DEVELOPMENT OF MUTUAL WATCHING SERVICE BASED ON ON-DEMAND BUS DATA

HAN XU

INDUSTRIAL INFORMATION SYSTEMS AND ENVIRONMENT LABORATORY

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- Background
- Objective & Scope
- Method
- Tamaki Town Trip
- Difficulties & Problems
- Future Work

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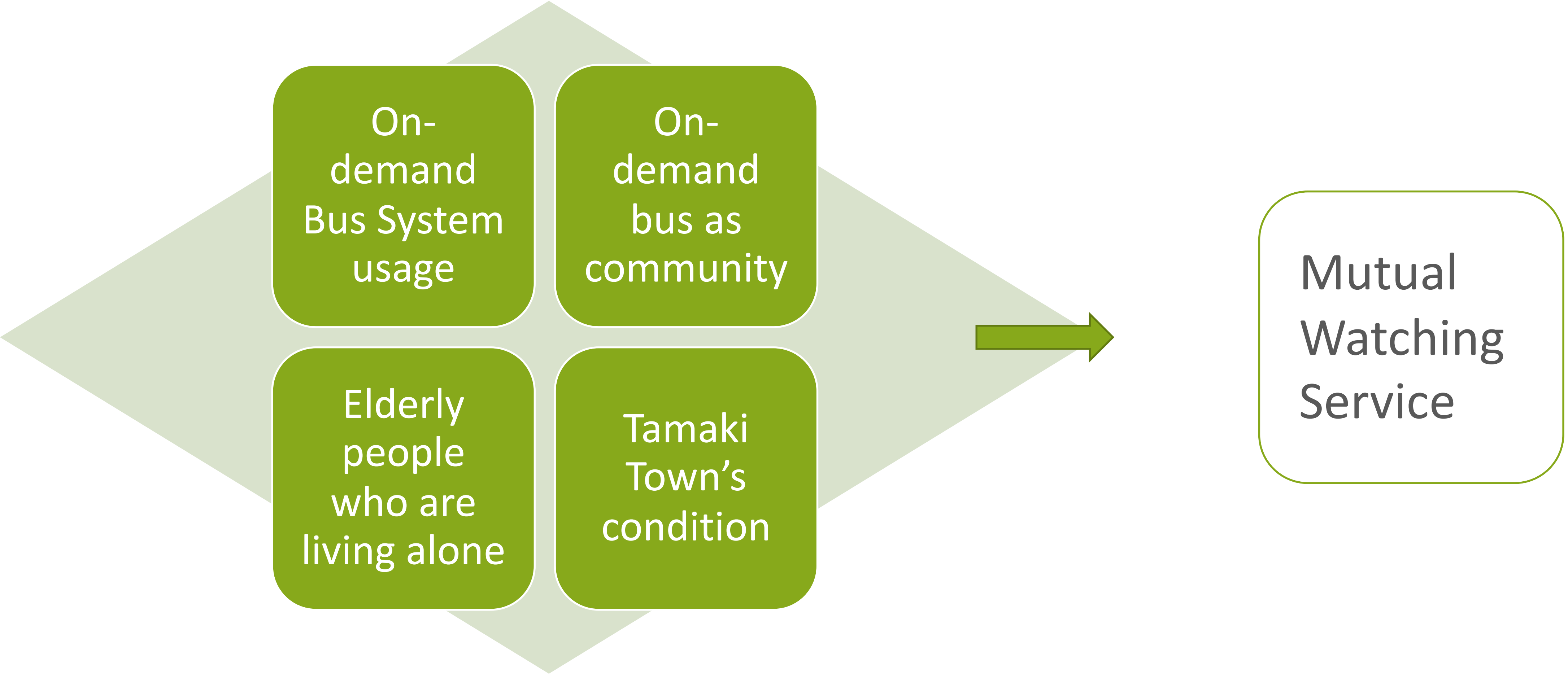
BACKGROUND



On-demand Bus System usage

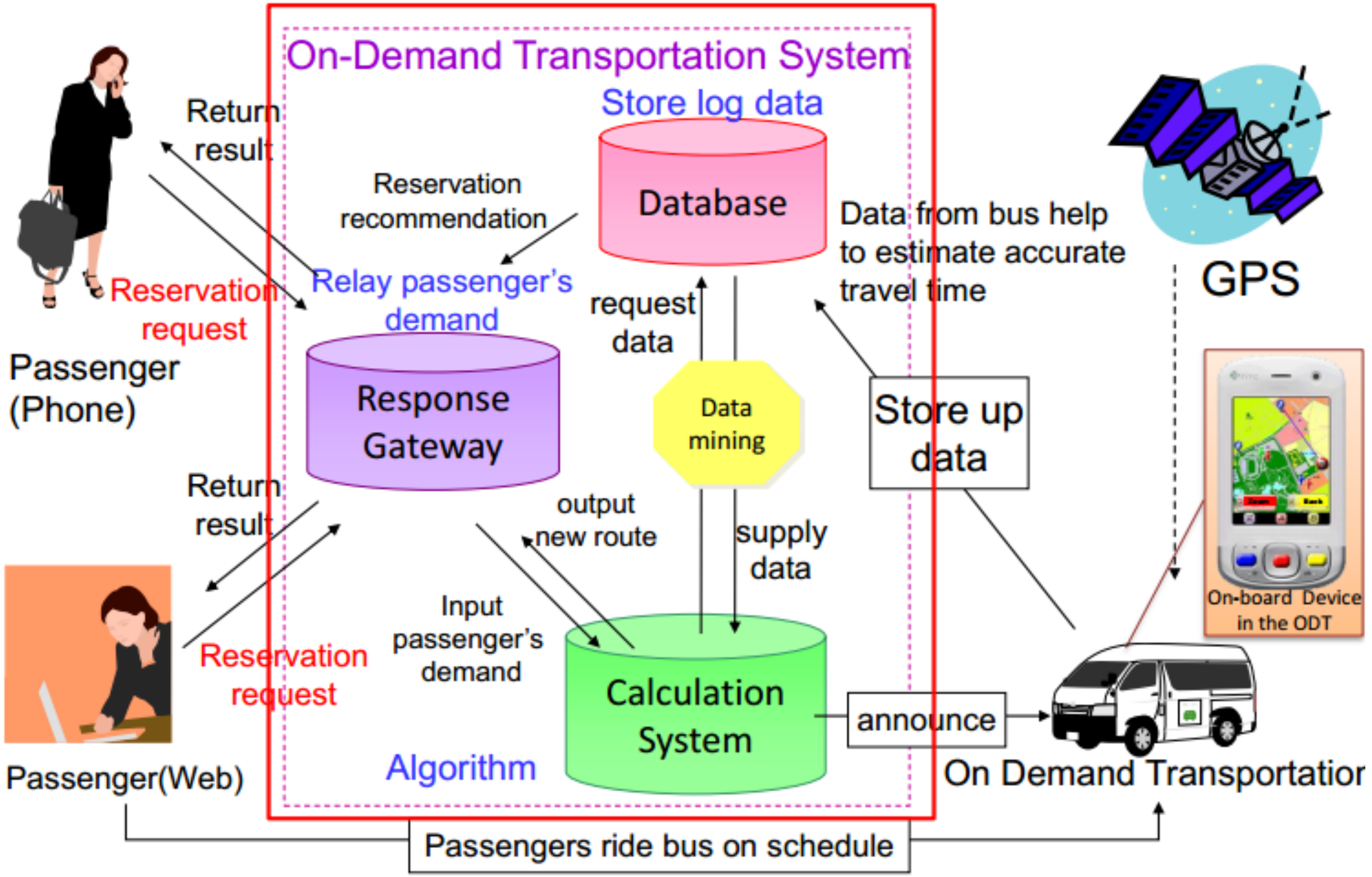
On-demand bus as community

Elderly people who are living alone

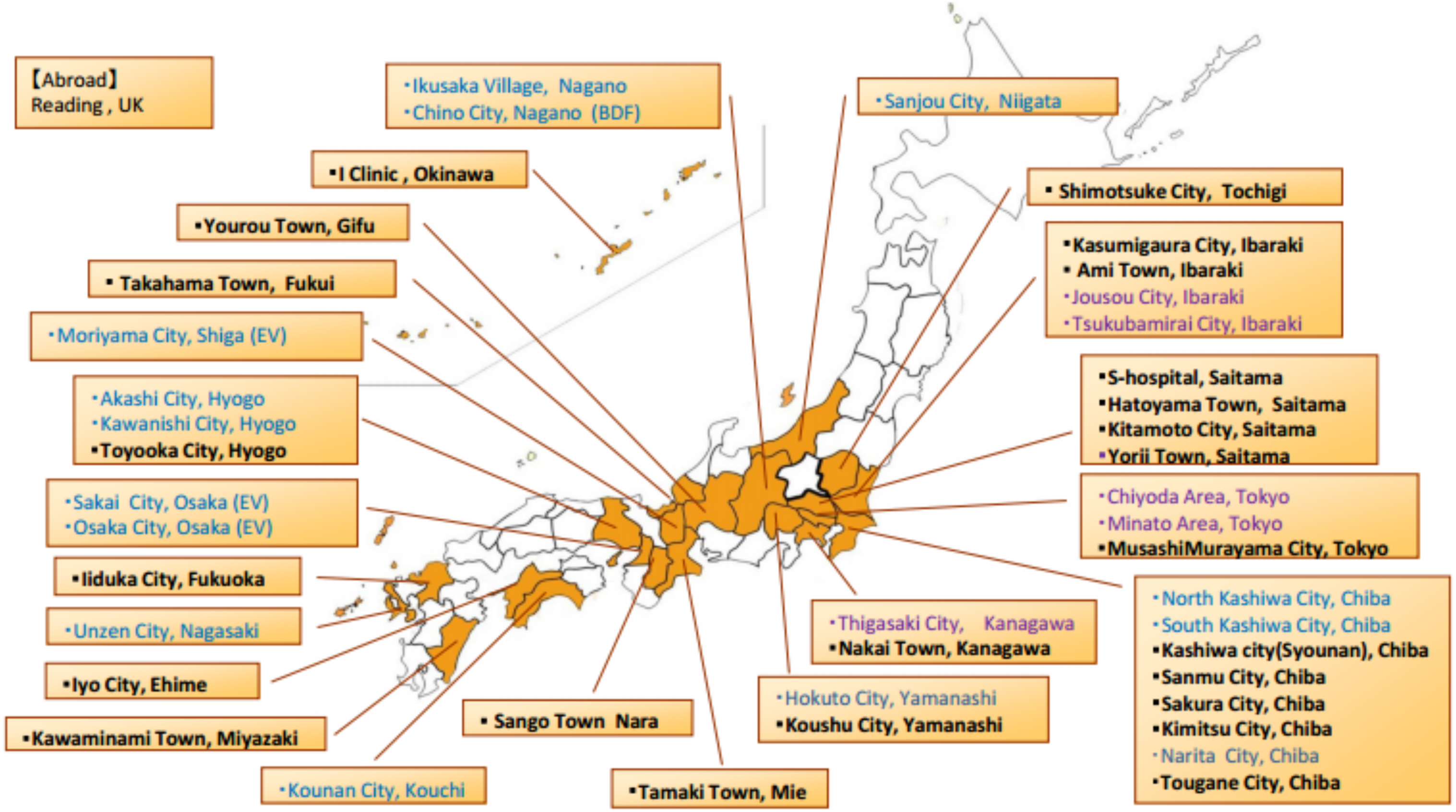
Tamaki Town’s condition

Mutual Watching Service

ON-DEMAND BUS SYSTEM USAGE


On-Demand Transportation System
Store log data
Database
Return result
Reservation recommendation
Relay passenger's demand
Reservation request
Passenger (Phone)
Response Gateway
request data
Data mining
Data from bus help to estimate accurate travel time
GPS
Store up data
On-board Device in the ODT
Return result
output new route
supply data
Input passenger's demand
Reservation request
Calculation System
announce
Passenger(Web)
Algorithm
On Demand Transportation
Passengers ride bus on schedule

ON-DEMAND BUS SYSTEM USAGE



【Abroad】
Reading , UK

・Ikusaka Village, Nagano
・Chino City, Nagano (BDF)

・Sanjou City, Niigata

▪I Clinic , Okinawa

▪Yourou Town, Gifu

▪ Takahama Town, Fukui

・Moriyama City, Shiga (EV)

・Akashi City, Hyogo
・Kawanishi City, Hyogo
▪Toyooka City, Hyogo

・Sakai City, Osaka (EV)
・Osaka City, Osaka (EV)

▪Iiduka City, Fukuoka

・Unzen City, Nagasaki

▪Iyo City, Ehime

▪Kawaminami Town, Miyazaki

・Kounan City, Kouchi

▪ Sango Town Nara

▪Tamaki Town, Mie

▪ Shimotsuke City, Tochigi

▪Kasumigaura City, Ibaraki
▪ Ami Town, Ibaraki
・Jousou City, Ibaraki
・Tsukubamirai City, Ibaraki

▪S-hospital, Saitama
▪Hatoyama Town, Saitama
▪Kitamoto City, Saitama
▪Yorii Town, Saitama

・Chiyoda Area, Tokyo
・Minato Area, Tokyo
▪MusashiMurayama City, Tokyo

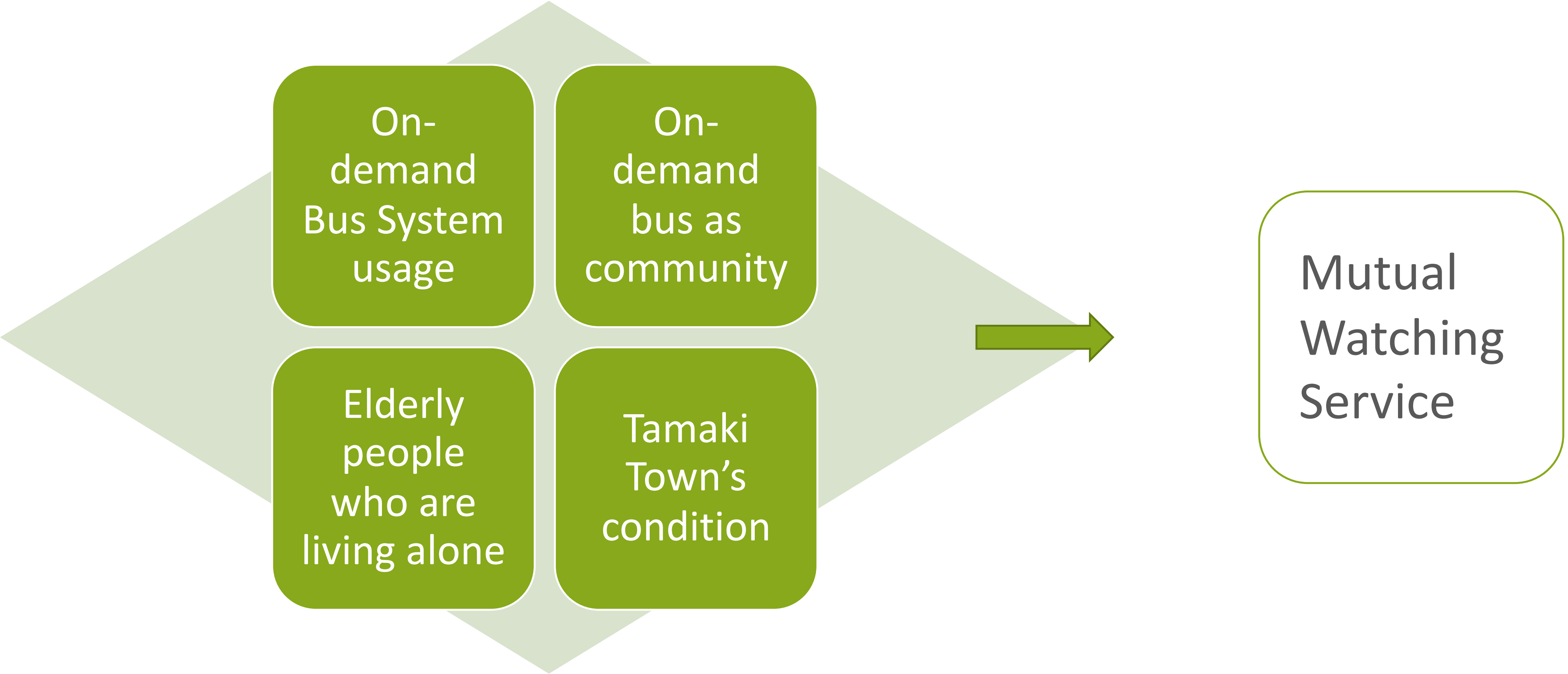
・Thigasaki City, Kanagawa
▪Nakai Town, Kanagawa

・Hokuto City, Yamanashi
▪Koushu City, Yamanashi

・North Kashiwa City, Chiba
・South Kashiwa City, Chiba
▪Kashiwa city(Syounan), Chiba
▪Sanmu City, Chiba
▪Sakura City, Chiba
▪Kimitsu City, Chiba
・Narita City, Chiba
▪Tougane City, Chiba

bold : currently operating

BACKGROUND



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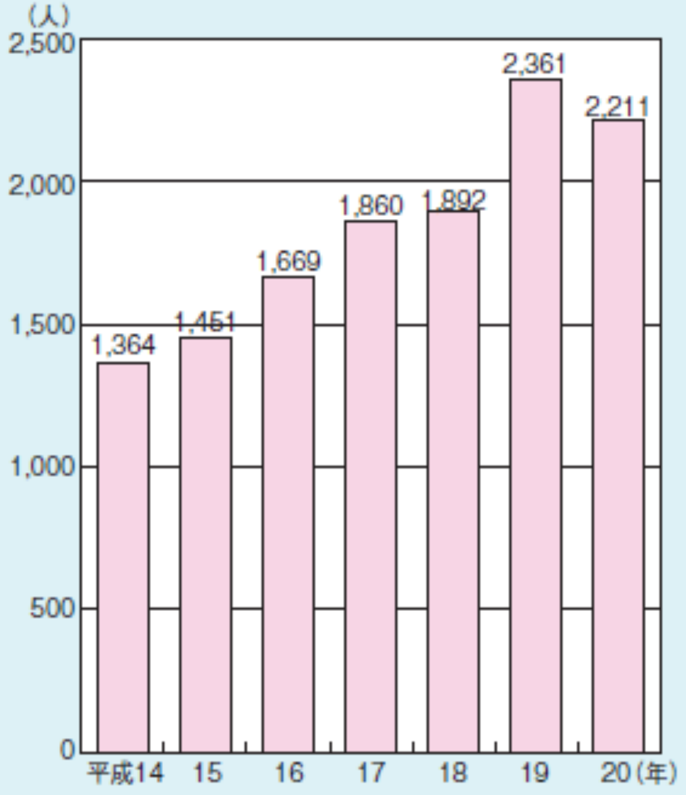
ELDERLY PEOPLE WHO ARE LIVING ALONE

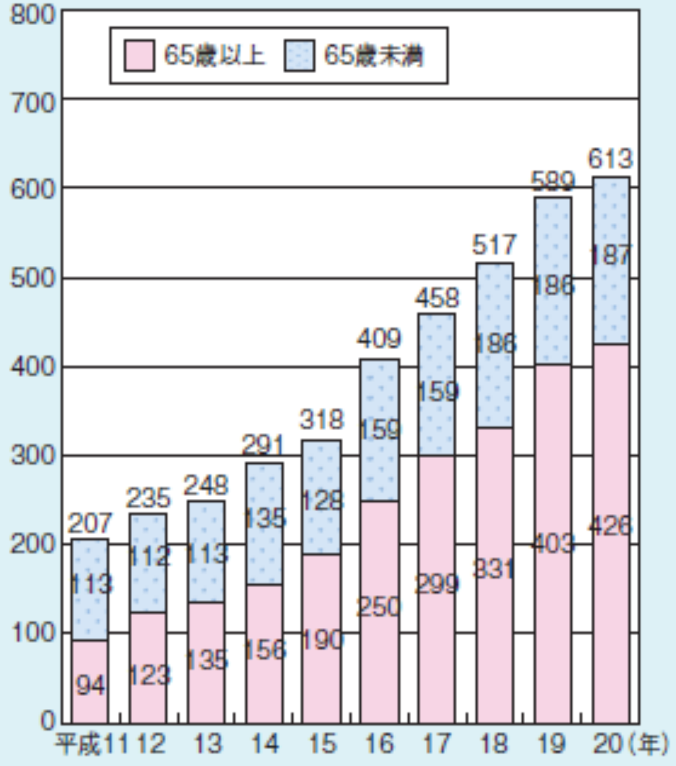
More and more elderly people (who are over 65) die alone

①東京23区内で自宅で死亡した65歳以上一人暮らしの者



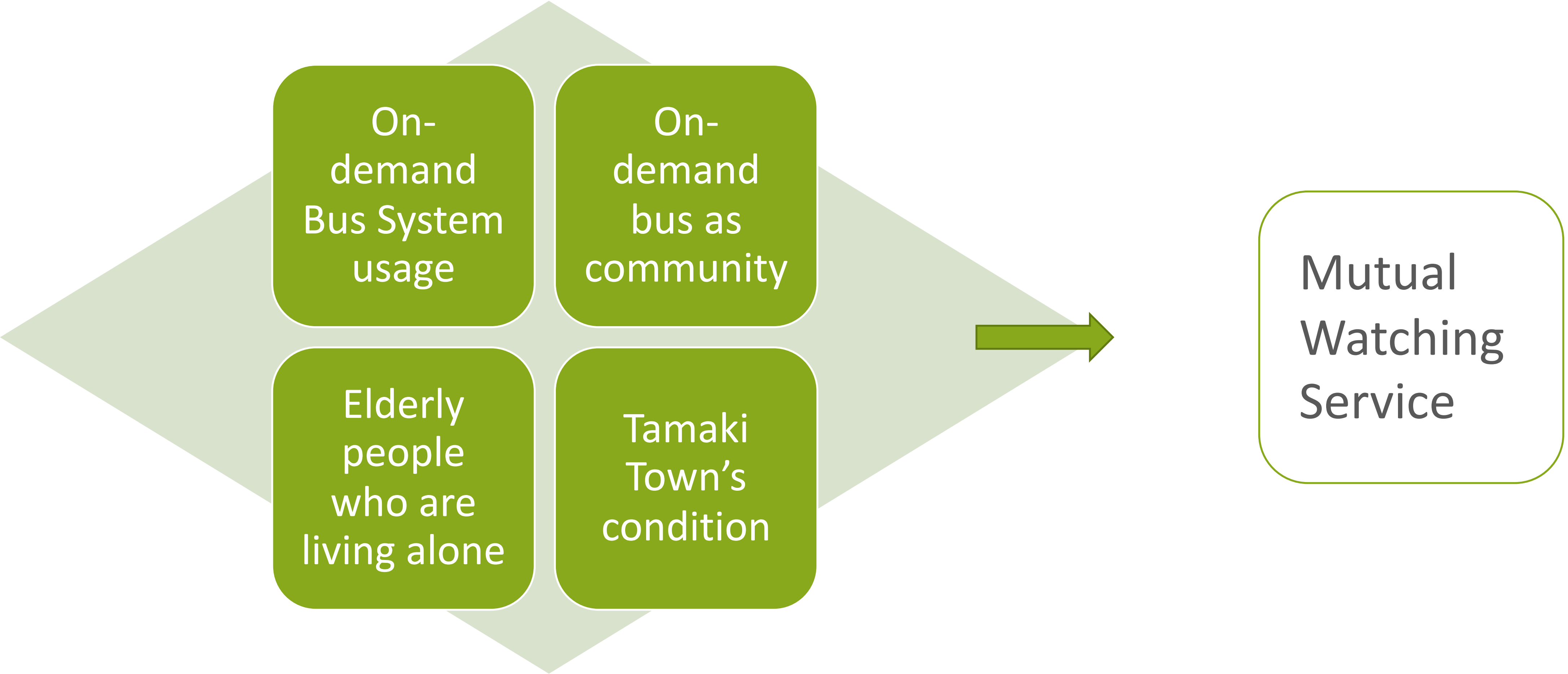
資料：東京都監察医務院「事業概要」

②（独）都市再生機構における「孤立死*」の発生状況



＊（独）都市再生機構が運営管理する賃貸住宅で、単身居住者が誰にも看取られることなく、賃貸住宅内で死亡した件数

BACKGROUND



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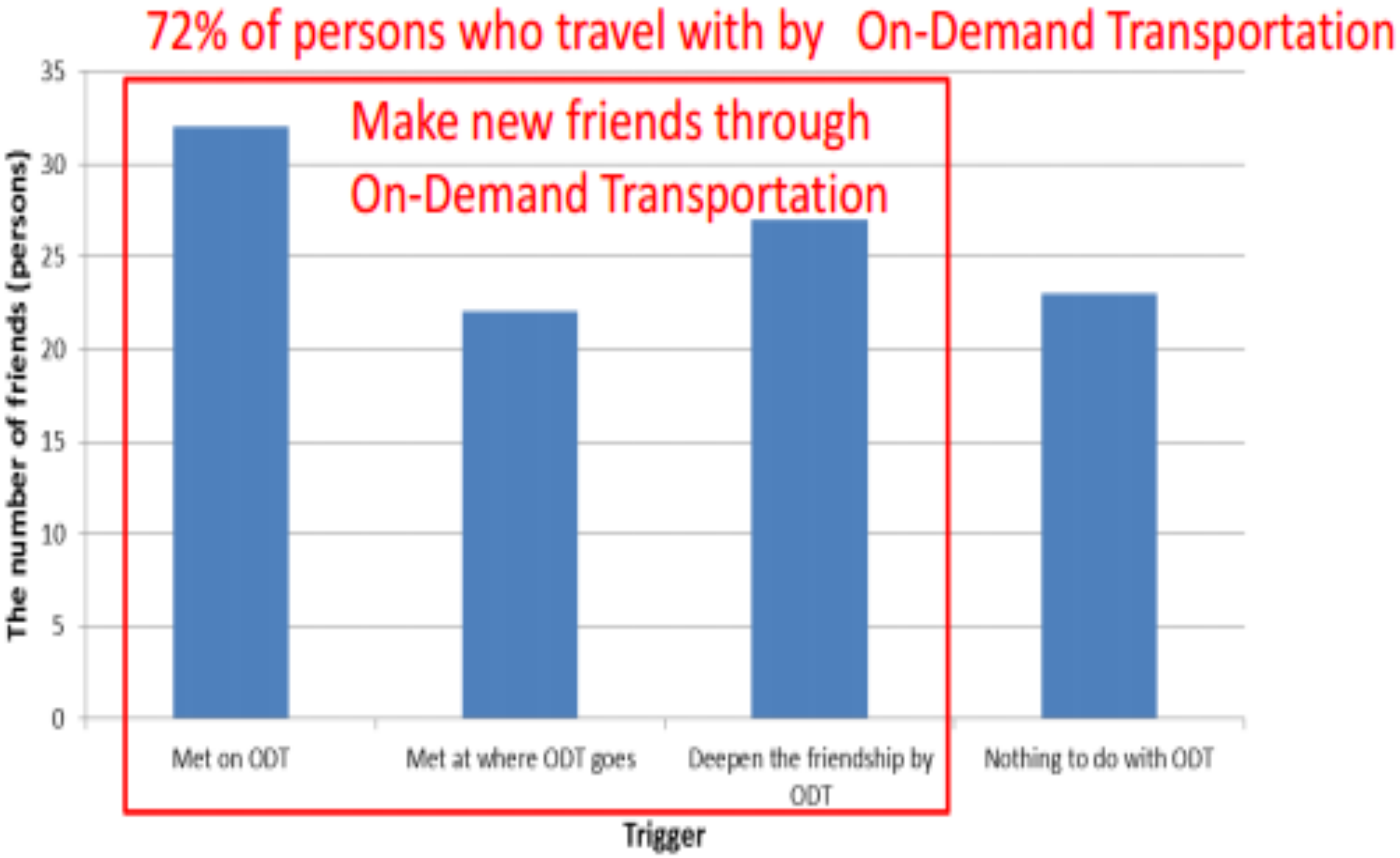
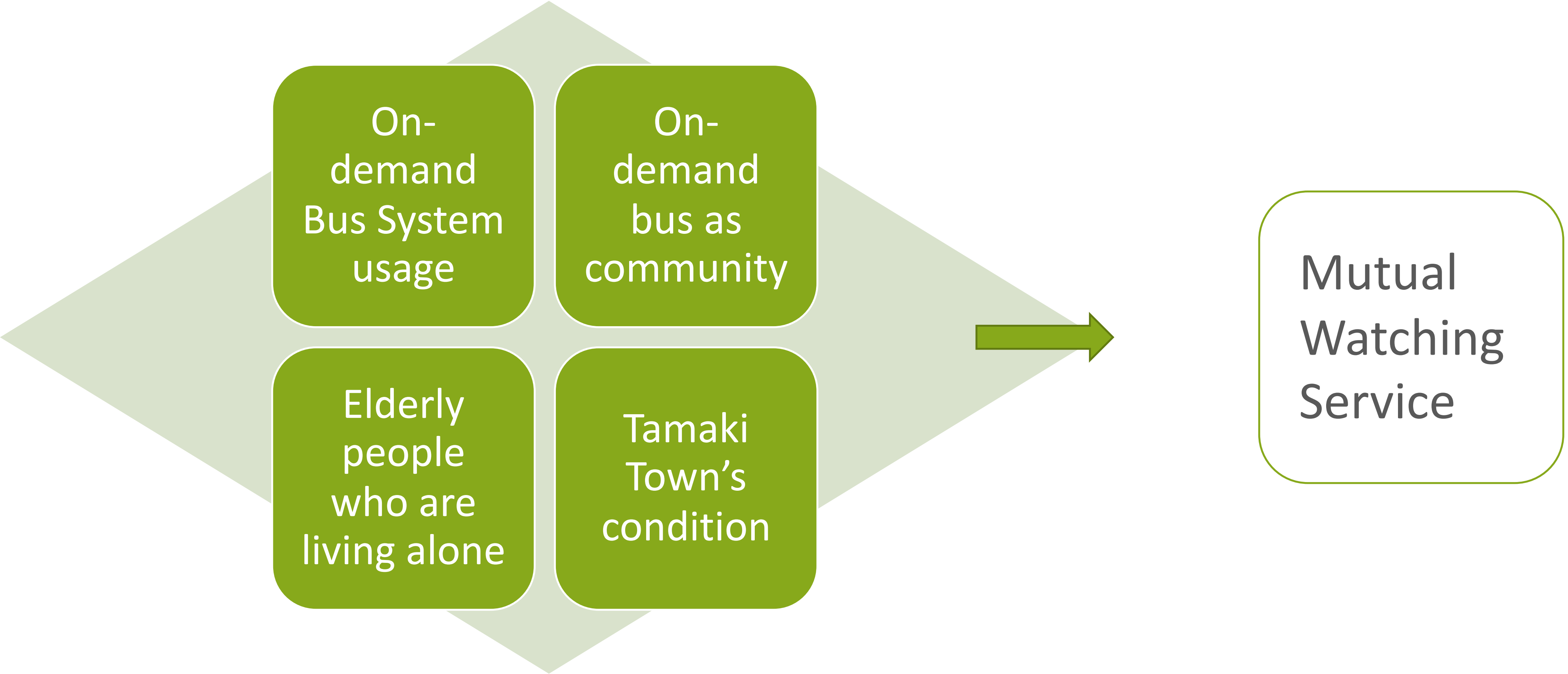
ON-DEMAND BUS AS COMMUNITY

Extract social network and life pattern from log data and analysis together with questionnaire and interview


72% of persons who travel with by On-Demand Transportation

Make new friends through On-Demand Transportation

BACKGROUND



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TAMAKI TOWN’ S CONDITION

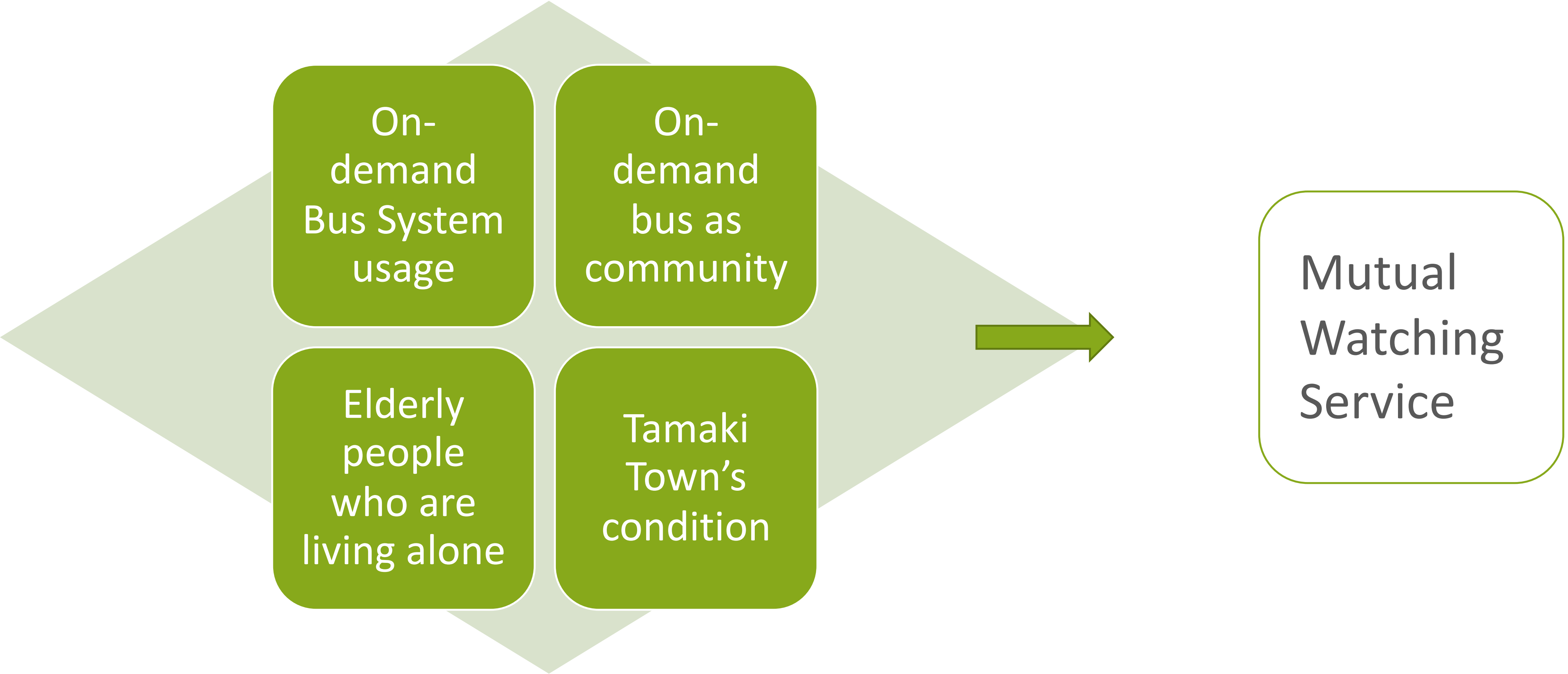
- 1,426 total ODB users
- 258 active elderly users (age ≥ 70, consecutive usage ≥ 4 weeks)
  - A user will be counted as active AFTER they have used ODB for 4 consecutive weeks.
  - 45 males (17%), 213 females (83%)
  - Most common age range: 80-85 years old (38%)
  - 20 people (8%) are disabled or need help/wheelchair.
- 13 weeks, from April 2016 to July 2016

多気
伊勢CC
参宮線
外城田
530
田丸
玉城町
13
宮川
169
38
大日山

TAMAKI TOWN'S CONDITION

- Elderly watching service

BACKGROUND



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OBJECTIVE & SCOPE

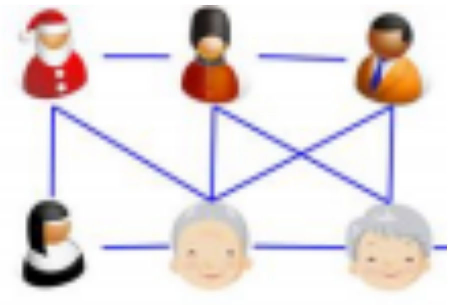
- to reduce the risk that some elderly people cannot handle their health condition by themselves
    - Recommend people who has similar life pattern by analyzing log data
    - Provide mutual watching service (leave message, get contact information, people with similar life pattern will notice abnormal situations more rapidly)

OBJECTIVE & SCOPE

- to reduce the risk that some elderly people cannot handle their health condition by themselves
  - Recommend people who has similar life pattern by analyzing log data
  - Provide **mutual watching service** (leave message, get contact information, people with similar life pattern will notice abnormal situations more rapidly)

WHY MUTUAL?

- Users with similar life pattern have much higher chance to meet frequently
- Users with similar life pattern can help with each other
- This can be more efficient and easier than accepting help from officers if something goes wrong with health conditions



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METHOD

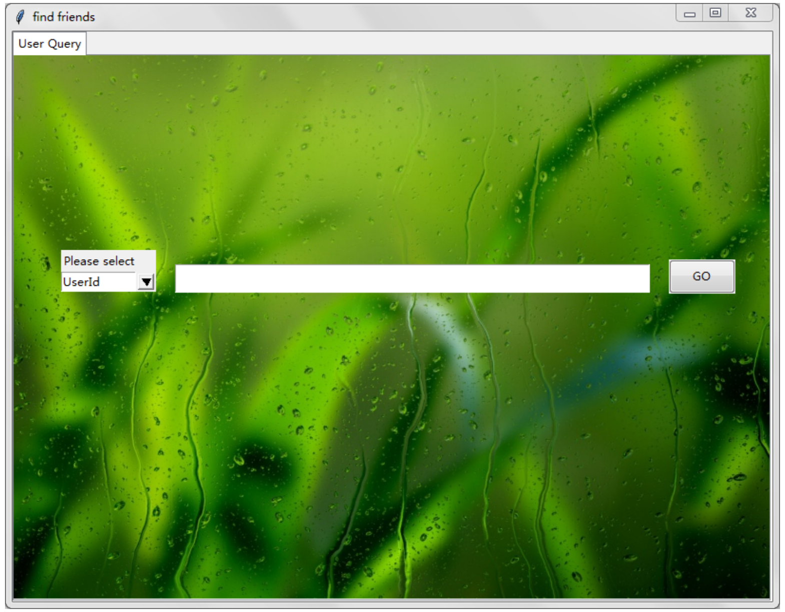
- Build a system to make users communicate more with each other during the bus
- Recommend people who has similar life pattern (based on log data)
- Inform other users about one particular user’ s health condition (based on log data)

BUILD A NEW SYSTEM

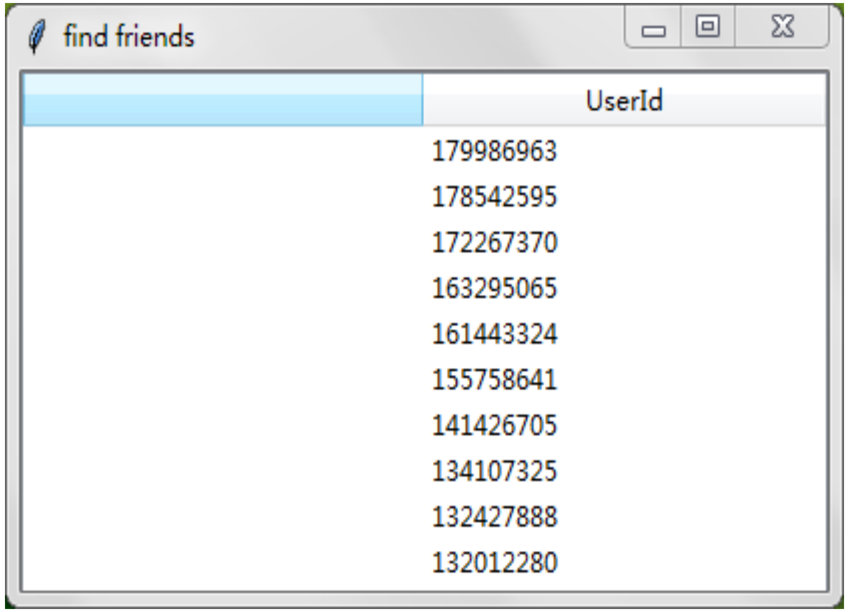
- Provide mutual watching service
- In python 3.4 (Django 1.9), deployed by IBM bluemix
- http://odtsystem.mybluemix.net

RECOMMEND PEOPLE

- Analysis log data (User ID, Age, Departure and arrival bus stop, Bus stop categories, Departure and arrival time)
- extract pairs who traveled together (MS Excel2013), create recommendation between pairs who move together over five times:



Please select
UserId



	UserId
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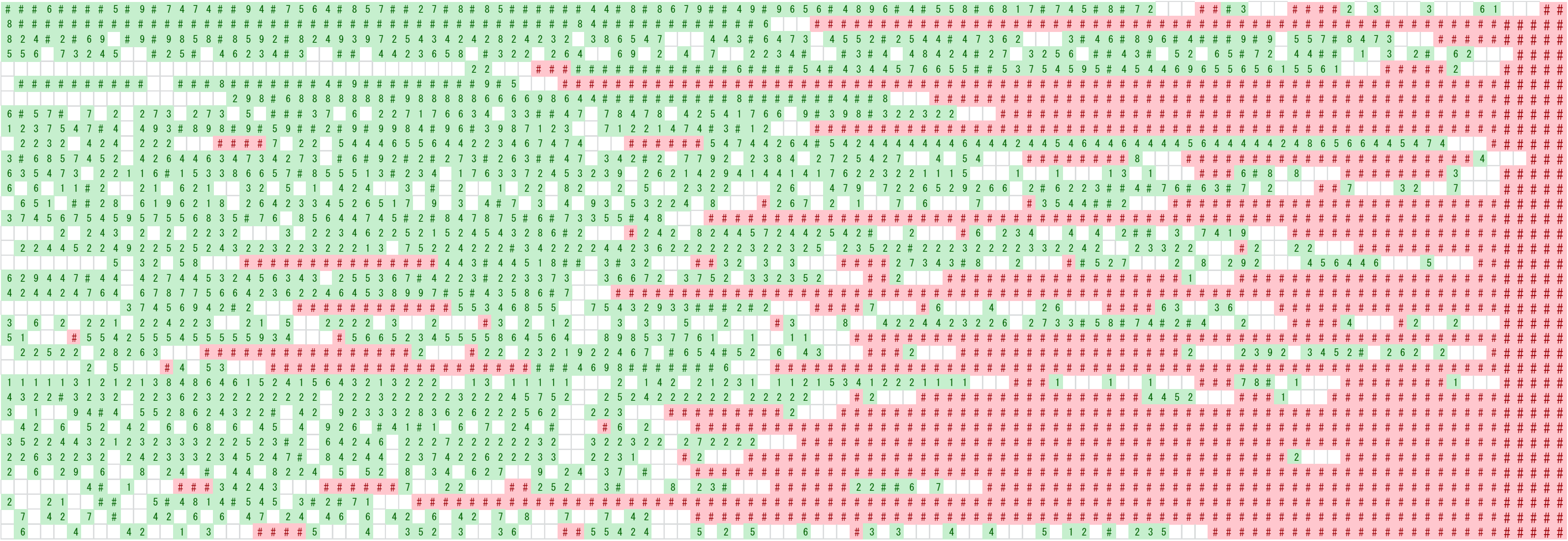
	178542595
	172267370
	163295065
	161443324
	155758641
	141426705
	134107325
	132427888
	132012280

INFORM PEOPLE

- Analysis log data (User ID, Age, Departure and arrival bus stop, Bus stop categories, Departure and arrival time)
- Inform: detect users who stop using ODT system for more than 4 weeks and inform other users who share the similar life pattern

INFORM PEOPLE

- If an active elderly ODB user stops using ODB for more than 4 weeks, there is a significant chance (> 20%) that he will never use it during the next 3 months.
- detect users who stop using ODT system for more than 4 weeks and inform other users who share the similar life pattern



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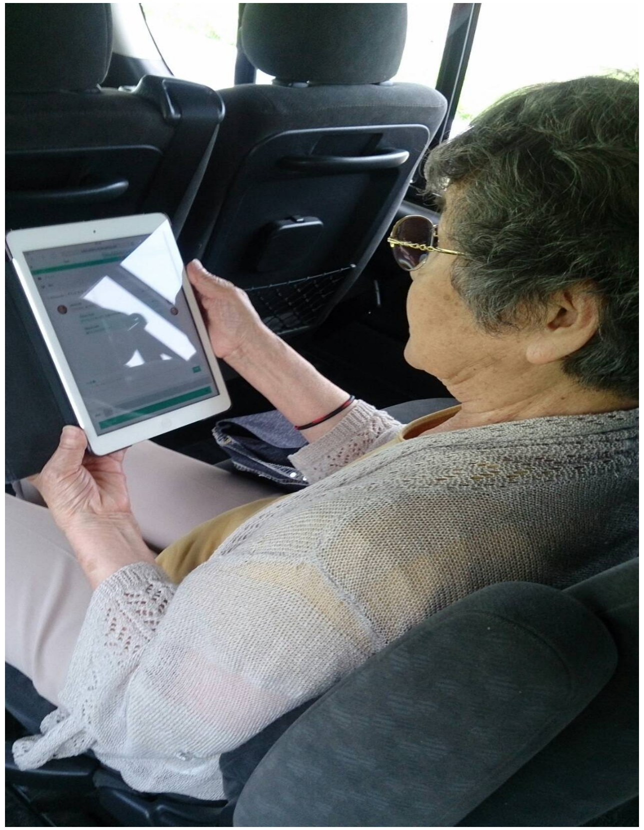
TAMAKI TOWN’ S TRIP

TAMAKI TOWN’ S TRIP

- To test the system
- To investigate the IT using conditions in Tamaki Town
- To show the work to local government

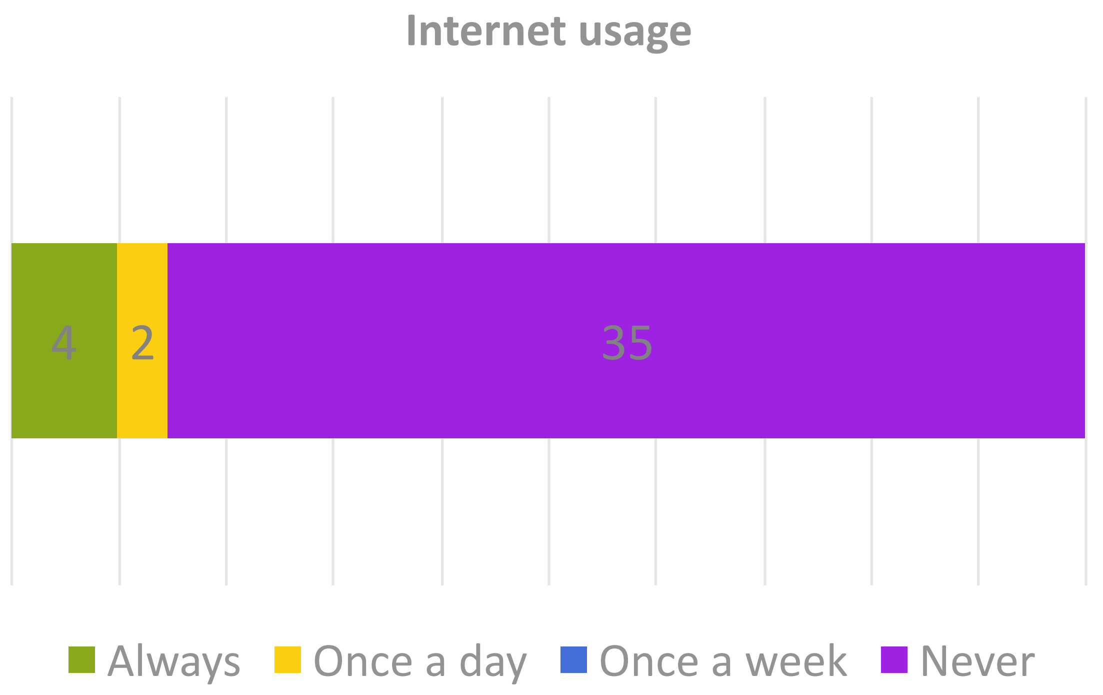
TAMAKI TOWN’ S TRIP

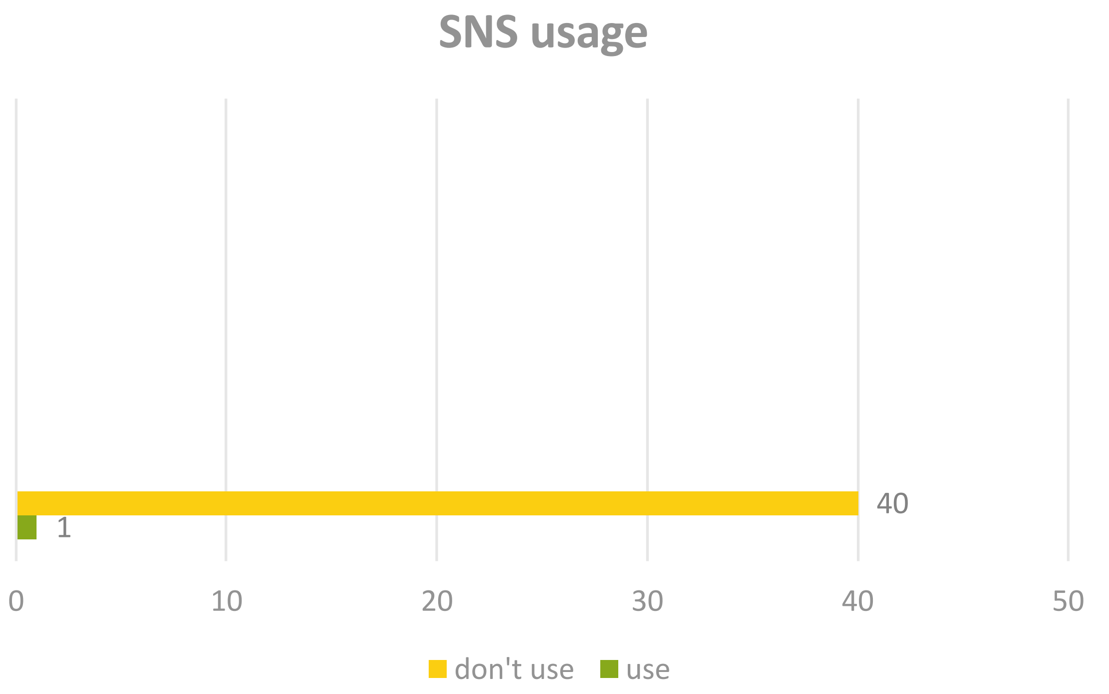
- The system run well during the trip



TAMAKI TOWN’ S TRIP

- Investigation results in Tamaki Town





TAMAKI TOWN’ S TRIP

- To show the work to local government

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DIFFICULTIES & PROBLEMS

- Not everyone has smartphone or pad or something alike
- People may not care about strangers
- People don’t feel like typing, reading, writing during the bus.

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FUTURE WORK

- Make the system run more smoothly
- Overcome the problem that elderly people are not used to IT system

ACKNOWLEDGMENT

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THANK YOU FOR YOUR ATTENTION