

How to visualize your AR idea by Rapid Prototyping

Yu Hata



I have been leading Tokyo-based AR studio Designium for more than 15 years, and has been creating immersive experiences in the AR field under philosophy of "No Experiment No Experience" for the past years in Designium.

Linkedin





Designium Inc.

Designium is a technology-driven AR studio that specializes in creating new immersive AR experiences.

Our primary focus lies in developing diverse applications that integrate augmented reality (AR) and visual positioning systems (VPS).

Additionally, we are actively exploring the potential of AR glasses in real-world practical applications.

Office

Tokyo office

〒141-0031

3F, 2-25-1, Nishi-gotanda, Shinagawa-ku, Tokyo, Japan

Aizu office

〒965-0872

ICT Office Building (Smart City AiCT) 3-2, 1-77,
Higashisakaemachi, Aizuwakamatsu, Fukushima, Japan

Contact

Email

contact_dsn@designium.jp

Likedin

<https://www.linkedin.com/company/thedesignium/>



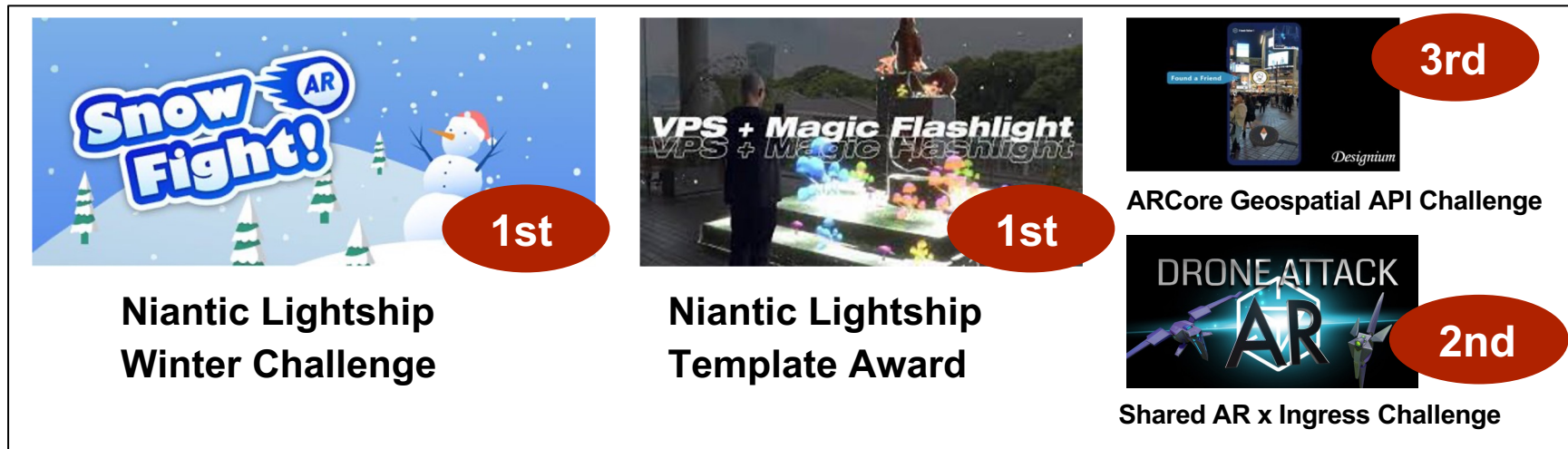
Designium is...

Designium is an award-winning technology and design company that merges technology and creativity to create new AR experiences.

|| Partnership

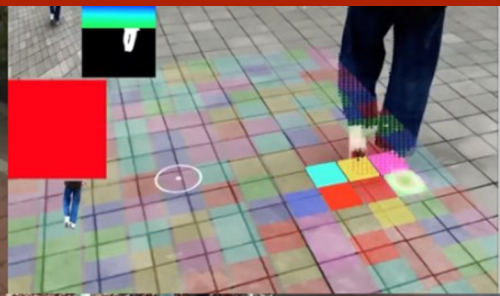
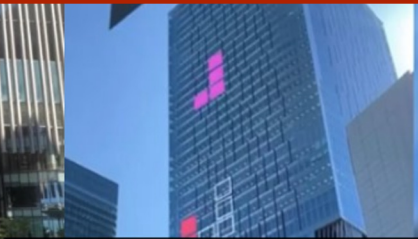


|| Awards

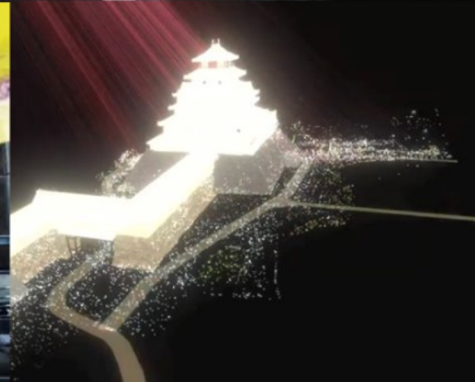
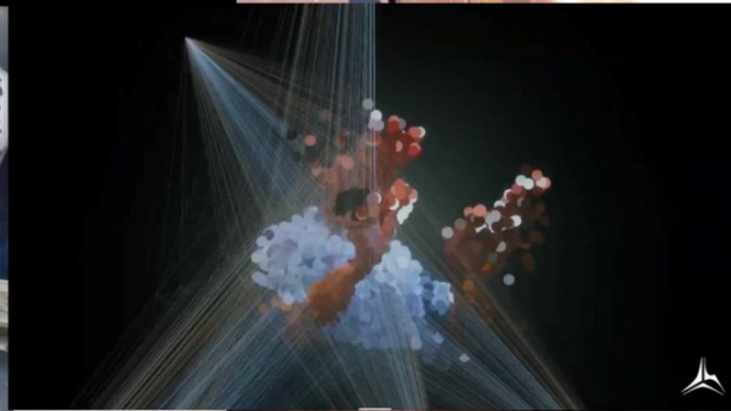




Designium is...



No Experiment No Experience





We have developed few hundreds of prototypes in past years.

Magic Flashing Game		Magic Flashlight Demo (Image)	Alexson	2023/09	Find hidden things in the AR world with this magical AR flashlight.		
Experimental & Prototypes		PlaneClassification	Alexson	2023/09	A function of custom ARPlane classification that will scan a plane's area size and height to determine its predefined type.		
Object & Person Tracking Interaction	Gaming and Entertainment	Dragon	Matt Mao	2021/09	AR Dragon by Niantic ARDK is a multiplayer AR game. People can enjoy attacking AR dragons together in the same place.		
	Unveil Hidden World	Unveil Hidden World (Forest)	Alexson	2023/06	Open an AR window and connect to the forest from your room. Then you can observe insects flying into the room up close. Players can enjoy		
Gaming and Entertainment	Hand Tracking and Interaction	Geospatial & Mapping			Lightship Map	Alex	A quick prototype of the 8thWall lightship map with A-Frame for viewing photos of specific locations. It works directly with your phone's GPS and data from Flickr (i.e. photos with geodata latitude/longitude).
Art and Creativity	Gaming and Entertainment	3D Space Painting			AR Drawings	Alex	The prototype uses 8thWall WebAR to draw in AR. Select a brush color and paint in the space.
	Art and Creativity	3D Space Painting	Art and Creativity		XR Fireworks at the rooftop for Obon festival	Alexson	Rooftop XR Fireworks created for Obon festival in Japan. The interaction method is to walk to the fireworks cannon, activate the cannon, gaze and aim, and trigger it on the mobile user interface.
	Art and Creativity	Art and Creativity	Art and Creativity				An interesting prototype of a useless machine
Art and Creativity	Art and Creativity	Location-Based AR Cyber Décor			Cyber Shibuya	Matt	Augmented Reality Future Shibuya Crossing: ARKit + Immersal + Unity. The prototype uses AR technology to imagine the future of cities. Flying vehicles come and go, floating digital content, interactive virtual interfaces appear on the streets, and much more you can imagine.
		Tokyo Time Machine			Tokyo Time Machine with map search	Matt	Use historical photogrammetry to create 3D models and superimpose past buildings onto the same current streetscape in Tokyo. Users can download specified models (models of past buildings) from Sketchfab based on VPS, and see the AR effects of these past buildings on the streets like a time machine.
	Gaming and Entertainment	Geometry interaction			Geometry Collision	Matt	A prototype using Google Geospatial Geometry to experiment with character and environment collisions. Characters and their animations utilize Ready Player Me and their animation libraries.
	Geospatial and Navigation				Places API	Matt	Added the Google Places API to the geospatial API & maps prototype. It will automatically add AR objects of "Places" (restaurants, stores



Why Prototyping?

Why do we need prototyping for AR?

Biggest advantage of prototyping is that we can evaluate your idea with minimum cost before you actually start developing final apps.

Cost of developing final AR app is mostly high.

This is why we need prototyping for AR.

In order to decrease risk of wasting your budget, it's better to have a phase of prototyping to evaluate your idea.



By Simon Sinek



Methods of Prototyping for AR

	Paper Prototyping	Video Storyboard	Working Prototyping
Speed	+	-	-->0
Cost	+	-	-->0
Understanding	0	+	+
Evaluate core value of UX	-	0	+
Evaluate technical feasibility	-	-	+

AR is a technology that uses visual information from a device to provide new experiences. Since the value of the experience is enjoyed on a specific device, it is necessary to build a working app-based prototype on an actual device to evaluate the idea.

Unlike simple systems or static designs, AR provides users with an interactive and immersive experience. Besides it's very difficult to simulate AR on computer because AR is experience with mix of real world. That's why, without app-based prototyping, you can't accurately evaluate the technology and experience, and it can be difficult to understand the potential value of the idea.



Methods of Prototyping for AR

	Paper Prototyping	Video Storyboard	Working Prototyping
Speed	+	-	-->0
Cost	+	-	-->0
Understanding	0	+	+
Evaluate core value of UX	-	0	+
Evaluate technical feasibility	-	-	+

AR is a technology that uses visual information from a device to provide new experiences. Since the value of the experience is enjoyed on a specific device, it is necessary to build a working app-based prototype on an actual device to evaluate the idea.

Unlike simple systems or static designs, AR provides users with an interactive and immersive experience. Besides it's very difficult to simulate AR on computer because AR is experience with mix of real world. That's why, without app-based prototyping, you can't accurately evaluate the technology and experience, and it can be difficult to understand the potential value of the idea.



What Prototyping?

Types of AR Prototyping

Based on our tremendous experience, we have “Designium Method” of prototyping. In the method, we categorize “Working AR Prototyping” into 3 types as follows.

	Input	Goal	Output	Note
Type1 Technical Feasibility	What to want to achieve	Determine if it is technically feasible	Specific function only	
Type2 Concept Expansion	Specific Technology or Device	Creating Use Case	Specific function with minimum visuals	Next for Type3
Type3 User Experience Evaluation	Hypothesis of Core UX Technically feasible	Evaluate the Core UX	Minimum functions with minimum visuals	

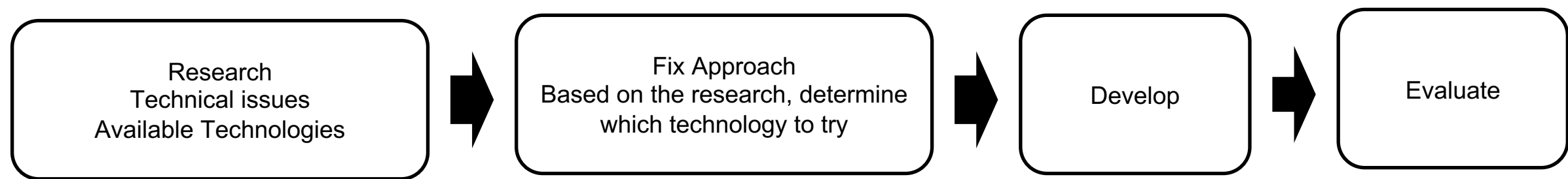


Technical Feasibility

	Input	Goal	Output
Type1 Technical Feasibility	What to want to achieve	Determine if it is technically feasible	Specific function only

Based on technical issues, Type1 is to research technologies it might solve the issues and create functional mockup to evaluate the technical feasibility.

It's only about technical feasibility so that It's just functional. no visual.



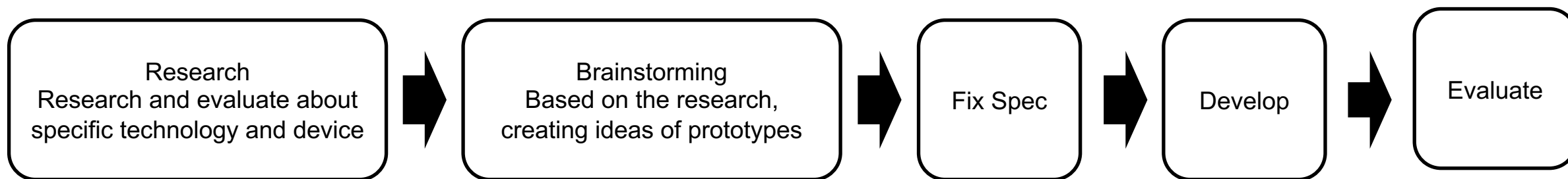


Concept Expansion

	Input	Goal	Output	Note
Type2 Concept Expansion	Specific Technology or Device	Creating Use Case	Specific function with minimum visuals	Type3 would be next step

Type2 is to create new experience with specific technology or device. In other words, the purpose of Type2 is to create useful experience which is same as “Use Case”.

To evaluate the “Use Case”, the prototype on Type2 should have specific functions with minimum visuals.

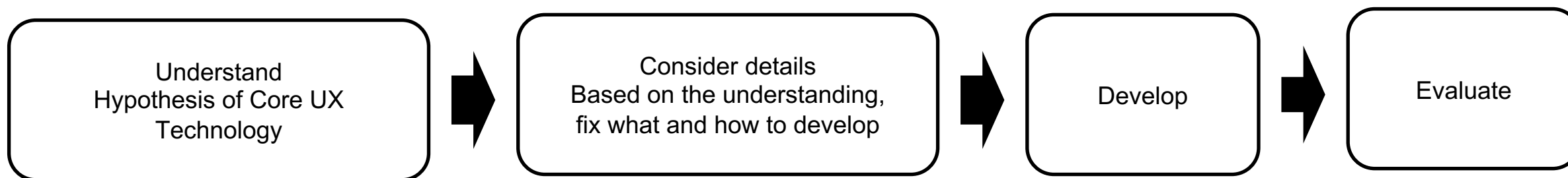




User Experience Evaluation

	Input	Goal	Output
Type3 User Experience Evaluation	Hypothesis of Core UX Technically feasible	Evaluate the Core UX	Minimum functions with minimum visuals

The purpose of Type3 is to evaluate if hypothesis of specific user experience is valuable or not. In order for the evaluation, prototype with minimum functions and visuals must be needed to create.





Technical Feasibility

Input	Goal	Output
Challenge if we can segment real world by Lightship ARDK	What kinds of things we can segment	Function to segment

Overview

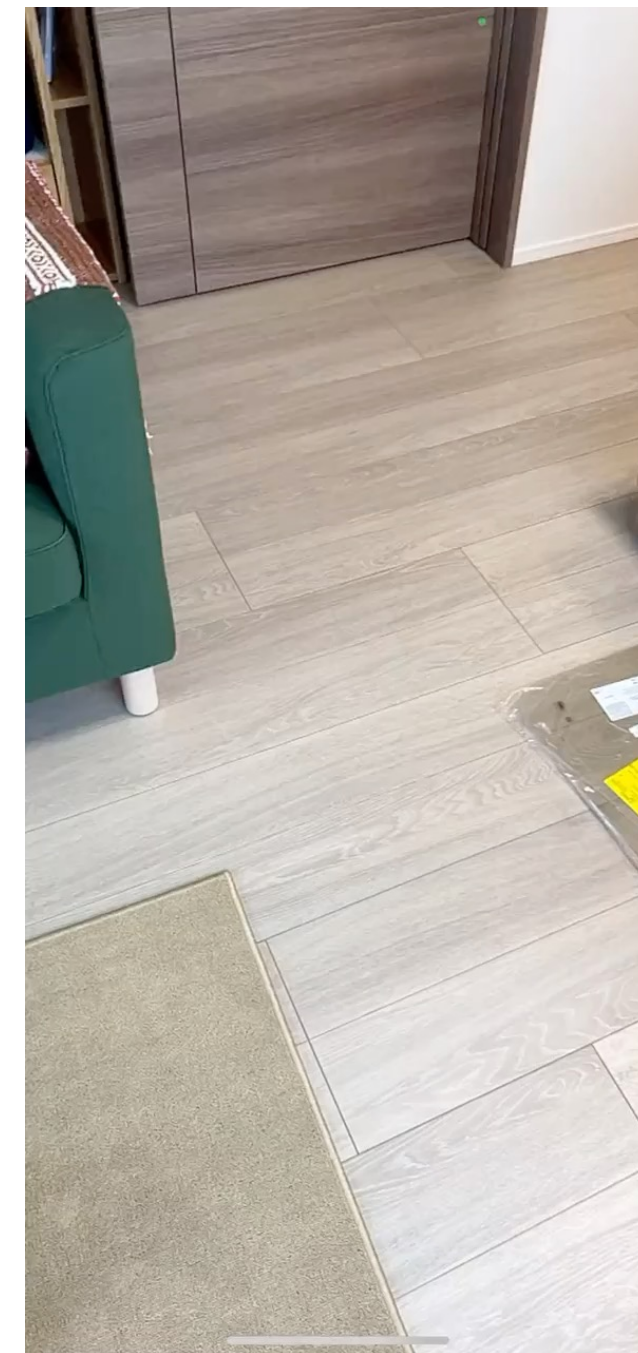
Clarify if Lightship ARDK allows for consistent segmentation across both iOS and Android platforms?

How

Detect the height and area of real-world objects using the Meshing feature, and categorize them based on the calculated results.

Evaluation

We found that it's possible to segment with a certain level of accuracy.





Concept Expansion on specific technology

Input	Goal	Output
Demand to create new use case with Geospatial API	Create useful experience with Geospatial API	Working prototype app to try the experience

Overview

We created this prototype after brainstorming over the use cases of the Google Geospatial API. We explored the direction of turning navigation into entertainment and came up with this prototype.

Evaluation

It's considered a highly effective approach in a hands-free world of AR glasses. On the flip side, we understand that continuously holding up a smartphone can be quite a physically stressful.





Concept Expansion on specific device

Input	Goal	Output
Request to explore potential of hand tracking feature	Create use case and evaluate what good/challenge	Working prototype to use the feature on Snapdragon Spaces

Overview

We've developed a use case for Qualcomm Snapdragon Spaces' HandTracking feature. Due to the limitation that HandTracking is only possible when hands are within the field of view, we designed the experience to consciously bring the hands into view by overlaying objects on them

Evaluation

This approach successfully demonstrated the potential of HandTracking, leading to discussions about developing it into a fully interactive gaming experience."





Evaluate specific UX

Input	Goal	Output
Lighting Experience	Evaluate if the hypothesis works good/challenge	Working prototype to demonstrate the function

Overview

In line with the hypothesis that leveraging AR's unique ability to make the invisible visible in the virtual realm could wow users, we created an experience where illuminating virtual objects with a light makes them appear.

Evaluation

The experience of virtual objects emerging as they're lit brought nice experience, it's linking naturally to the action of holding up a smartphone. Additionally, the action of searching itself was fun, leading to high praise and the potential for various creative projects."





Evaluate specific UX

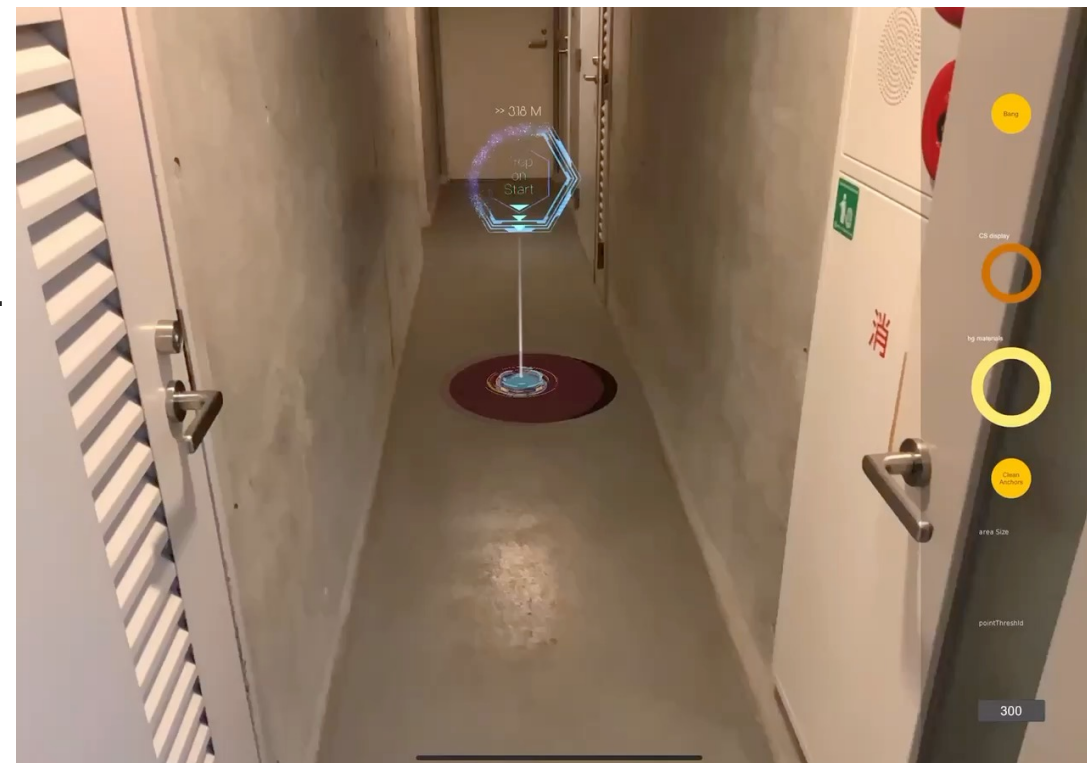
Input	Goal	Output
Function to detect foot with lidar sensor on smartphone	Evaluate if the function is effective or not	Working prototype to demonstrate the function

Overview

We developed a prototype based on the hypothesis that utilizing Lidar sensors to capture depth data would enable not only hand but also foot movement tracking. This led us to consider interactions based on stepping as potentially effective.

Evaluation

The act of pointing a smartphone at an object felt natural, and the excitement of something happening as a result of stepping on it was a positive aspect of the interaction. However, one challenge was that pointing the smartphone at our feet limited our field of view, indicating a need for clever directing of the user's gaze in the design.





Evaluate specific UX

Input	Goal	Output
Hypothesis AR would be effective for meet-ups	Evaluate the hypothesis	Working prototypes to have the experience on own devices

Overview

Utilizing Visual Positioning System, we hypothesized that during meet-ups, each individual's location could be visualized in AR, potentially offering an effective solution. Based on this premise, we developed a prototype.

Evaluation

In crowded areas, it proved to have a certain level of effectiveness. However, some suggested that it might be more useful in situations like when a small child gets separated, rather than places where people can easily communicate.



Mix types

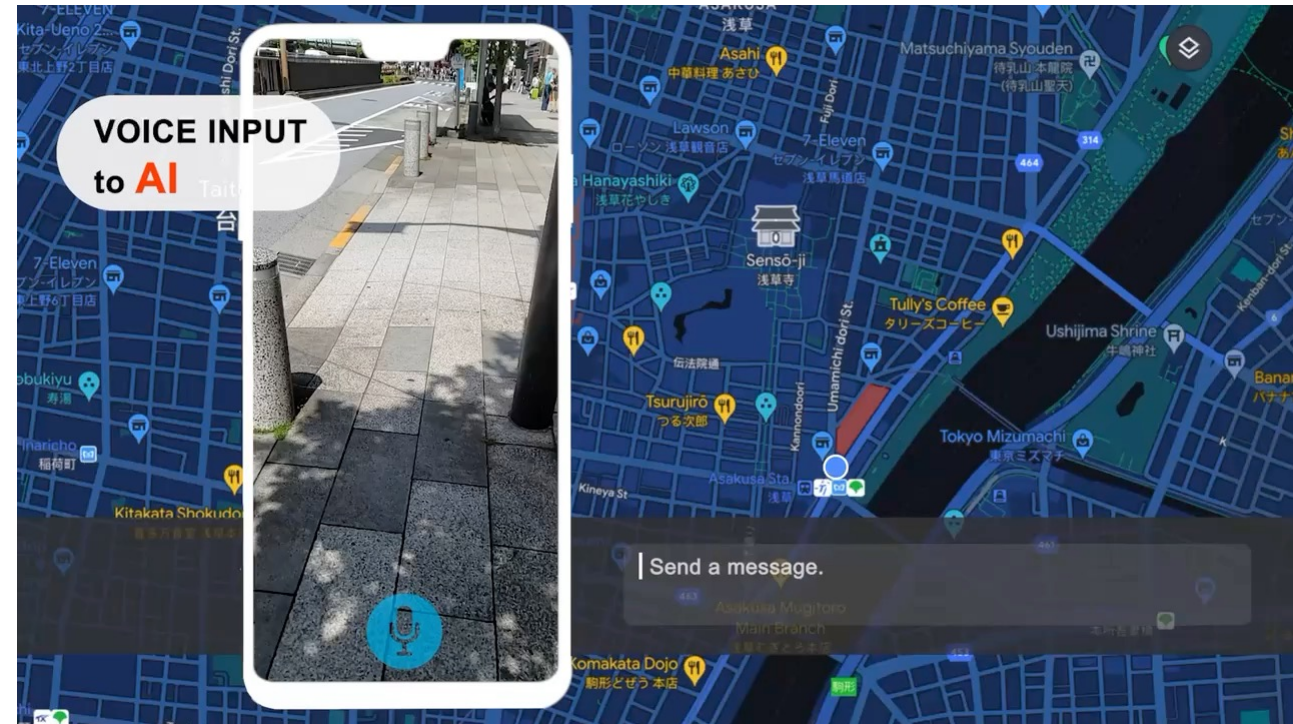
Input	Goal	Output
ChatGPT + Geospatial API	Create use case	Working prototype

Overview

Envisioning a future where AR content is automatically generated by AI, we developed a prototype which AI autonomously creates a Day Trip Tour, which can then be navigated through AR.

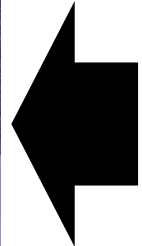
Evaluation

Various use-case scenarios can be imagined.





Next Step Case 1



Overview

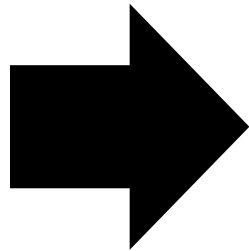
Having confirmed that segmentation is technically feasible, we developed two prototypes leveraging this capability.

One transforms the ceiling into an aquarium, while the other turns the walls into a forest, from which insects fly and land on specific pieces of furniture.

In practice, these fall under Type 3. They are examples ranging from Type 1 to Type 3.



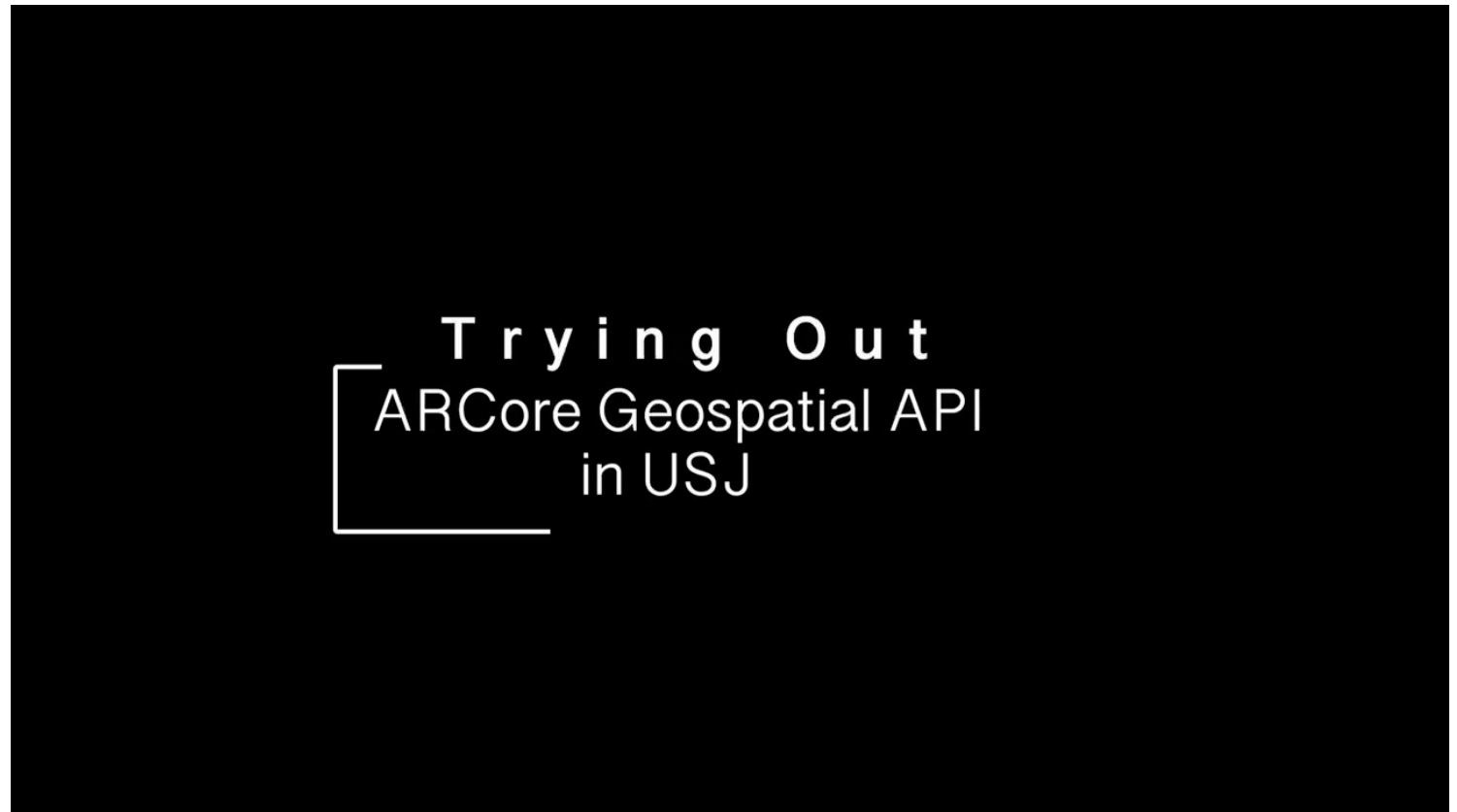
Next Step Case 2



Overview

We applied the concept of making navigation more entertaining to an actual theme park.

By altering the items to be collected based on the destination, we enhanced the entertainment factor and further demonstrated its tangible potential.





Next Step Case 3

Overview

We developed a TimeMachine app that places past videos in their original locations using AR, allowing users to step back in time. Later, we leveraged AR glasses for tourism purposes and launched a TV program-linked app in collaboration with a television network. Beyond tourism, the project has been adapted for educational purposes and is still ongoing.

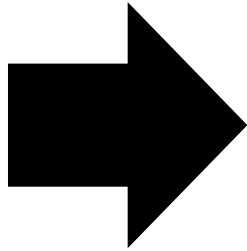




Next Step Case 4

Overview

We realized the value of the AR FlashLight concept as a worthwhile experience, so we moved forward and developed a final app suitable for events. When the app recognizes a monument, the surroundings transform into a Magical World where users can search for clues.

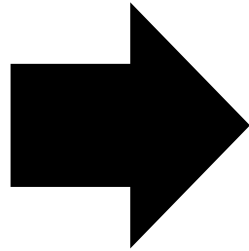




Next Step Case 5

Overview

Through UX evaluation, we identified the effectiveness of the Lidar-based Step interaction. With its potential for various applications in mind, we developed a reusable module to facilitate its broader use.





Service by Designium

Designium

Rapid AR Prototyping

Visualize your idea into AR

Our Rapid Prototyping service quickly turns your ideas into AR working prototypes in just a few weeks. Based of our AR/XR development experience, we are able to achieve high-speed production because we have created much reusable assets. That means we can create the prototype with minimum cost in the market. The purpose is to accelerate the development of your business's product, brand, and business model. Our creators, the creative minds behind these prototypes, work directly on making your vision a reality.

Technical Coverage

ARKit	ARCore	Lens Studio	Snapdragon spaces	Various AR Glasses
8thWall	NIANTIC LIGHTSHIP	Google Geospatial API	IMMERSAL part of Hexagon	And so on...

SCOPE



Matt

R&D engineer, focusing on location-based development such as VPS. Also interested in digital heritage, developing applications that combine AR/XR with AI.



Mao

Creative designer, engineer and artist, covering a variety of technical fields. Combine technology with the real world to enrich the experience of the world.



Alexson

Creative designer and engineer, bring interesting game ideas into AR/XR applications, and the prototypes have wonderful visual effects.



Alex

WebAR R&D Engineer, combining various related development kits or services into WebAR.