2025

Presented by LBStech

LBS Tech

Location Based Service

CONTENTS.

I.

Market Trend & Problem

01. Mobility Market

Advancement of Autonomous Driving Technology

TESLA

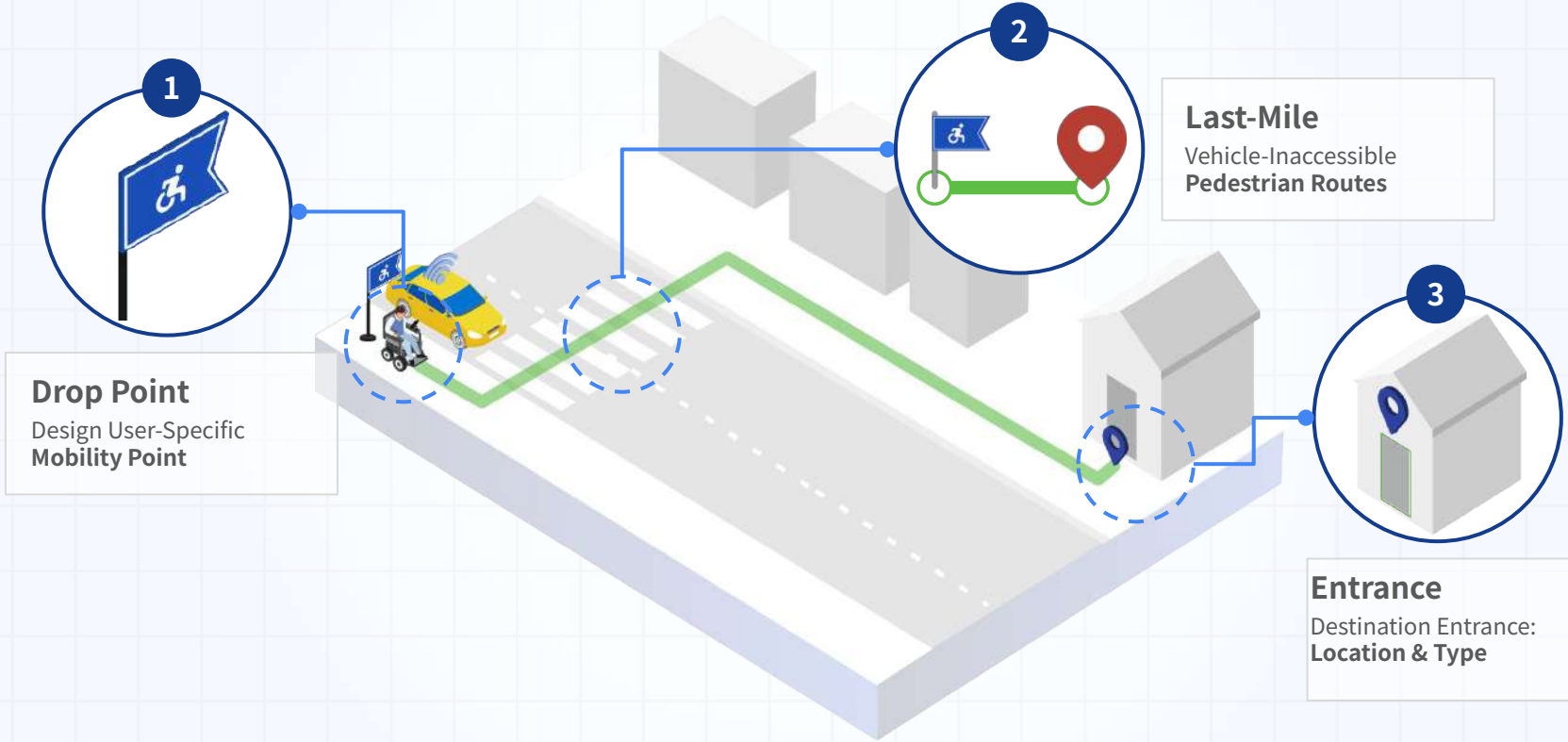
WAYVE

WAYMO

Lv.0	Lv.1	Lv.2	Lv.3	Lv.4	Lv.5
No Automation	Driver Assistance	Partial Automation	Conditional Automation	**High Automation**	**Full Automation**

02. Necessity of Last-Mile

A Walk Journey to the Destination, “Last-Mile”



Drop Point
Design User-Specific
Mobility Point

Last-Mile
Vehicle-Inaccessible
Pedestrian Routes

Entrance
Destination Entrance:
Location & Type

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03. Problem

Challenges in Walkway Data Collection System

1

Vehicle-Based Data Collection

Necessity of
pedestrian-based data collection

2

Outdated Data

Necessity of
continuous update of collected data

3

Areas with Missing Data

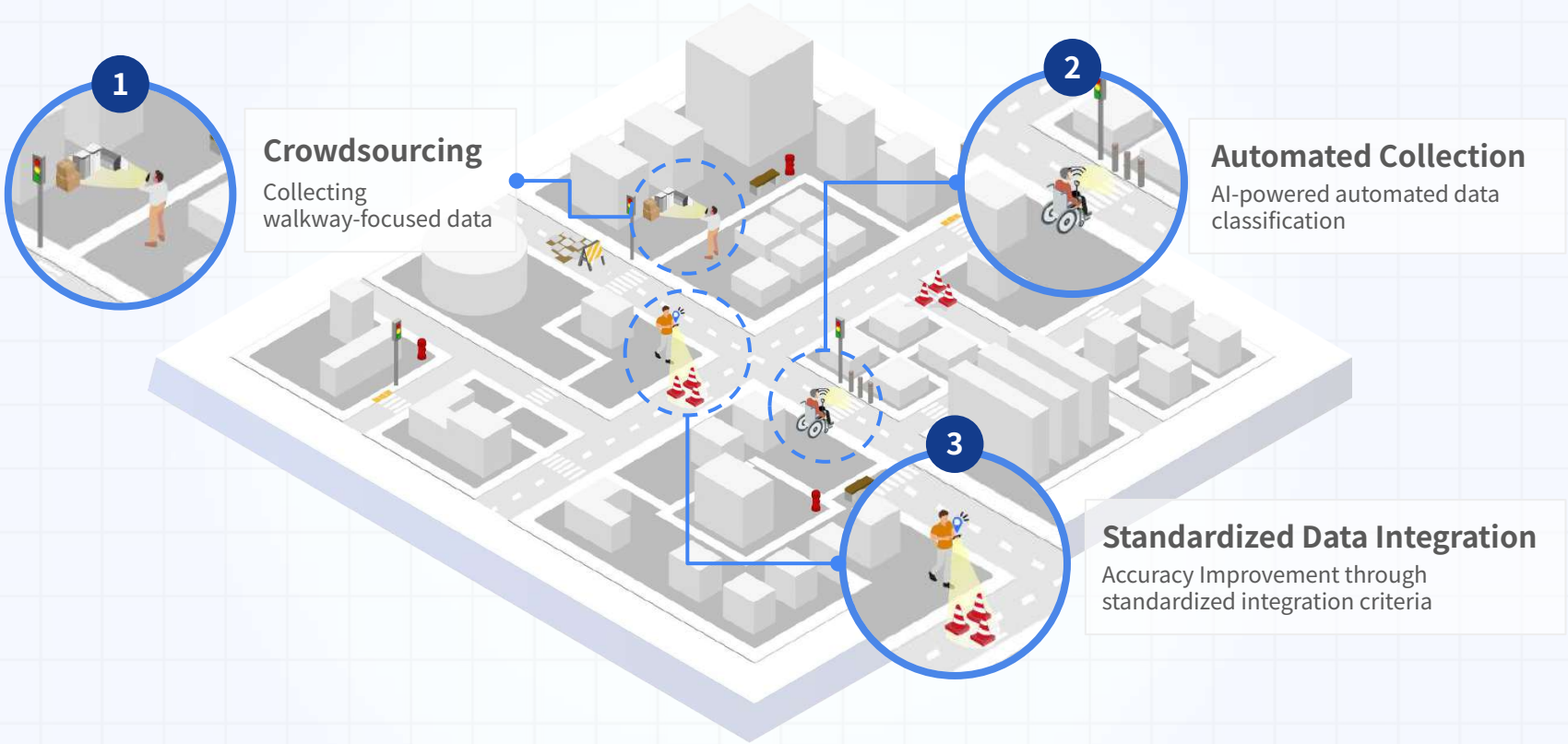
Necessity of
automated data collection & monitoring

II.

Solution

01. Solution

Automated Solution from Data Collection to Integration



Crowdsourcing

Collecting
walkway-focused data

Automated Collection

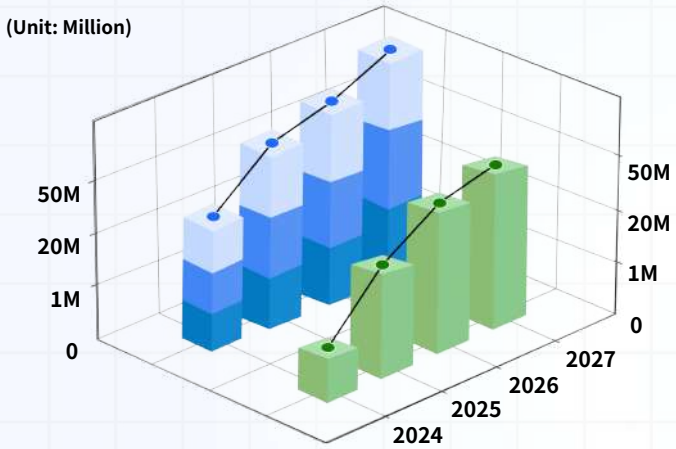
AI-powered automated data
classification

Standardized Data Integration

Accuracy Improvement through
standardized integration criteria

02. Crowdsourcing-Based Data Collection

Ongoing Data Collection by Citizen Participation



	2024	2025	2026 (Prediction)	2027 (Prediction)
ESG (Corporate)	100	300	500	1,000
CSR (Public org.)	500	1,000	1,500	2,000
Public Project	1,000ppl	4,050ppl	20,000ppl	90,000ppl
Volunteer		13,746ppl	50,000ppl	100,000ppl

Obstacle walkway Accessibility Oversea

2025 New Collectors

3,050ppl

Data Collection

7,840,806pcs

Door

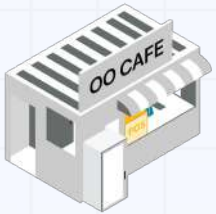
1,557,451

Entrance

1,795,035

Walkway

1,079,178



Amenity

766,668

03. Automated Data Collection & Classification System

AI-Powered Automated Data Collection & Classification

Data Collection
1
- Recording time
- Recording location(GPS)

Data classification
2
- Accessibility DB
- Obstacle DB

Accessibility Information
3
- Accessibility unique ID
- Door & entrance type
- Indoor amenities
- Location information(VPS)

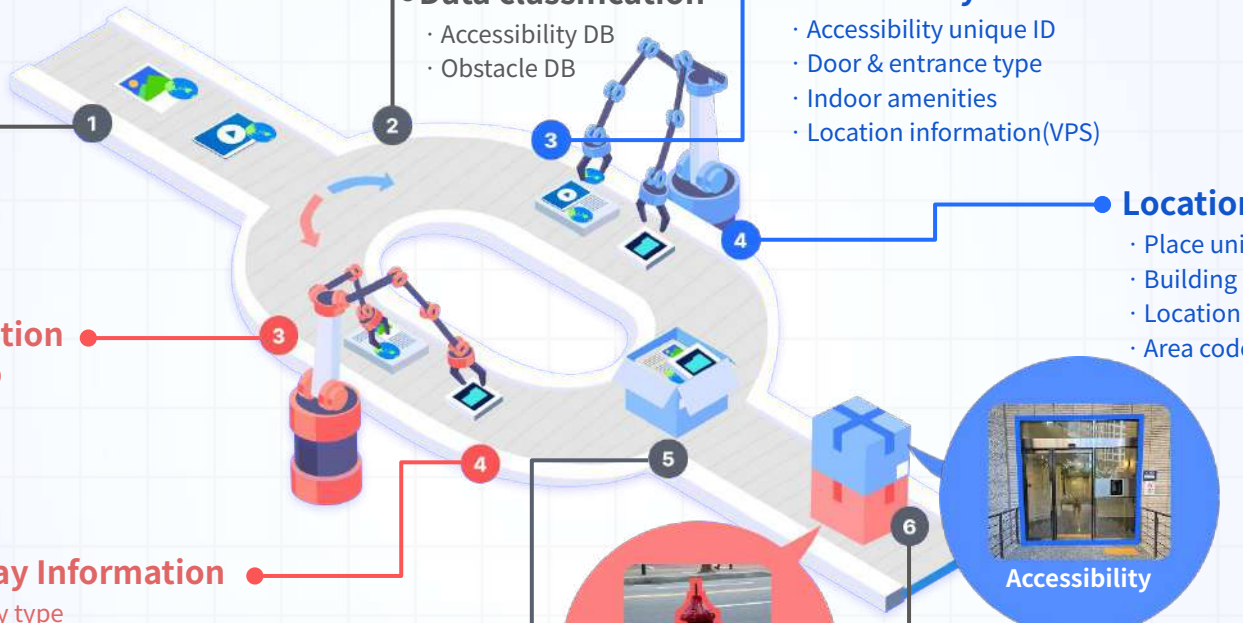
Location Information
4
- Place unique ID
- Building point
- Location
- Area code

Obstacle Information
3
- Accessibility unique ID
- Obstacle type

Walkway Information
4
- Walkway type
- Walkway feature

Data Verification
5
- data matching accuracy

Data Integration
6
- Verified Data



Accessibility

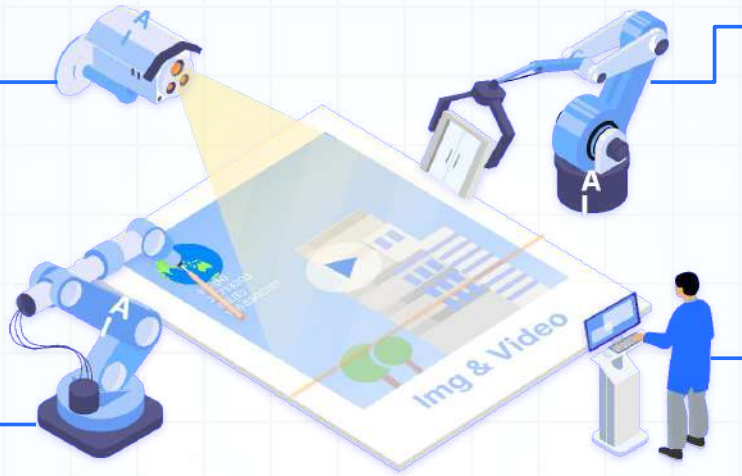
Obstacle

03. Automated Data Collection & Classification System

AI-Powered Automated Data Collection & Classification

Auto-Data Verification
· Verify data matching accuracy

Auto-Data Classification
· Automatic classification after identifying entrances and obstacle features



Auto-Data Implementation
· Obstacle/accessibility/place unique ID
· Door/entrance type
· Obstacle/walkway type
· Indoor amenities
· Location information(VPS)

Final Verification
· Final human verification conducted to check errors after AI-based validation

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04. DB Standardization

Applying Updated Accurate Data by DB Standardization

Layer 6: User Experience

· User Experience Index :
Based on User Routes & Capture Data

Layer 5: Safety

· Walkway Safety Information :
Damaged Areas, Epidemics, Disasters

Layer 4: Environment

· Weather-Dependent Walkway Conditions :
Ice, Puddles, UV exposure

Layer 3: Obstacle

· Walkway Obstacles :
Bikes/Scooters, Illegal Parking, Trash, Stalls

Layer 2: Accessibility

· Building Access & Facilities :
Entrances, Restrooms, Elevators

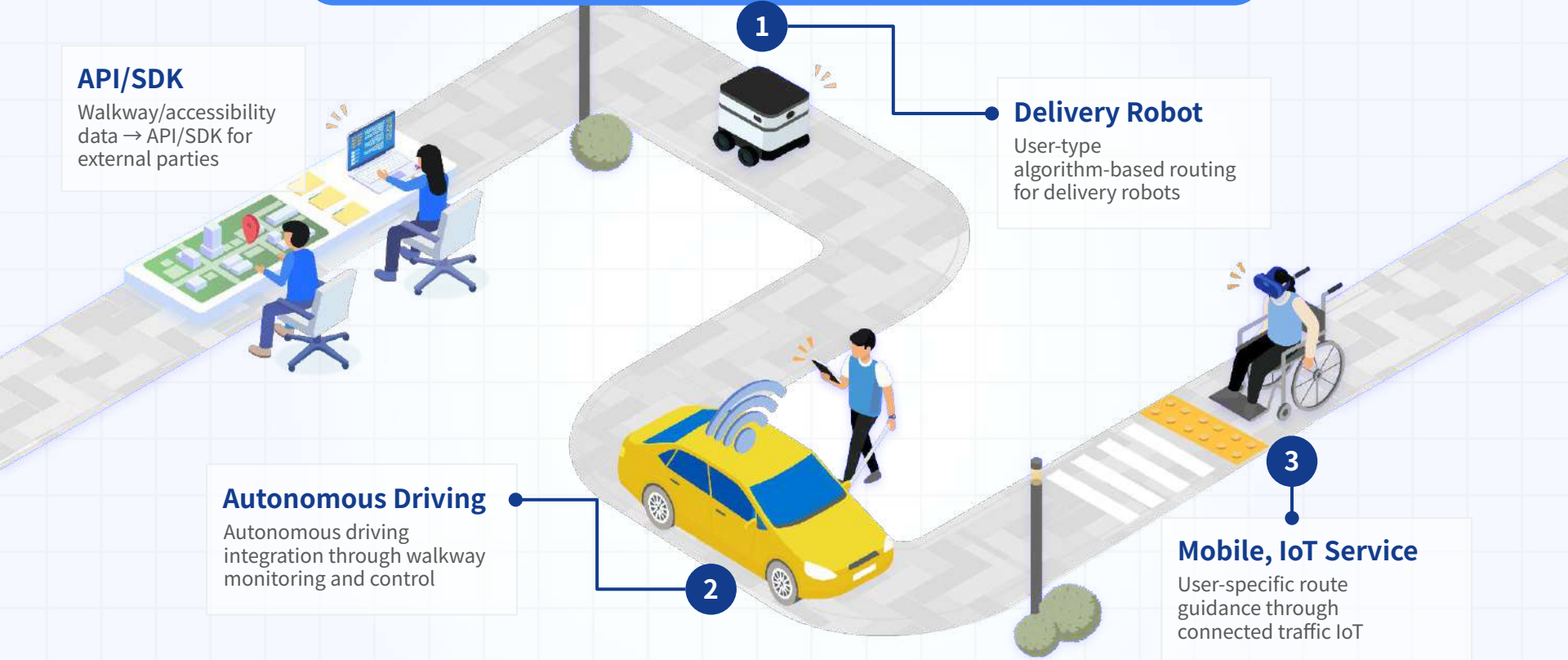
Layer 1: Walkway

· Classification by Road Type :
Pedestrian, Shared, Bicycle

III. Utilization

01. Solution Utilization

Universal Last-Mile Solution for ALL Mobility Types



API/SDK

Walkway/accessibility data → API/SDK for external parties

1

Delivery Robot

User-type algorithm-based routing for delivery robots

Autonomous Driving

Autonomous driving integration through walkway monitoring and control

2

3

Mobile, IoT Service

User-specific route guidance through connected traffic IoT

02. Navigation for Mobility-Challenged Users

User-Centric IoT & Wearable Navigation

IoT-linked walkway navigation for Visually Impaired

AR-Pedestrian Tour Service for Wheelchair Users

「Smart Watch Integration Demo for Visually Impaired」

「Crosswalk Signal Integration Demo for Visually Impaired」

「Walkway Tour Demo for Wheelchair Users」

「Walkway Navigation Demo for Wheelchair Users」

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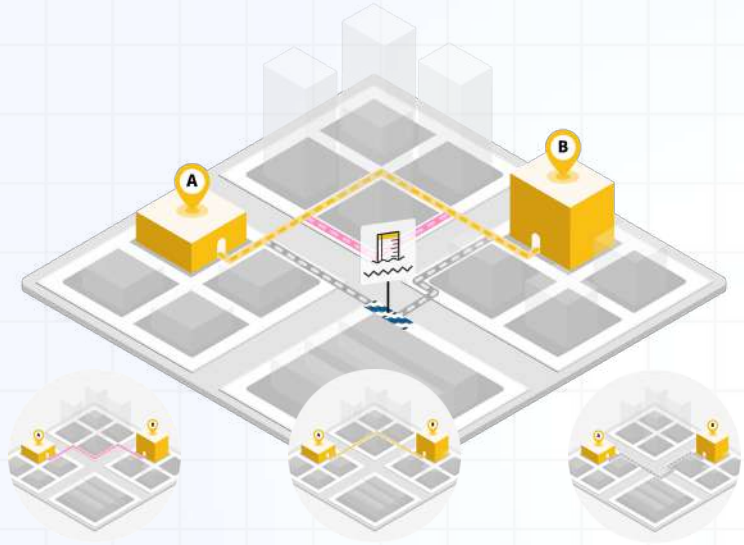
03. Route Algorithm Integration

Delivery Robot Navigation via Walkway Route Algorithms



Visually Impaired　Wheelchair User　Senior & People

Detect Formula

$$F(x) = \frac{f(x+h)-f(x)}{h}$$

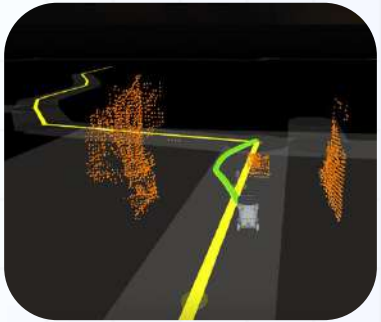
$$(x-x_1)^2 + (y-y_1)^2 + (z-z_1)^2 = (t_{r1}-b-s_1)\,c$$

$$(x-x_3)^2 + (y-y_3)^2 + (z-z_3)^2 = (t_{r3}-b-s_3)\,c$$

「Konkuk Univ. Campus Demo」

「Yeonsei Univ. Campus Demo」

「Robot monitoring system」



「Object-Aware Routing Sample」

04. Last-Mile Connection

Autonomous-Linked Last-Mile PoC Project

First/Last-Mile Model with Autonomous Shuttle

Autonomous Delivery Robot Route Optimization

Robot Taxi Integration by User-Specific Drop Points

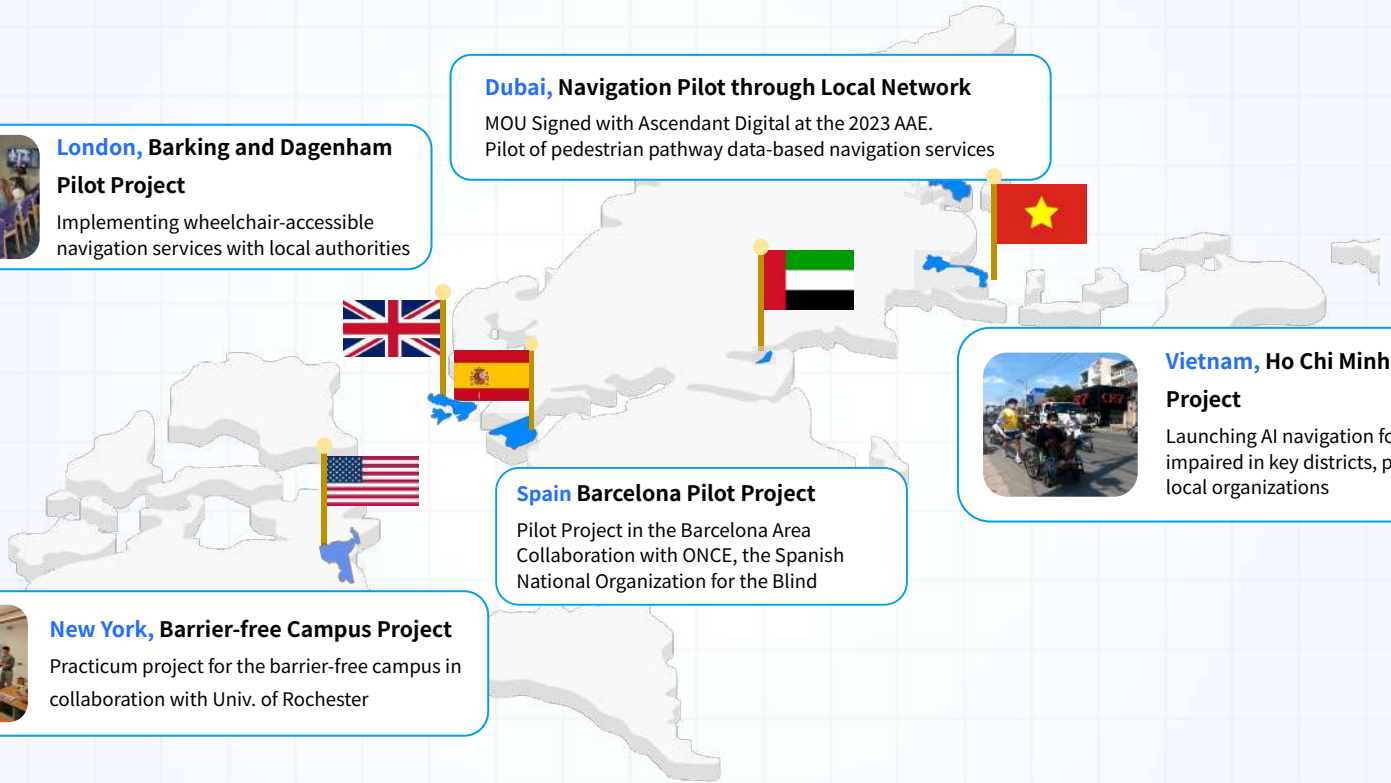
「2026 Ohmio Collaboration discussion」

「Autonomous Shuttle Pilot Project」

IV. Scalability

01. Global Expansion

LBS Tech Global Collaborations



London, Barking and Dagenham Pilot Project

Implementing wheelchair-accessible navigation services with local authorities

Dubai, Navigation Pilot through Local Network

MOU Signed with Ascendant Digital at the 2023 AAE.
Pilot of pedestrian pathway data-based navigation services

Vietnam, Ho Chi Minh Cith Pilot Project

Launching AI navigation for the visually impaired in key districts, partnering with local organizations

Spain Barcelona Pilot Project

Pilot Project in the Barcelona Area
Collaboration with ONCE, the Spanish National Organization for the Blind

New York, Barrier-free Campus Project

Practicum project for the barrier-free campus in collaboration with Univ. of Rochester

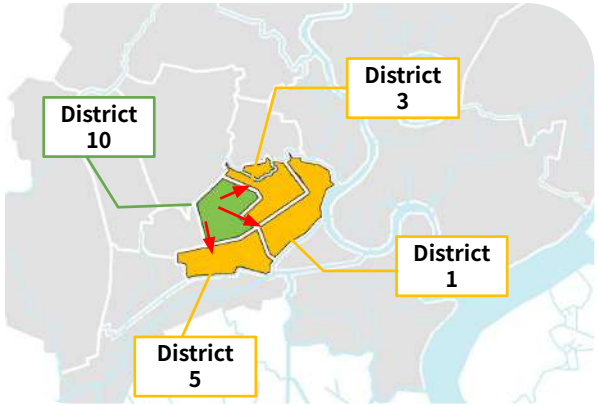
01. Global Expansion - Vietnam

Mobility & Access Service PoC for Barrier-Free Smart City

Smart City Project in Vietnam

- Data collection of walkway & building accessibility
- Store infrastructure improvement & certification
- Demo of walkway navigation for visually impaired
- Demo of contactless order/payment system for visually impaired

Achievements



- **23% increase** in sales at stores through demo project
- **16% expansion** in average travel range for testers
- Business coverage expanded from Dist. **10** to **1, 3, 5**
- Local network with **MSD, DRD, ISCM**

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01. Global Expansion - US

Barrier-Free Campus with University-Industry partnership

Practicum with Univ. of Rochester




UNIVERSITY of ROCHESTER

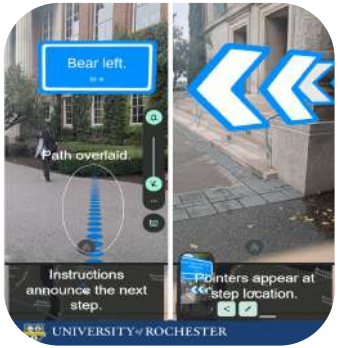
Carnegie Mellon University

USC

- Technical support for data collection
- AR-campus service with student participation
- API support for user-specific route algorithms
- University-based collaborative networks

Achievements

< Rochester Univ. Data Sample >



< AR Service Development >

- Case study of **XR-based accessibility enhancement**
- Study on improving service usability through **AR- glasses integration**
- Verification of tech support process via **API**
- Expansion of campus project in **Cornell, Carnegie**

01. Global Expansion - UK

Barrier-Free Town Project with Last-Mile Service

London Smart-Town Project

- Walkway data collection in Barking, Dagenham
- PoC of walkway navigation service for “Vision Zero”
- Last-mile based walkway mobility & tourism information service
- PoC Project with local wheelchair users

Achievements

< WMCA LOI signed >

West Midlands Combined Authority

- Project expansion to **Birmingham, West Midlands**
- **LOI Signed** for collaboration with local authorities
- Implement last-mile services integrated with **autonomous driving**
- Validation of last-mile **barrier-free town** project

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02. Service Scalability

Function Expansion through Integration

Kiosk

Wearable Devices

Autonomous Wheelchair

Version	v2.0	v3.0	v3.5	v4.0
Function	Kiosk Connection	Wearable Devices Connection	Autonomous Wheelchair Connection	Autonomous driving Connection
User	Mobility-Challenged user	+ IoT, Machine	+ Seniors	+ Vehicle
Technology	Optimized Interface	Walkway Providing System	Standardized Spatial Data	Integration of Autonomous Driving Technology
Year	~2025	~2027		~2029

03. Collaboration

Data Collaboration via API, SDK

PED HUB

- Human verification & AI-based auto validation
- Pedestrian road / Accessibility / Location DB
- Data classified into 7 layers :User experience, Safety incidents, environment, obstacles & facilities, Buildings & roads
- Periodical update : Event of incident / 3 months / 1 years

2

Classification

Collection

- Using Door Scanner/Road Scanner
- Video Collection(Sensor)

1

Data Provision

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Collaboration Architecture

Data Provision

Application

- Data : API/SDK
- Application : PED-Map, G-EYE
- IoT : AR glasses, Watch
- Mobility : Delivery, AI Camera

3

04. Technological Expertise

Proven Technological Expertise through Global Awards

< President's Volunteer Service Award >

Global Awards

CES Innovation Awards 2026 Best of Innovation

<2026 CES>
BOI of Travel & Tourism

CES Innovation Awards 2025

< 2025 CES Innovation Awards>
Honoree of Human Security 4 All

GLOMO Global Mobile Awards

< 2023 MWC GLOMO Awards>
Best Mobile Use for Inclusive

Patents & Award

Every Move, Every Step, For Everyone