synched seamlessly** within a 3D environment.*

Factor 2: Most players have never experienced the HoloLens.

Solution: explain the actual FOV size before the gameplay using visuals.

It will be easy for anyone to know that there is a digital world in blue frame (= Field of View).

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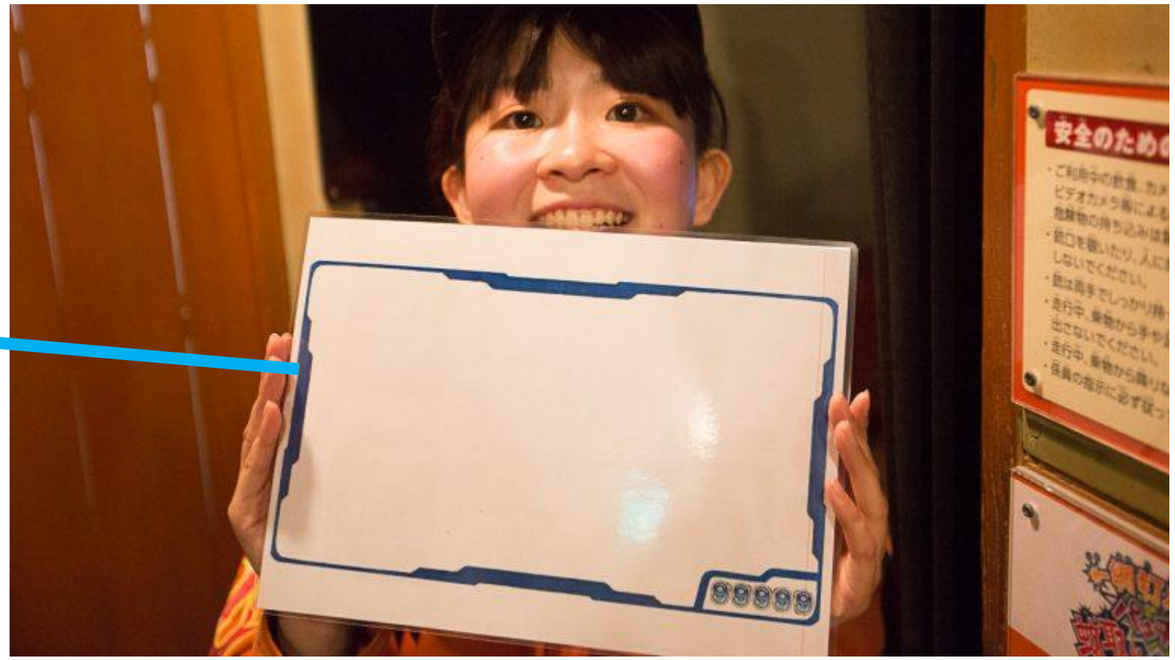

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Factor 3: The noisy issue for the theme park and big scale exhibitions.

Solution: we developed our own unique ear attachment.

The ear attachment also prevents players from pushing the sound volume button or brightness button by mistake.

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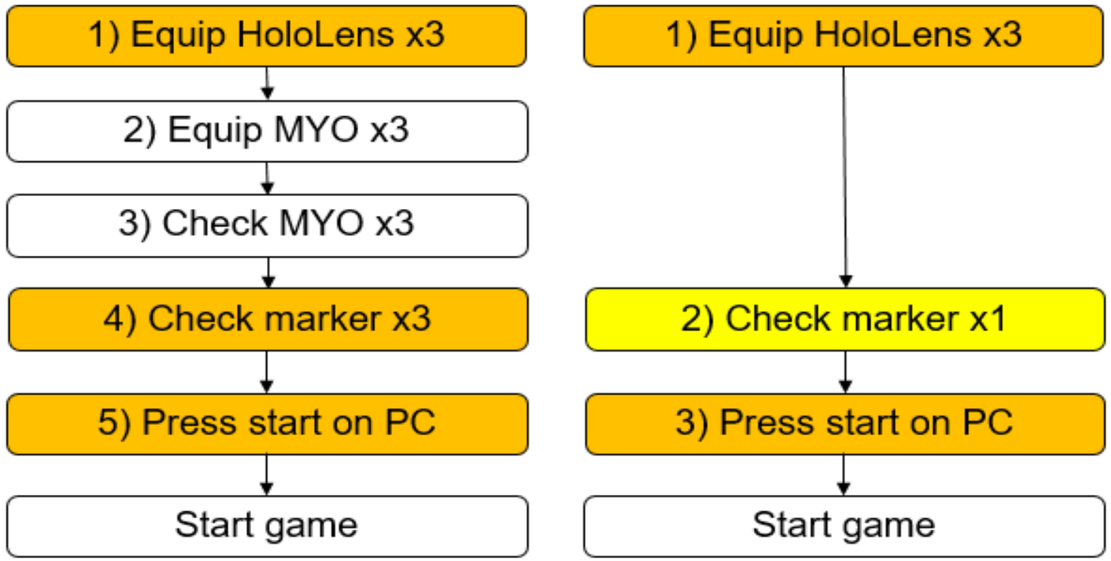
Factor 4: It takes a long time equipping the HoloLens until game start.

Solution: Minimize the procedure before starting the game.



ARS Electronica Festival

5 steps

NAMJA TOWN

3 steps

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4) Amazing Findings of Mixed Reality

1) Mixed Reality adds a whole new level of pure playfulness into our real world

Mixed Reality can adds pure playfulness into our real world.

http://panora.tokyo/53151/

https://www.watch.impress.co.jp/vr/articles/news/180209_naja.html

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*The theme park invests a lot of money into its **facility** and its **interior design**.*

Mixed Reality is PERFECT for Theme Park.

網打尽！パッチン！蚊取り大作戦

2) Mixed Reality is exceptionally cost-effective than VR

It does not need to create everything virtually.

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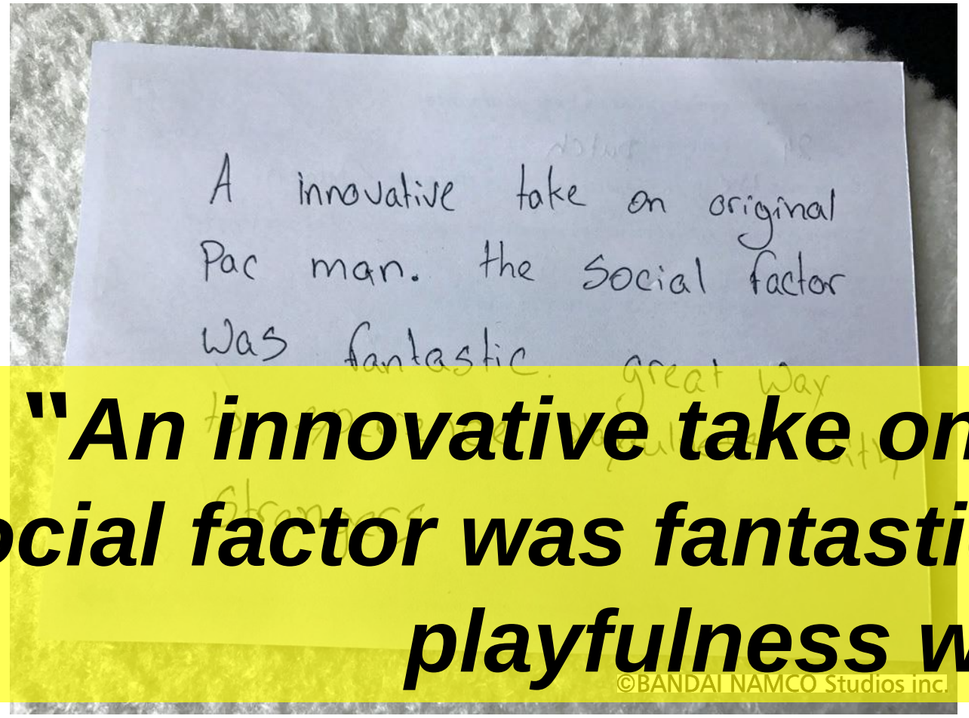
*This is mainly the reason why Project MOSQUITO completed **"four months"** , and PAC-MAN HoloLens took **one month only** for prototype.*

3) 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.*"

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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-MAN HoloLens” alone triggered interaction between people who were complete strangers before the game.

Mixed Reality has potential in "encouraging sociability" through entertainment

PAC-MAN HoloLens - Developing a Mixed Reality Game for a Broad Audience

- **Mixed Reality *works best with* Collaborative play!**
- **It is essential to make sure everyone will be sharing an experience by an audience view.**
- **Mixed Reality adds a whole new level of pure playfulness into our real world and it has potential in "encouraging sociability" through entertainment.**

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Thank you for your time!

Questions?
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Reference：
BANDAI NAMCO Group's "NAMJA TOWN x MR Project"
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