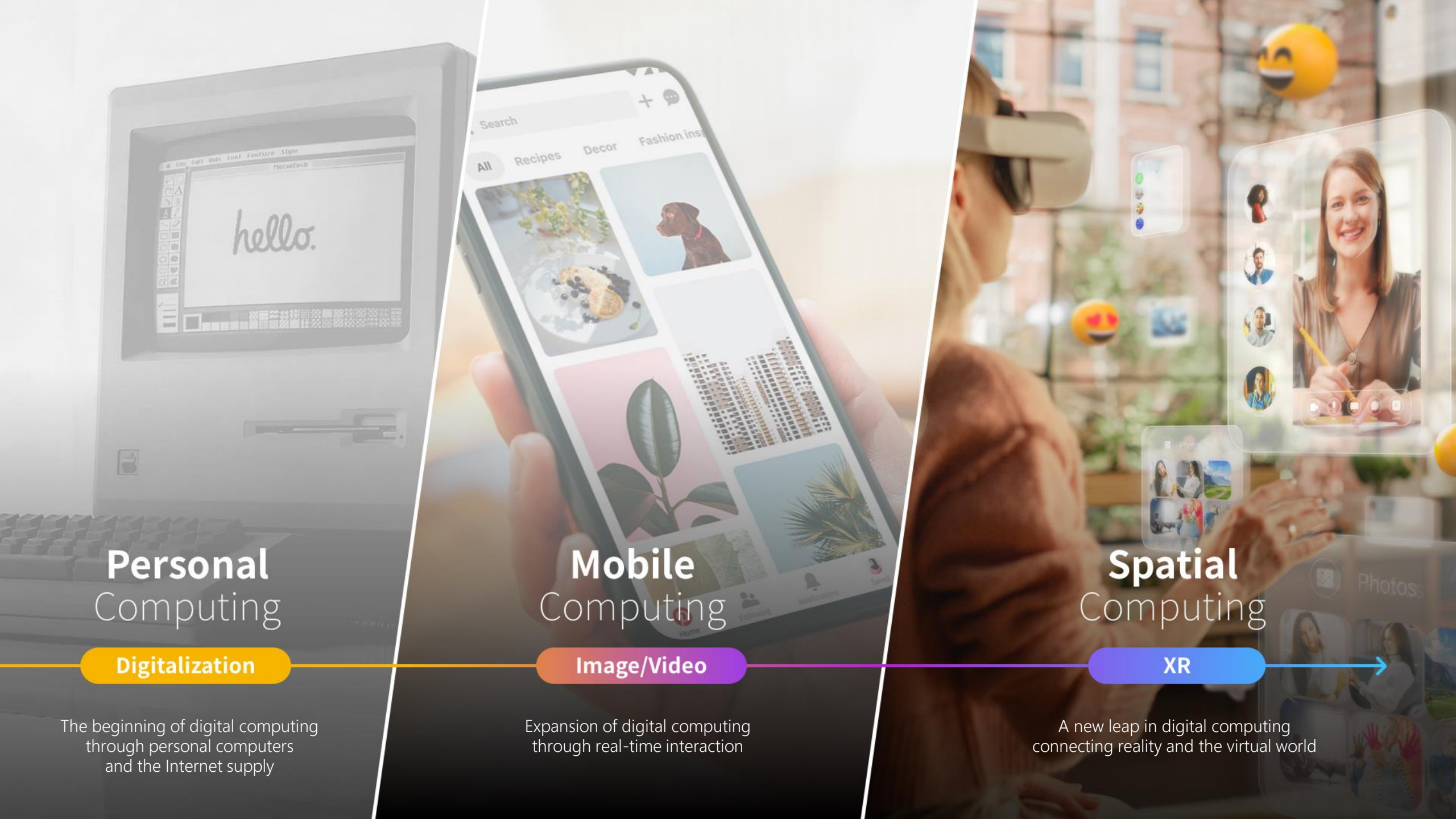
DEEP.FINE

XR Spatial Computing Platform Company

DEEP.FINE

Expansion of Reality, Immersive Space Experience

2024.08
DEEP.FINE Co., Ltd
Tel. 070-4633-2487 | Mail. help@deepfine.com | Home. https://www.deepfine.com



Personal Computing

Digitalization

The beginning of digital computing through personal computers and the Internet supply

Mobile Computing

Image/Video

Expansion of digital computing through real-time interaction

Spatial Computing

XR

A new leap in digital computing connecting reality and the virtual world

New Digital Normal

The era of spatial computing, where all real-virtual spaces and information are interconnected, is approaching.

AI stocks gain as Meta unveils Orion AR glasses

2024.09.27 14:21:27

Meta CEO Mark Zuckerberg wearing the augmented reality device 'Orion'. (Reuters/Yonhap)

South Korean artificial intelligence (AI)-related stocks gained ground on Friday morning after Meta Platforms Inc., the parent company of Facebook, unveiled an augmented reality (AR) device that is worn like glasses.

Shares of MAXST Co., a company specializing in AR, were trading at the upper limit

Samsung confirms 'new XR platform coming this year' in partnership with Google

News By Hamish Hector published July 11, 2024

Samsung's XR headset or glasses might actually land in 2024

When you purchase through links on our site, we may earn an affiliate commission. Here's how it works.

The ultimate XR-based spatial computing platform

that transcends the limitations of user and spatial experiences

DEEP.FINE

XR Platform

- XR Spatial Computing-

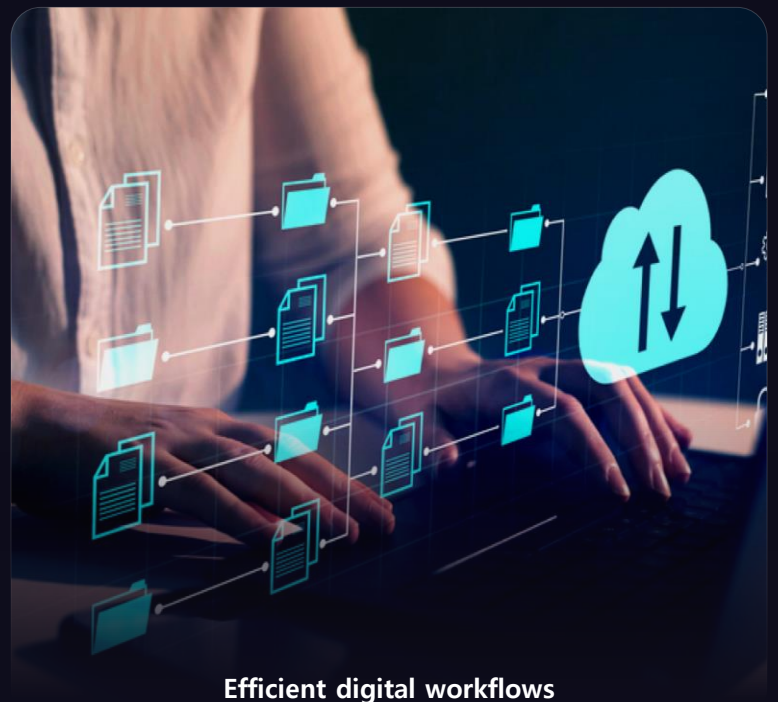
DEEP.FINE

AR.ON

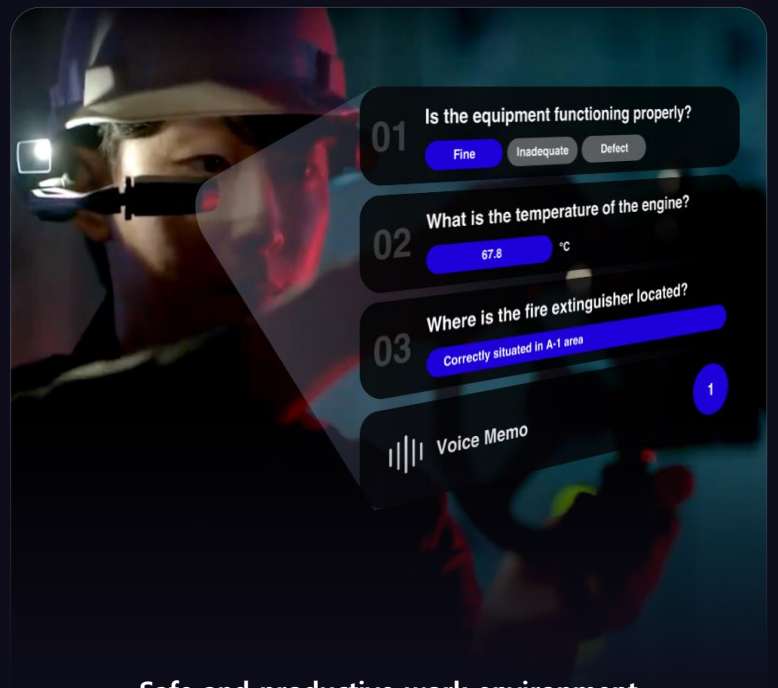
AR Glass-based solution for enhancing workplace productivity

DEEP.FINE AR.ON
focuses on improving industrial site productivity.

Video conferencing-based collaborative work
that effectively reduces business trip costs



Efficient digital workflows
through digitalized field work and reporting



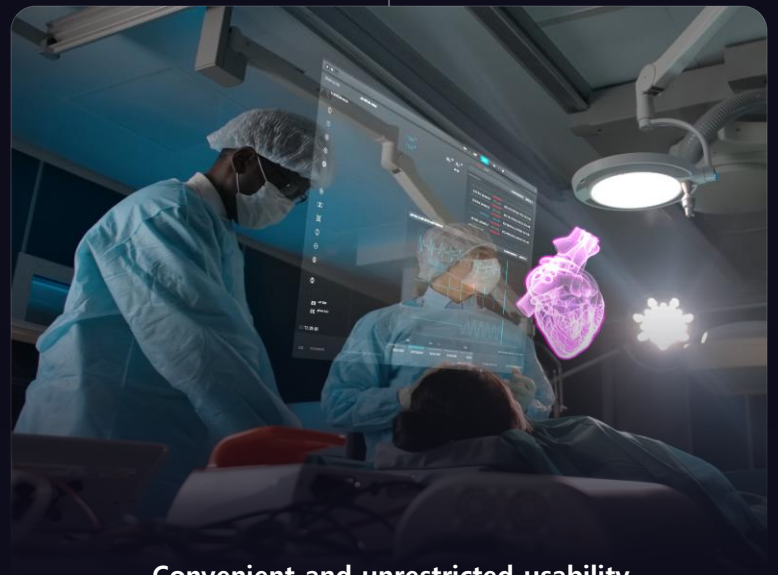
Safe and productive work environment
through integration with AR glasses and XR technologies

User experiences beyond reality delivered via AR glasses.

DEEP.FINE AR.ON

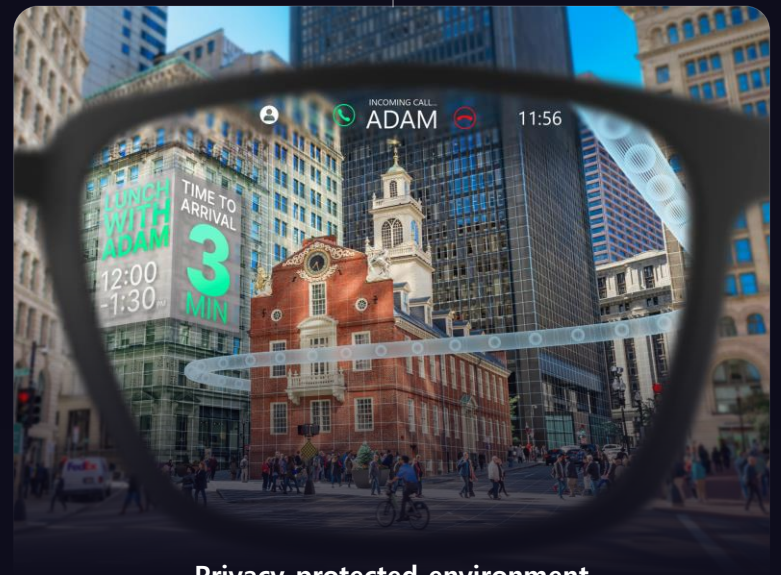
Spatial experiences transcending physical limitations

Digital space experience overcoming physical space limitations through digital information projected into the real world



Convenient and unrestricted usability

Hands-free environments and usability enabled by gaze tracking, hand motion tracking, and voice commands of users



Privacy-protected environment

Real-time information directly projected onto AR glass lenses for a personalized device experience away from other people's eyes

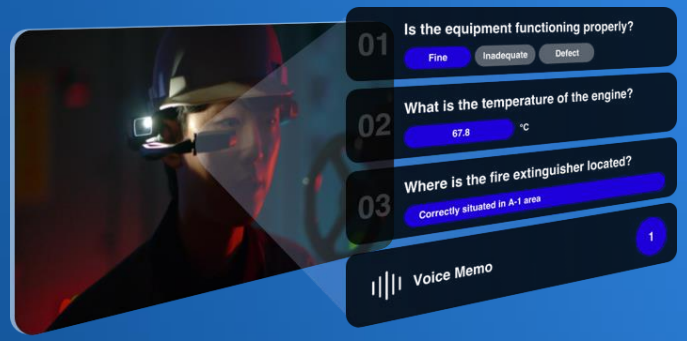
DEEP.FINE AR.ON provides diverse and specialized services integrated with AR glasses.

Reality-based remote collaboration services

AR Remote

Digital checklist and task management services

Workflow



Knowledge assistance systems utilizing AR technology

AR/AI Viewer

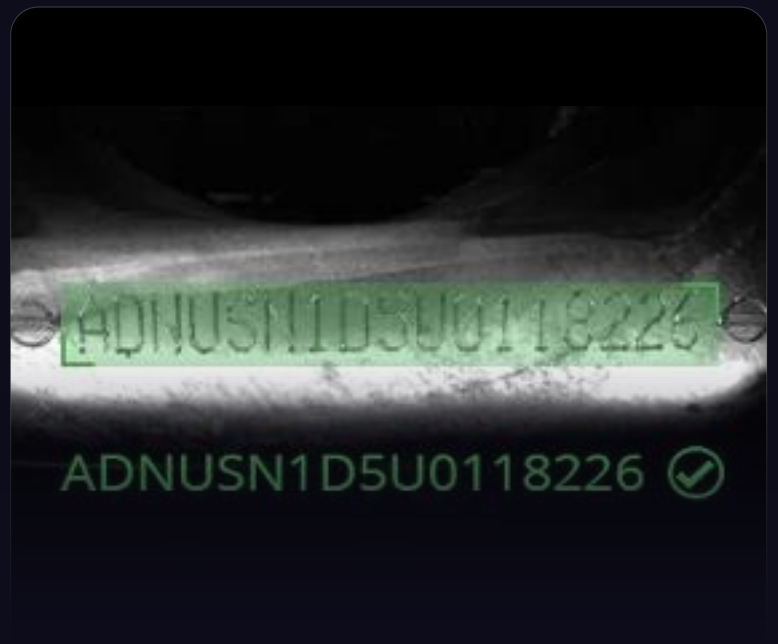
High work efficiency provided through XR services visualizing digital information.

AR Manuals

Digital checklists and AR manuals for necessary inspection items, such as multiple-choice and numerical inputs

IoT Data Augmentation

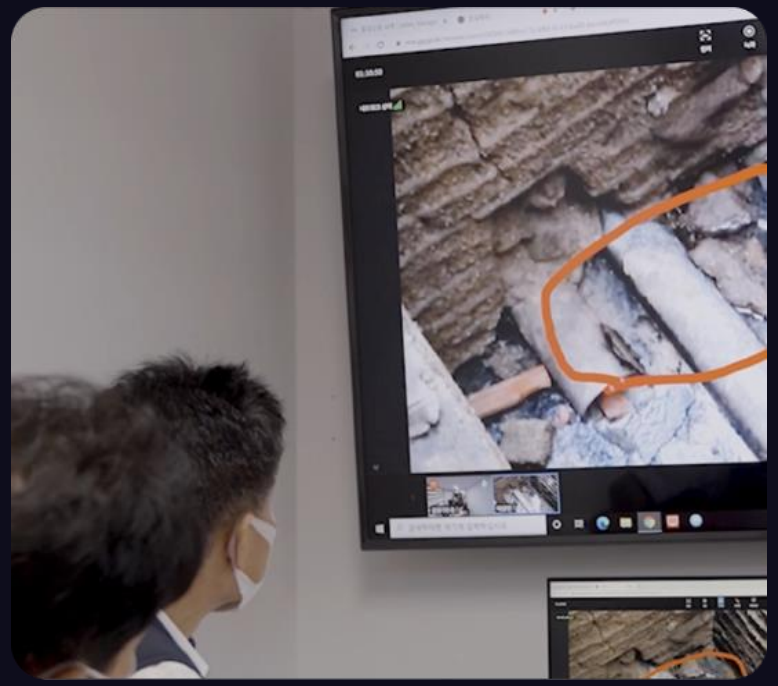
Enhancing operational efficiency by augmenting equipment system or inspection device data into real spaces for intuitive field data understanding



Vision AI

Rapid and accurate analysis of video, image, and text information using AI-based vision recognition technology

AR Glass-based remote safety inspection solutions for vulnerable and hazardous facilities in Gyeonggi-do.



Remote facility safety inspections using AR glasses across Gyeonggi-do

Real-time on-site repair·reinforcement consulting through AR glasses and utilizing statiscal data for facility inspection plans

40%	60%	3times
Total remote inspection processing rate	Reduced long-distance business trip costs	Complaint resolution rate

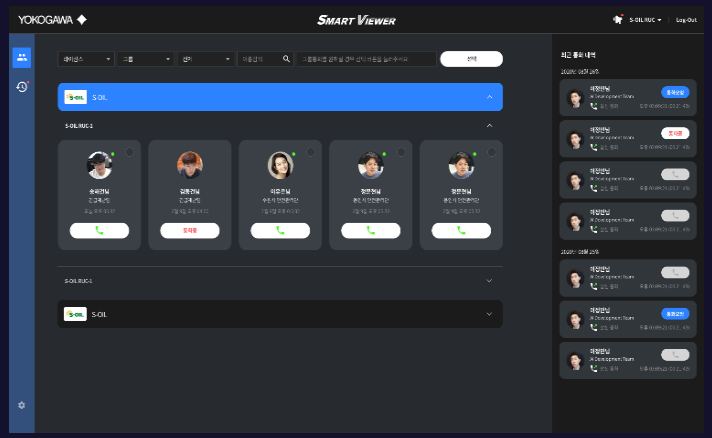
Gyeonggi-do and all cities and counties in the province have established a control system that can remotely inspect vulnerable and dangerous facilities and complaints related to facilities by residents using smart glasses and drones equipped with DAO solution.

The largest case of smart glasses in Korea for a single public project,
Best Practices in Smart Public Service and awarded the Minister of the Interior and Safety commendation

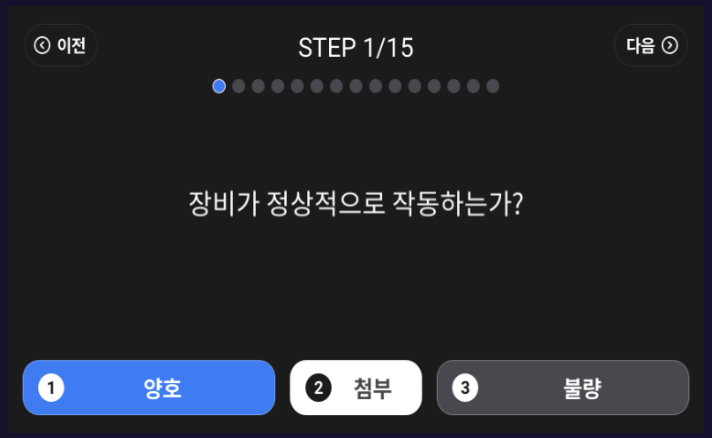
Building and operating a multi-plant integrated Management DT platform service through internal OPC-UA data linkage at Yokogawa Electric Korea.

YOKOGAWA

Integrated remote support service
using multi-device setups by YKO customers



Simplified / efficient facility management
using digital checklists on-site



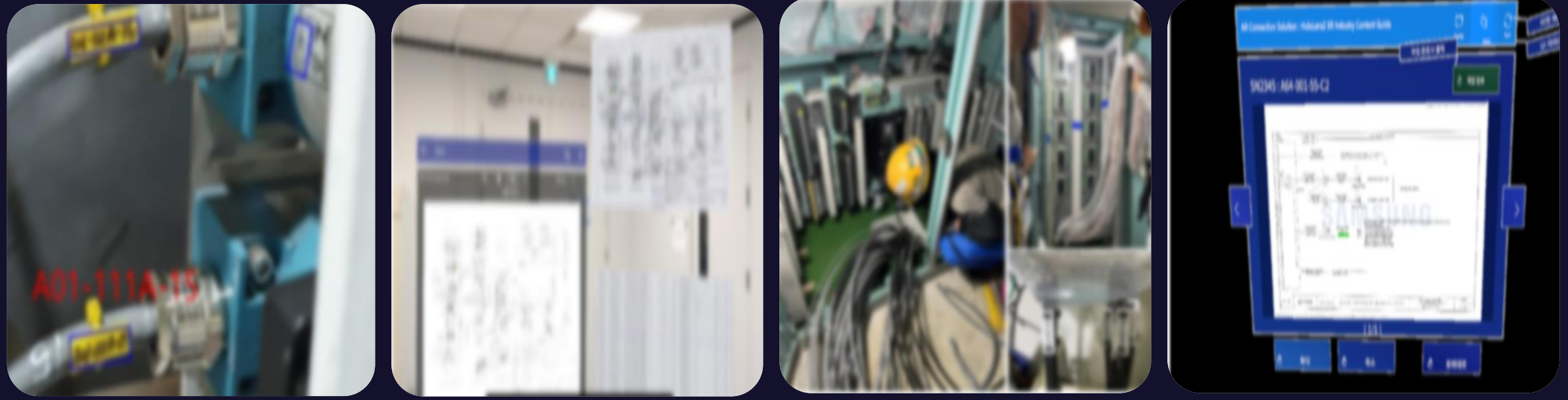
Real-time equipment data
through YKO OPC-UA data linkage

A long-term contract established with Yokogawa Electric Korea in 2020 for OPC-UA data linked workflows and an integrated facility management platform using smart glasses, supporting 1:N remote assistance for each plant.

It is in the process of globalization with Yokogawa Japan headquarters.

Addressing inefficiencies caused by lost wiring and schematics. Building a collaborative system without spatial constraints using AR glasses.

SAMSUNG 삼성중공업



A system implemented with AR glasses equipped with AR.ON
to mitigate excessive time and effort spent on printing and searching schematics during operations.

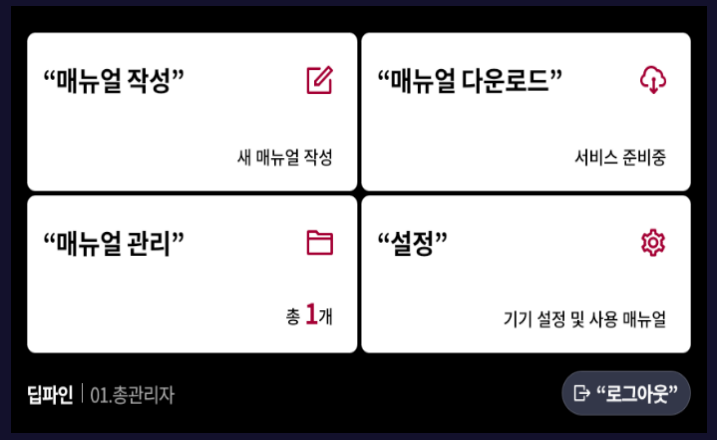
Using AR glasses , XR manual · Vision AI · OCR simplify and automate tasks

Creation of efficient on-site E-Manuals and integration with PLC information to establish a PLC alert list system.

LG전자

Real-time XR manual creation in the field

Smart glasses utilization

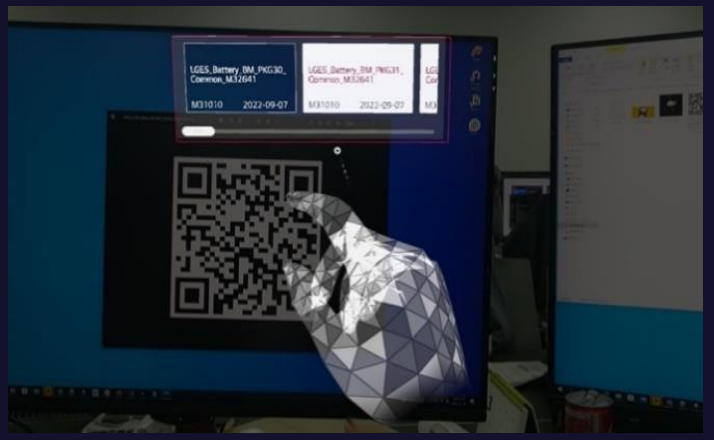


Integrated manual management system

E-Manual System

Real-time XR manual supply in the field

Smart glasses utilization



A system using smart glasses was established that replaces handwritten methods with voice and AR methods for writing, distribution, and management.

Improve work productivity through real-time on-site manual production/distribution using AR Glasses

Innovations in food manufacturing, logistics, supply chain quality/hygiene management and training using smart glasses and Vision AI technology.

식품의약품안전처 농심 Pulmuone 아워홈
롯데제과 대상주식회사 sunjin 오뚜기

Inspection (Quality and Hygiene)

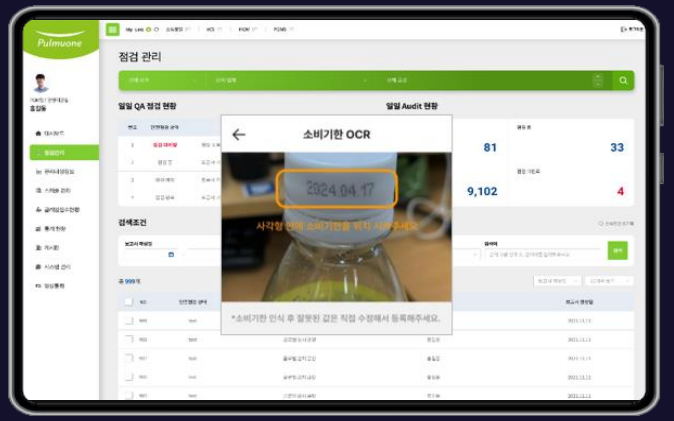
Vision AI-based inspection of irregular food materials

Remote monitoring and training

AR Glass-based employee training and remote monitoring

Digital food information management

AI-based recognition, classification, and intelligent management of food information



Revolutionizing food inspection and auditing for global operations through DAO solutions, addressing the challenges of time and geography in food supply chains.
Remote collaboration centered on overseas workplaces and distribution centers across the country and intelligent digital transformation for food audit and claim management are in progress.

Securing competitiveness in food manufacturing/equipment-related services such as HACCP certification by the Ministry of Food and Drug Safety

Collaborating with diverse clients across construction safety, facility inspections, manufacturing facility management, and XR sales.

SAMSUNG 삼성중공업
Mercedes-Benz
KIA Movement that inspires
현대건설
LG전자
LG Energy Solution
LS ELECTRIC
HYUNDAI 현대 L&C
경기도
식품의약품안전처
Pulmuone
DAESANG
LOTTE
한진택배
SK telecom
art center nabi
YOKOGAWA
Etc.

DEEP.FINE

Spatial Crafter

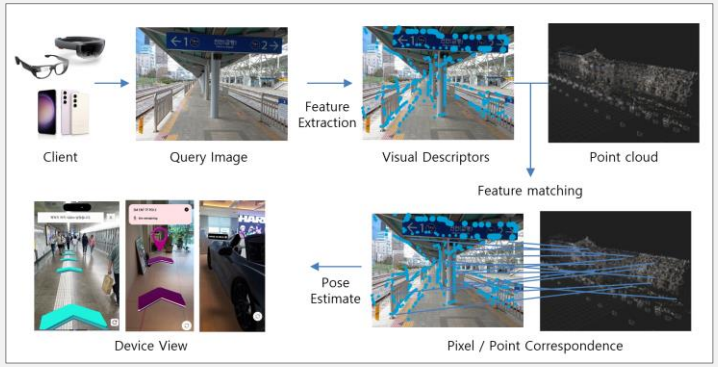
Easily create 3D spaces and ultra-precise location-based services

Create Interactions
Between Reality and Digital.

DEEP.FINE Spatial Crafter enables the creation and distribution of
all desired digital information in various real-world spaces.
Experience a fully digitalized real-world space with DEEP.FINE Spatial Crafter.

The importance and expansion of VPS technology in the upcoming spatial computing era.

VPS(Visual Positioning System) technology



"Recognizing the surrounding environment and determining location through a camera"

High-precision positioning
Overcoming GPS/WiFi

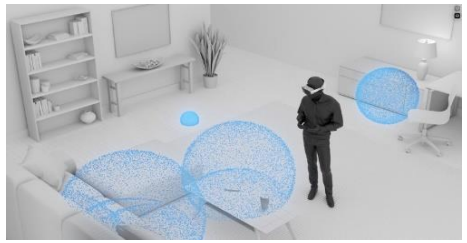
Hardware independence
No specialized requiring

Scalability
for various environments

Client Device

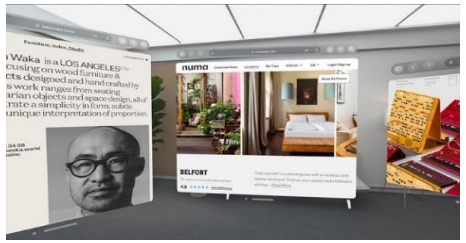
Phone/Tablet | AR glasses | VR/MR HMD | self-driving robot

Spatial Computing-Based XR Services



- XR content consumption based on indoor spaces
- High-precision indoor positioning

XR · Metaverse



- Virtual space experiences based on real-world location information
- Creation of more realistic metaverse

Expansion into Robotics and Various Spatial Domains

- Spatial mapping, positioning, route control, obstacle detection
(reducing H/W costs by replacing high-performance sensors)
- Indoor location-based docent marketing, etc.

The complexity and challenges of existing spatial data acquisition and 3D mapping processes.

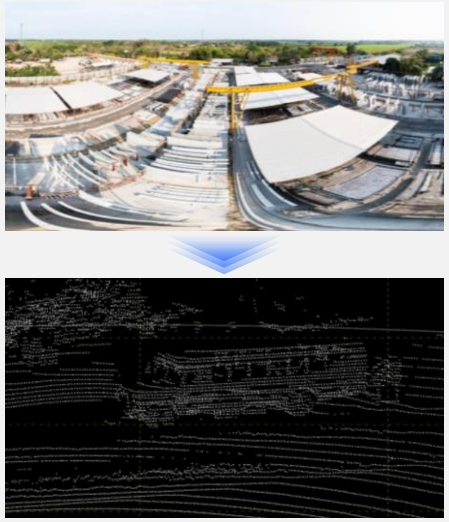
01. Scan : Acquiring 3D spatial data

"Requires a variety of specialized equipment and engineers"

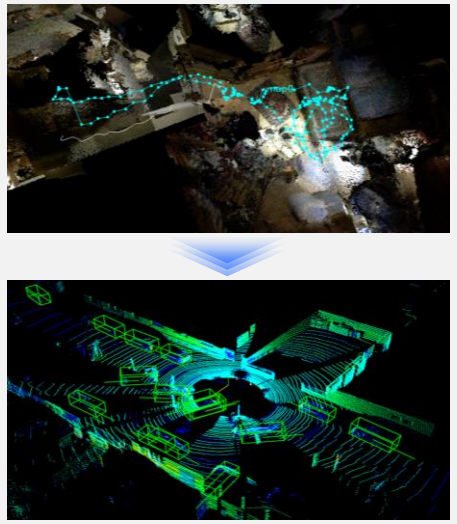
02. Mapping : 3D spatial information generating process

"Complex procedures and technical difficulties in utilizing 3D engines and processing spatial information"

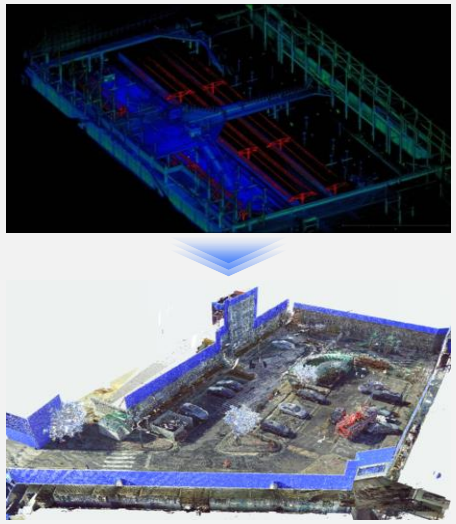
360 RGB images
LiDAR Point Cloud



Camera motion trajectory estimation
Point Cloud Map creation



Visual Geo DB creation
3D Mesh creation



3D spatial information construction process using DSC in a cloud environment.

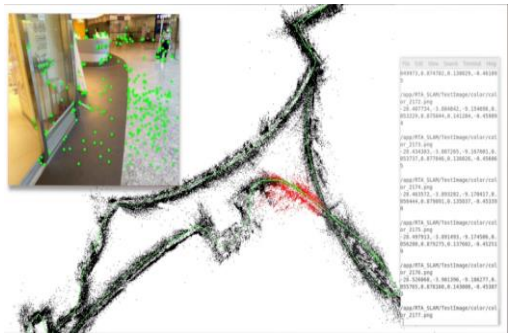
Scanning Real-World Spaces

Conduct scanning and perception of 3D spaces using cameras, sensors, and other tools attached to mobile devices.

Capture spatial data from real-world
using non-specialized equipment

Phone/Tablet AR glasses VR/MR HMD Robot

3D Spatial Mapping

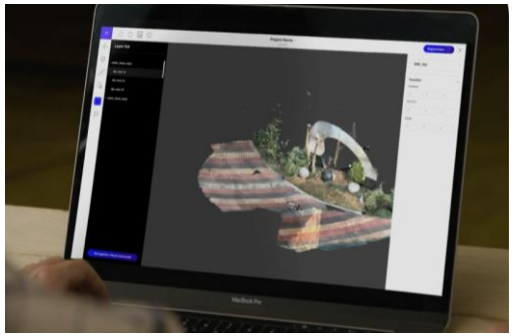


Generate 3D models from acquired spatial data and map real-world and virtual spaces.

Automatically create 3D spatial models
on cloud-based servers

Cloud server

3D Model Creation

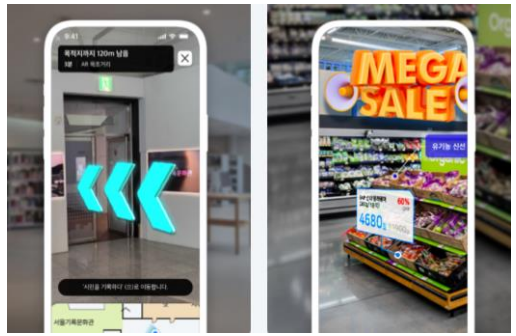


Convert the 3D models into viewable formats (e.g. fbx, ply, obj) to create XR content that links real and virtual spaces.

Visualize 3D models and create content
with simple toolkits based on No-Code

Tablet PC

Spatial Positioning Utilization



Estimate user positions within real-world spaces by matching feature points between 2D images and the 3D model.

XR spatial experience services
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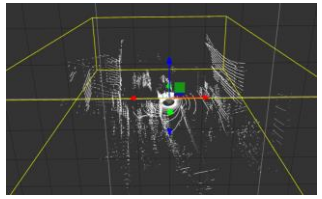
Spatial information Raw-Data

Camera RGB data (png)

LiDAR point cloud (pcd)



IMU sensor data (json)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{
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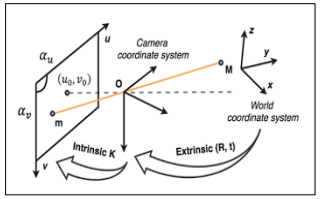
      "Delta v.y":-0.0020877537317574024,
      "Delta v.x":-0.0004352375399321317,
      "frame":"ENU",
      "accY":-0.4176580309867859,
      "accX":-0.0871003046631813,
      "accZ":9.788664817810059
    },
  "Timestamp":{...},
  "Orientation Data":{...},
  "Angular Velocity":{...}
}
```


Camera Calibration (yaml)



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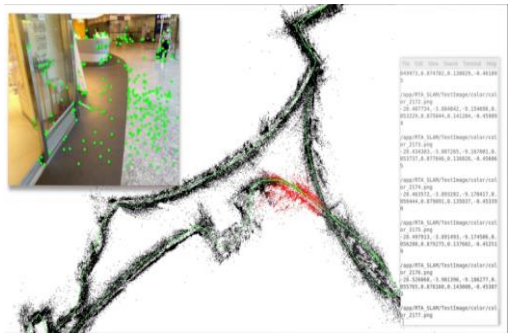
Phone/Tablet AR glass VR/MR HMD Robot

3D Spatial Mapping



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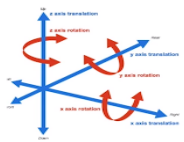
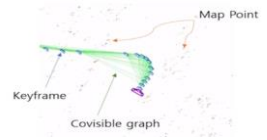
Automatically create 3D spatial models on cloud-based servers

Cloud server

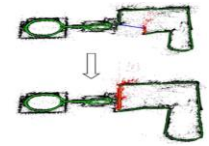
Feature extraction / local mapping



Feature Point Extraction / Camera Pose Estimation

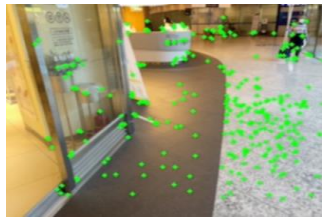


Local 3D Mapping / Map Point Optimization

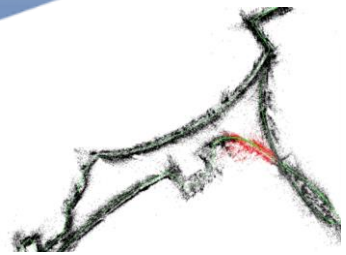


Key Frame Culling / Loop Closing

Extracted data



Key Frames



Map Point

Tablet PC Phone/Tablet AR glass VR/MR HMD Robot

3D spatial information construction process using DSC in a cloud environment.

Scanning Real-World Spaces

using non-specialized equipment

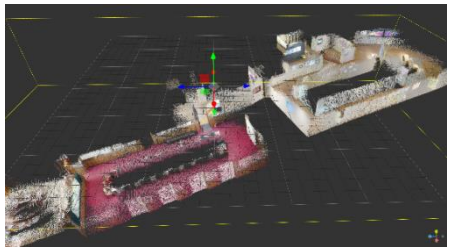
Phone/Tablet AR glass VR/MR HMD Robot

3D Spatial Mapping

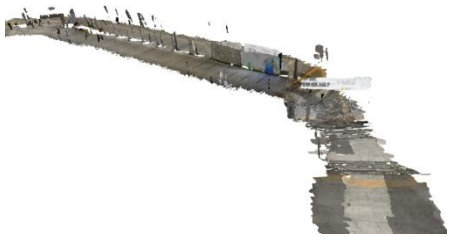
on cloud-based servers

Cloud server

Final generated data

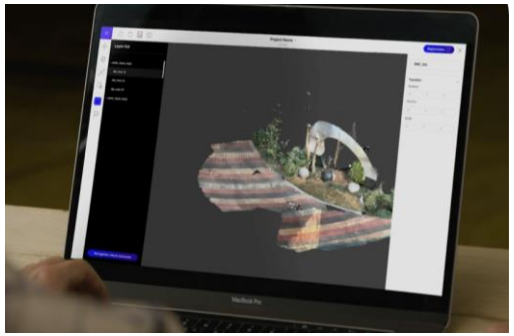


3D Point Cloud (pcd)



3D Object model (ply, obj, fbx)

3D Model Creation



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Visualize 3D models and create content
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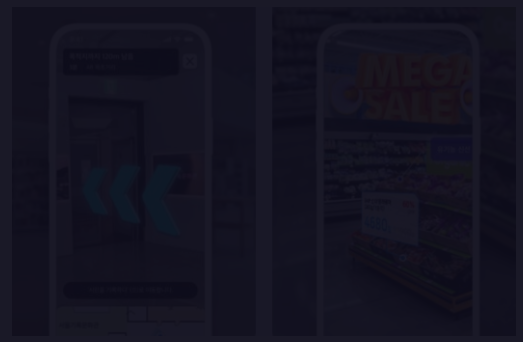
Tablet PC

Spatial Positioning Utilization



Estimate user positions within real-world spaces by matching feature points between 2D images and the 3D model.

XR spatial experience services
through Image-based real-time positioning

Phone/Tablet AR glass VR/MR HMD Robot

3D spatial information construction process using DSC in a cloud environment.

Scanning Real-World Spaces

3D Spatial Mapping

3D Model Creation

Conduct scanning
3D spaces using ca
other tools attached

Capture spatial dat
using non-specialized equipment

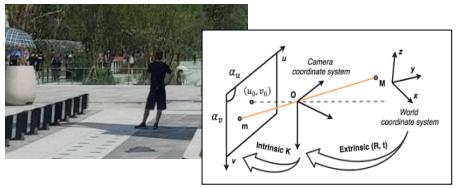
Phone/Tablet AR glass VR/MR HMD Robot

Cloud server

Tablet PC

Visual positioning API

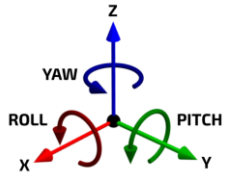
Input



Camera RGB data (png),
Camera Calibration data (yaml)

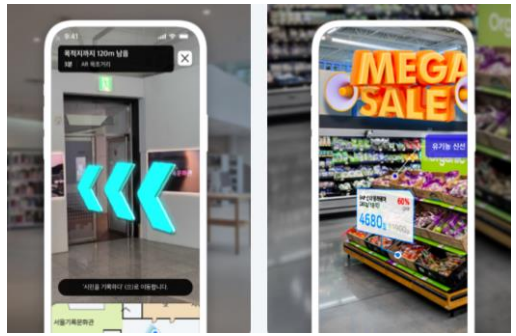
VPS positioning server

Output



6-DoF Pose data
(rotation, translation)

Spatial Positioning Utilization



Estimate user positions within real-world spaces by matching feature points between 2D images and the 3D model.

XR spatial experience services
through Image-based real-time positioning

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DEEP.FINE Spatial Crafter (DSC) platform provides everything for XR spatial experiences based on reality.

DEEP.FINE
Spatial Crafter

Frame Builder

Create real space as 3D spatial information.

Contents Editor + Generative AI

Create a variety of 2D and 3D content.

Geometry API

High-precision positioning and XR generating technology are available to all.

Even non-experts can scan their surroundings and create my own XR spatial content.

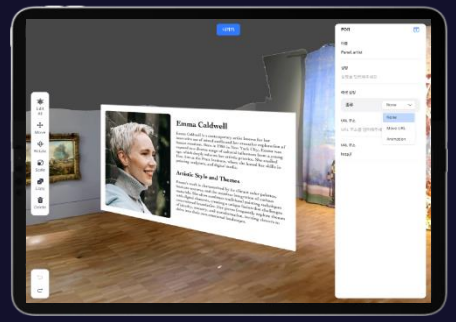
Frame Builder

Scan, make, and distribute at once

Based on images, anyone can easily map and produce my surrounding space into a digital space.

Spatial scanning

XR spatial creation



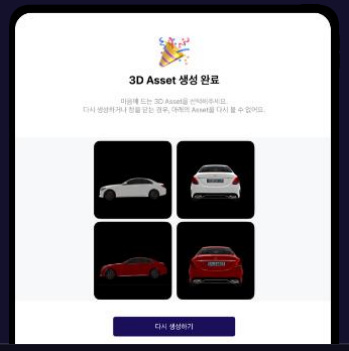
XR distribution

Contents Editor

Easy 2D, 3D content creation

It is possible to easily produce 2D and 3D content using Generative AI and real object scanning.

Generative AI



Real object scanning

Geometry API

3rd Party service

It provides Geometry APIs necessary for service development such as external Applications.

DEEP.FINE

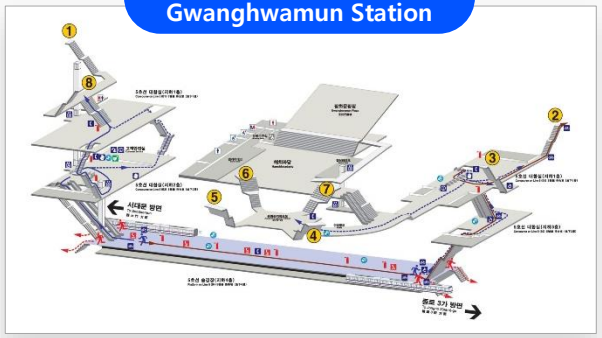
Spatial Crafter

Implementation of Large-Scale Indoor & Outdoor Location-Based AR Services Around Gwanghwamun Station and Square Using VPS Technology.

LX, AR indoor & outdoor navigation demonstration project in collaboration with the Seoul Metropolitan Government

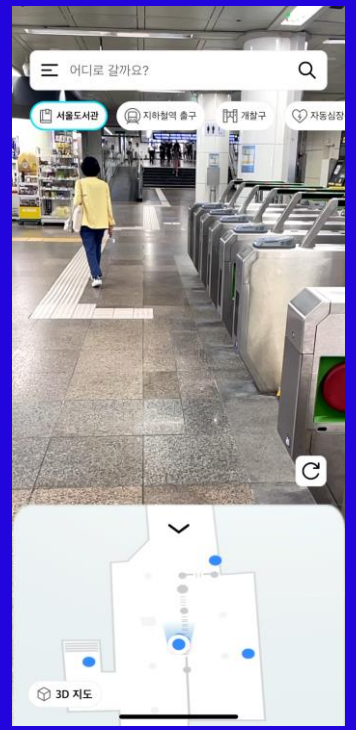
POI
360 Map
2D Map
Point Cloud
Real World

Indoor space of Gwanghwamun Station



Outdoor space of Gwanghwamun Square

AR navigation

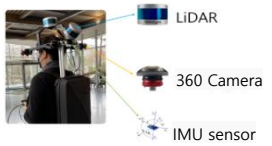


Distinct Advantages of VPS Technology for Easy Integration with XR.

Differentiation of VPS compared to traditional indoor positioning technologies

Category	GPS	Wi-Fi	BLE Beacon	UWB	VPS
Positioning Information	2D Location	2D Location	2D Location	2D Location	**3D Location, 6-DoF Direction**
Positioning Accuracy	5~20m	2~5m	3~8m	0.3m	**0.03~0.3m**
Initial Deployment Difficulty	Low	Middle	Middle	High	**High**
Cost of Deployment	Low	Low	Middle	High	**Middle**
Necessary Infrastructure	Satellite Signal Receiving Terminal	Wireless AP Network	Beacon Network	UWB Tag Device	**Camera (Phone)**
Indoor Positioning possibility	○	✓	✓	✓	✓

DEEP.FINE Spatial Crafter : Reduces setup costs by approximately 80% and enhances usability for non-experts

Category	traditional (other company) method	DSC's improved method
Real-space Scanning Equipment		
Real-space Scanning Work	 Expert scan	 Non-expert scan
3D Spatial Information (Modeling)	 Use Unity, Unreal Engine	 Cloud server auto creation
Apply XR Content	 Use Unity, Unreal Engine	 Use No-code production tool
Cost of building an enterprise model (based on 3,306m2)	Using equipment cost: KRW 20 million Mapping process cost: KRW 40 million Mapping process time: 7 days	Using equipment cost: **FREE** Mapping process cost: **KRW 10 million** Mapping process time: **0.5 days**

Infrastructure utilization and technical cooperation/support through various partnerships not only collaboration with major domestic and global corporations.

Microsoft

- ✓ Selected as Microsoft for Startups 1st tier
- ✓ MS Hololens2 Technical Support and MRPP Official Partner
- ✓ Registered as an MS Co-Sale Partner

SAMSUNG 삼성전자

- ✓ Selected for Samsung C.Lab Outside 5th cohort
- ✓ Completed Samsung Electronics Accelerating Program in 2023

SK telecom

- ✓ Infrastructure support and business collaboration, including 5G MEC
- ✓ Indirect investment by the company

GLASS

- ✓ Google Assist Technical Support and Business collaboration Organization
- ✓ Solution Partner/Korean Reseller in progress

aws

- ✓ AWS Wavelength(5G MEC) Best Practice Selection
- ✓ AWS Cloud Support/Collaboration

HYUNDAI

- ✓ Expanding collaboration with Hyundai Motor
- ✓ Equity investment by Hyundai Motor and Hyundai Motor Securities

Mercedes-Benz

- ✓ Stuttgart HQ EXPO 2022 Invitation/Speaker
- ✓ Joint R&D and co-patent filing with the German headquarters

YOKOGAWA

- ✓ Signed DAO solution supply contract (7 years)
- ✓ Advancing the globalization of DAO solution

SM ENTERTAINMENT

- ✓ Expanding collaboration with SM Entertainment
- ✓ Equity investment by SM Culture Partners

LS ELECTRIC

- ✓ Expanding XR collaboration in the smart factory
- ✓ Equity investment by the company

SAPEON

- ✓ NDA signed for AI and AR glass solutions
- ✓ Joint R&D in progress for VPS development


Thank You
DEEP.FINE