Midterm Presentation

TEAM B
김준서
임승현
정종현
최지훤

1

Team Introduction

1 Team Introduction

- Roll of Each Member

최지훤(Choi Jihwon): single page application 구현, basic layout 구현 및, API 연동

김준서(Kim Junseo): Frontend layout 작성, User, Admin 관련 기능 구현 및, flask, react 연동

임승현(Lim Seonghyeon): 로봇 내 computer vision 관련 DL 및 로봇 navigation 구현

정종현(Jeong Jonghyeon): 로봇환경 작동환경 구축 및 서버-로봇 연동 및 로봇 관련 API

*추후 작업에서, 변동 및 추가 가능

- Objectives ו Member

Objectives

- Elder people can take a walk with robot to relieve the stress of nursery.
- Robot can recognize emergency situations.

1 Team Introduction

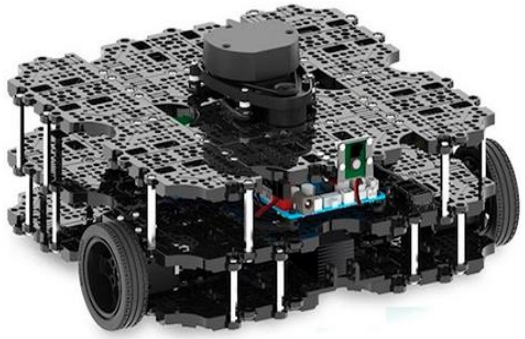
- Milestone

part	function	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
Robotics	로봇 시뮬레이션 설정										
	로봇 센서 설정										
	로봇 Navigation 설정										
	로봇 actor plugin 개발										
Deep learning	OpenPose Pose 감지										
	물체(사람)탐지 모델 개발										
	실시간 물체 깊이 정보 추출										
	산책 주행 알고리즘 개발										
	백앤드 서버와 연결										
	사람간 판별 기능 구현										
front end	레이아웃 작성 - 피그마										
	로그인 기능 구현										
	레이아웃 구현										
	api 접속 테스트										
	api 활용한 기능 구현										
	알람 기능 구현										
	버그 수정 및 보수										
Back end	Database/Storage 연결										
	로봇의 카메라 정보 전송										
	로봇과 서버 연결										
	목적지 전달하는 API										
	login, register										
	member_info 수정										
	react - flask 연동										

1 Team Introduction

- Structure

Robot



Navigation

Pose Estimation

Object Detection

Front-End

React

Member Management

Single page application

Linking API

Linking FE, BE

Back-End

aws

Member Management Function

Robot Control API

Storage / Database

Server based robot

2

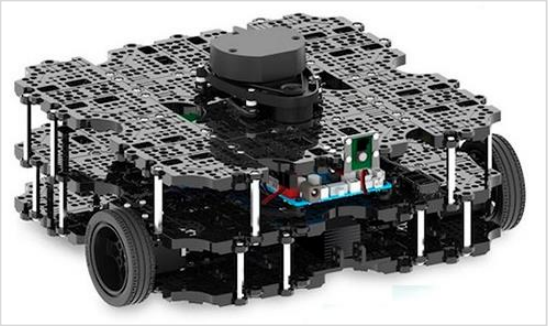
Robotics

2 Robotics

- Real time RGB-Depth detection
- Pose Recognition for emergency detection
- Strolling assistant- interaction with human

2 Robotics

- Environment



Hospital Map in Gazebo Simulator and Turtlebot3

- Actor Controller

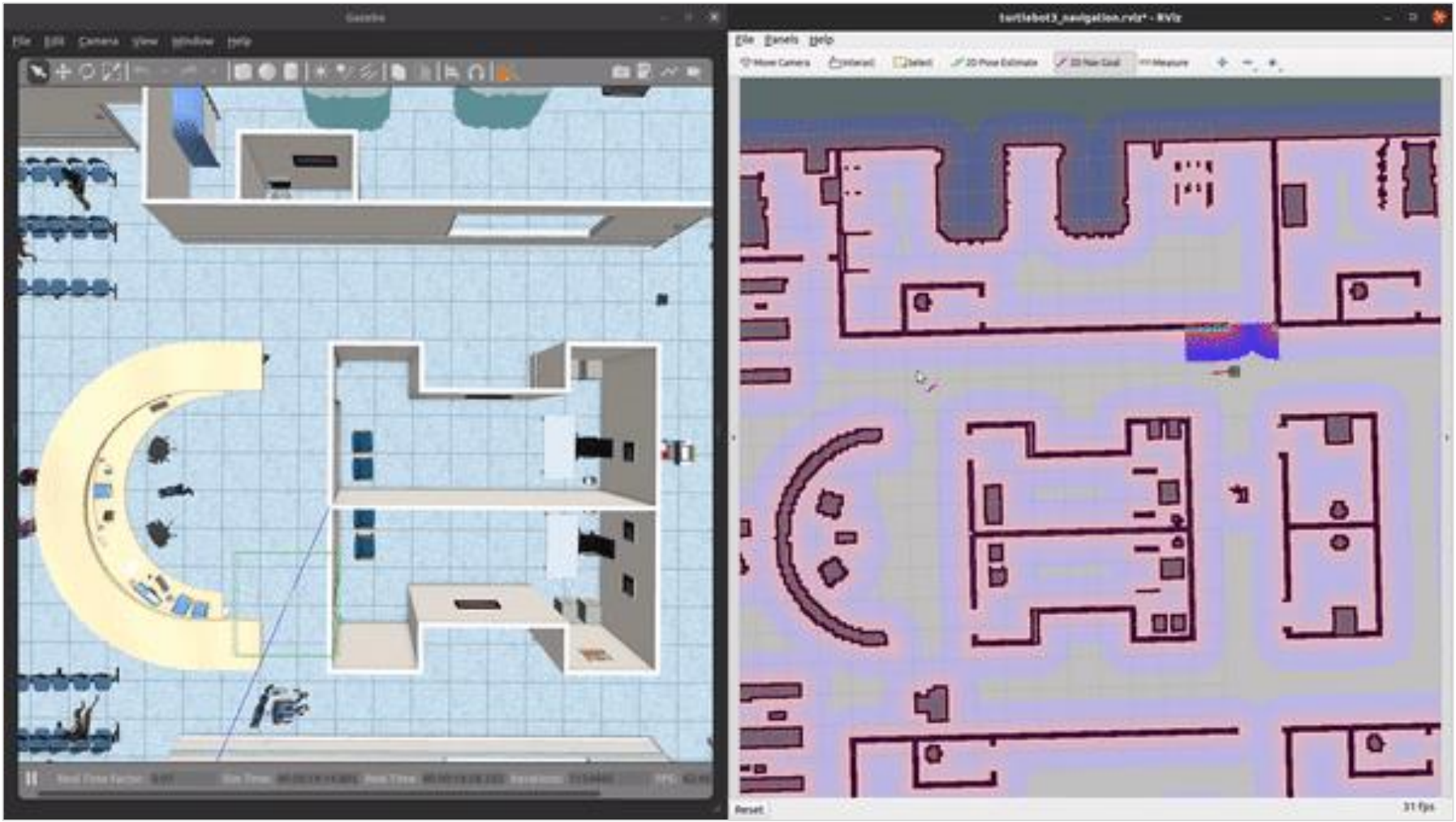
Walking

Rotating

Falling Down

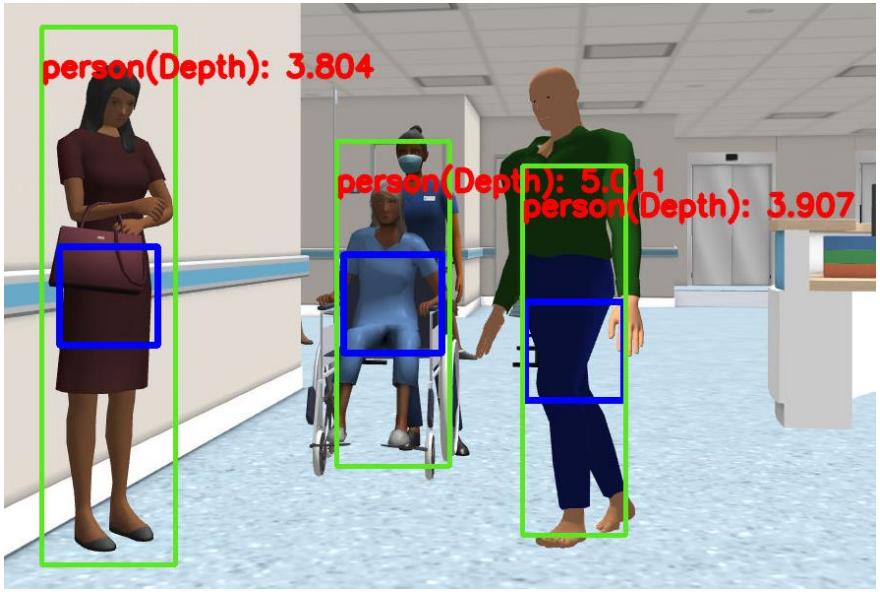
2 Robotics

- Navigation



- RGB-Depth estimation

Real-time object detection

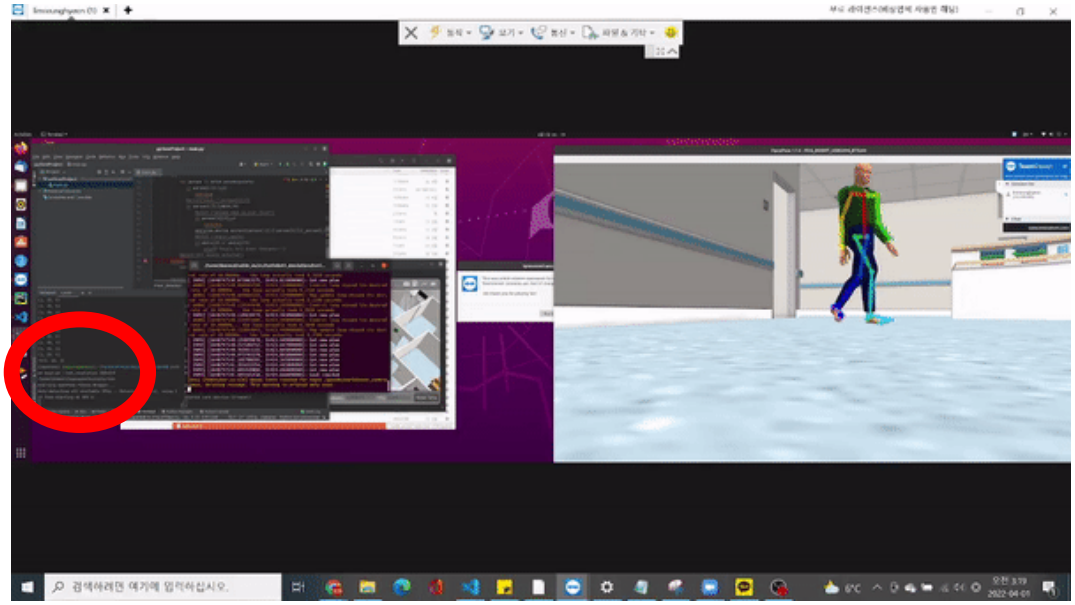


YOLO v3 with Coco dataset

yolov3_tiny.weight for speed, adjusting depth range

2 Robotics

- Pose Recognition for emergency detection



Emergency detection

→ Human fell down on the ground

Openpose: Detecting the pose of falling down by the position of the face and hips

Use Openpose Body 25 model

2 Robotics

- Strolling assistant (Development for the last week)

Strolling the predefined path with humans

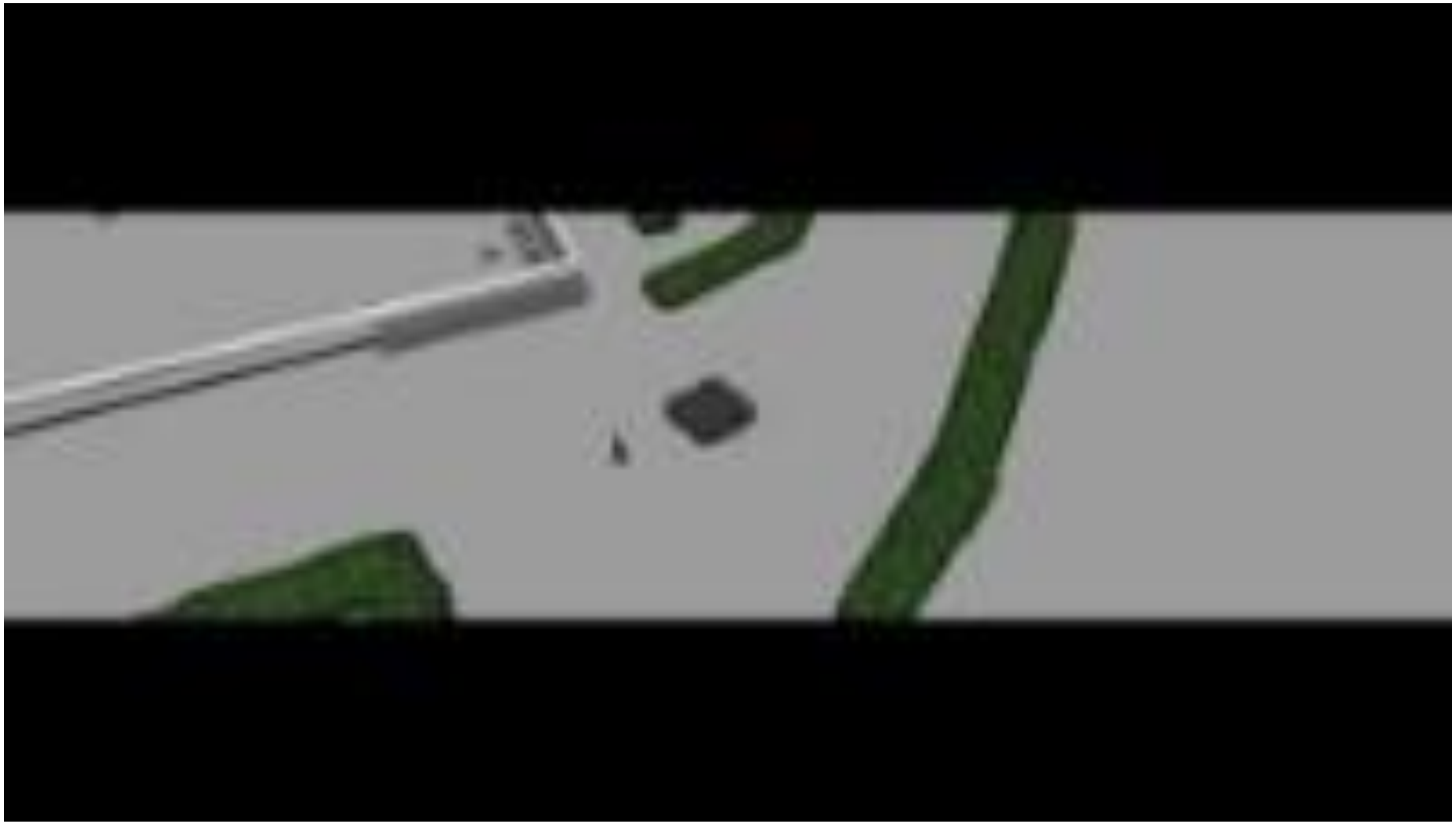
Always keep in eye on humans

Changing velocity with respect to the distance between human and a robot

If they goes too far. . . STOP and wait for humans!!

2 Robotics

- Video for Stroling Assistant



- **Limitations & Further possible improvements**

Imcomplete autonomous driving . . . Nav. Stack Parameters

Connect Robots to backends with API and finally implement services

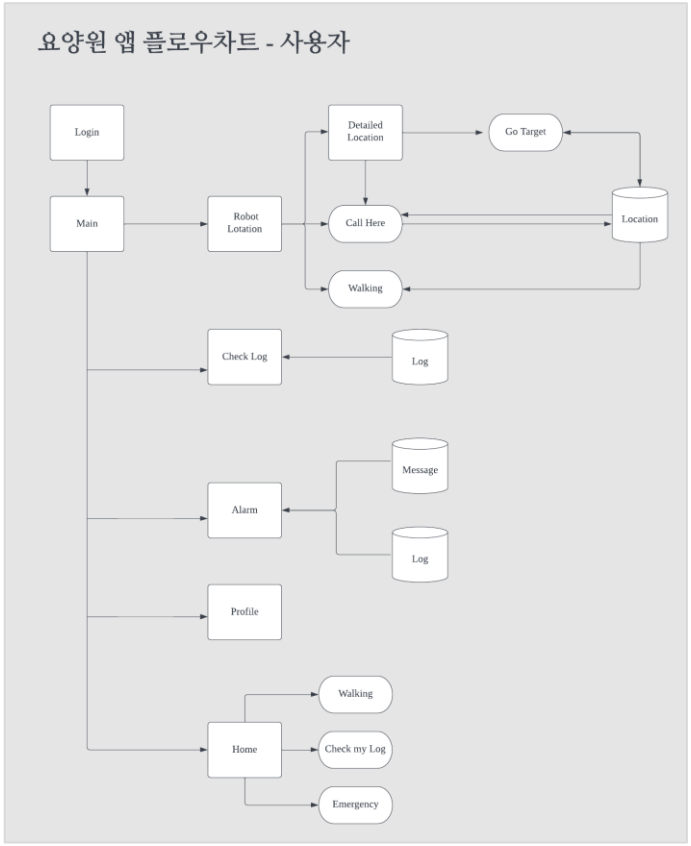
Subtask : Cannot distinguish between humans

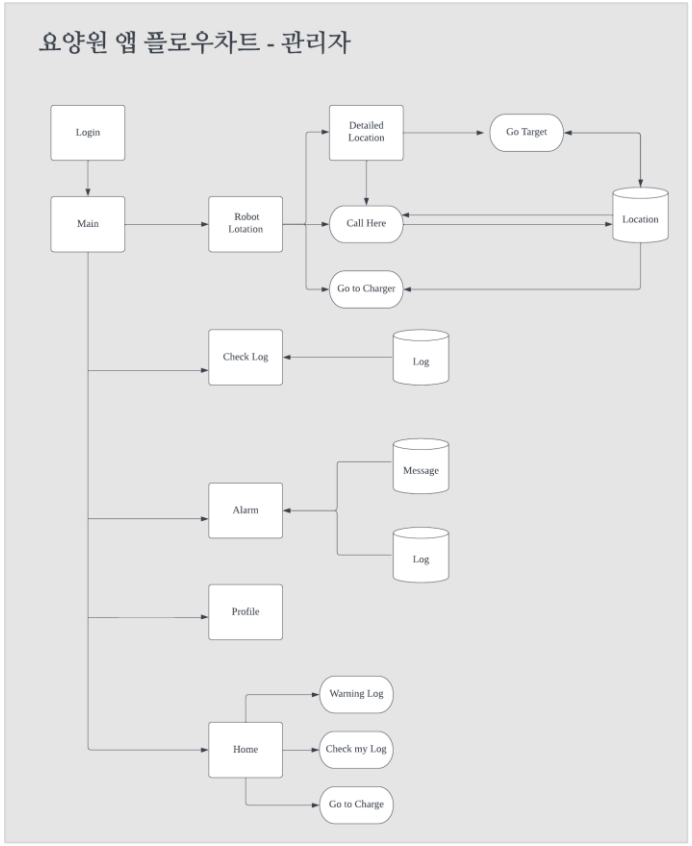
3

Front-End

3 Front-End

- Flow Chart

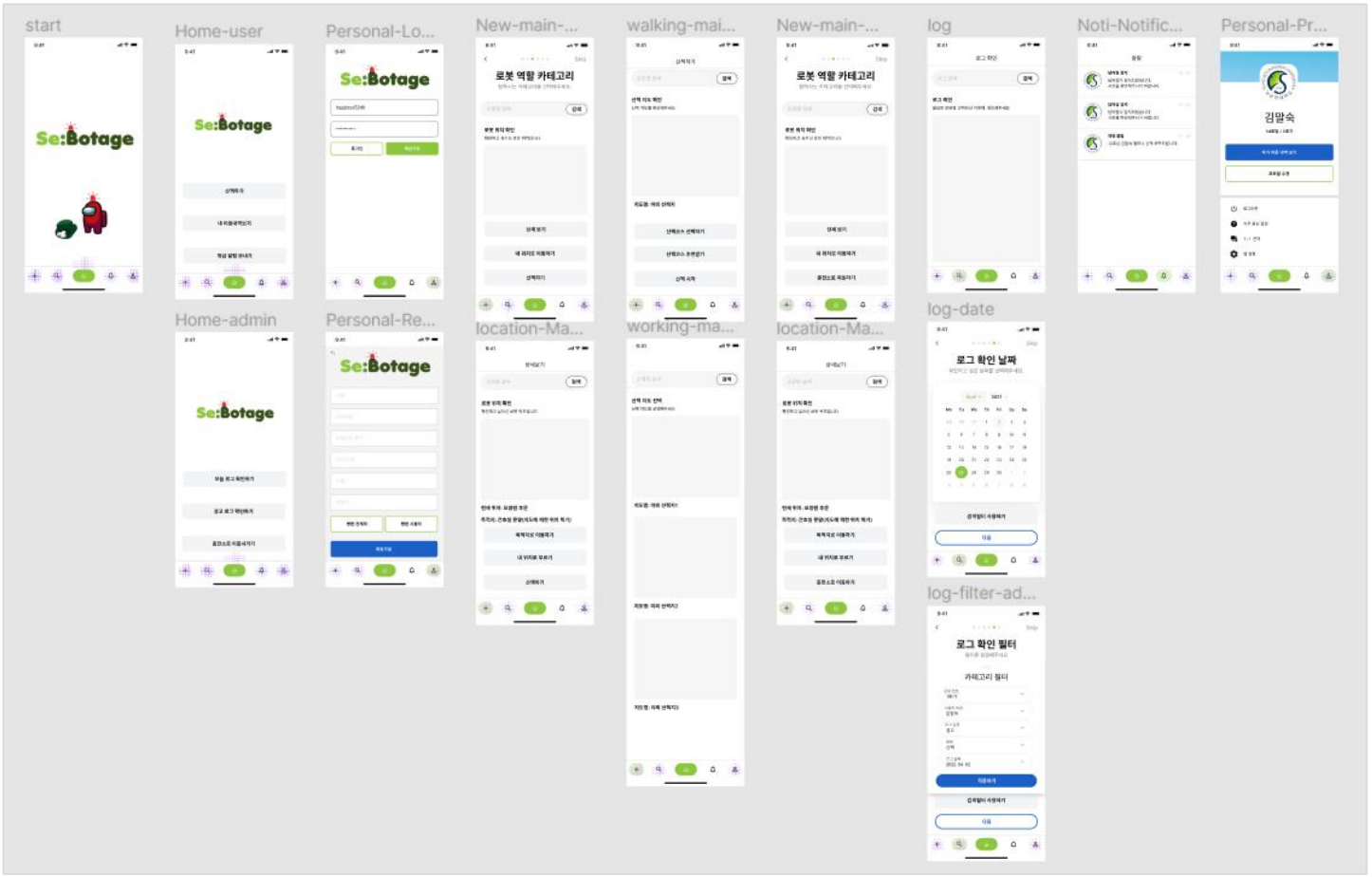




User and Admin Application Flow Chart

3 Front-End

- Figma – WebApp Design

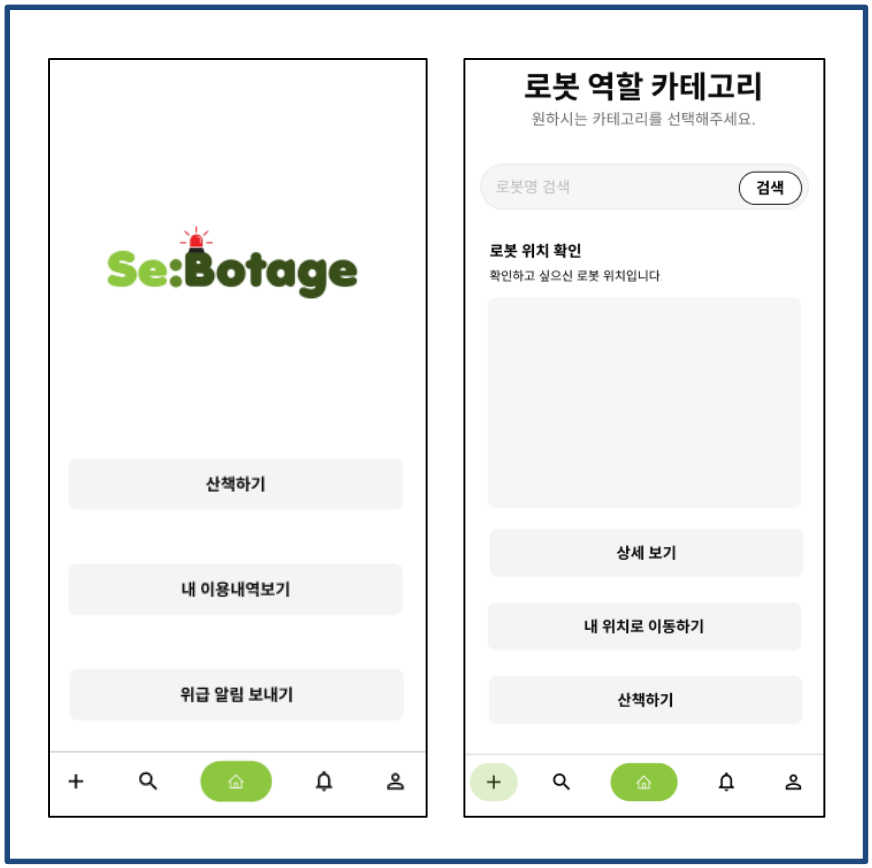


WebApp: **'Se:Botage'** Design with Figma

3 Front-End

- Web Application Goal

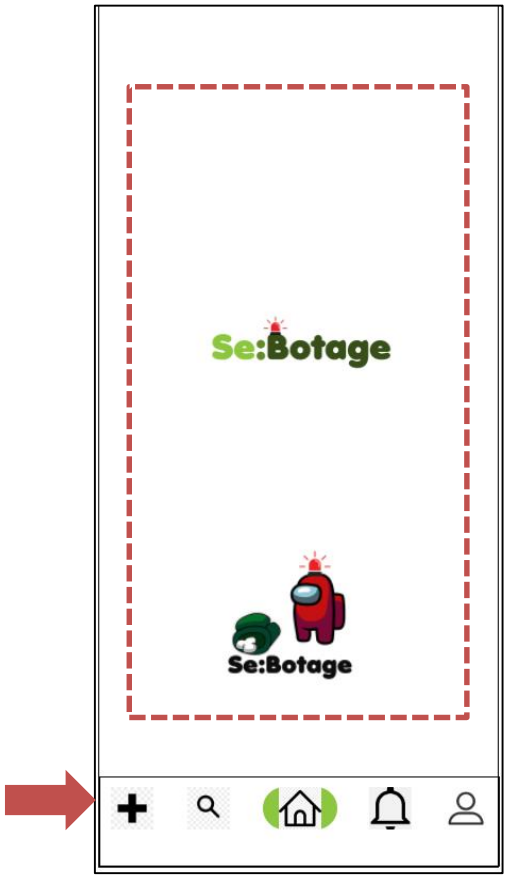
USER PAGE



ADMIN PAGE

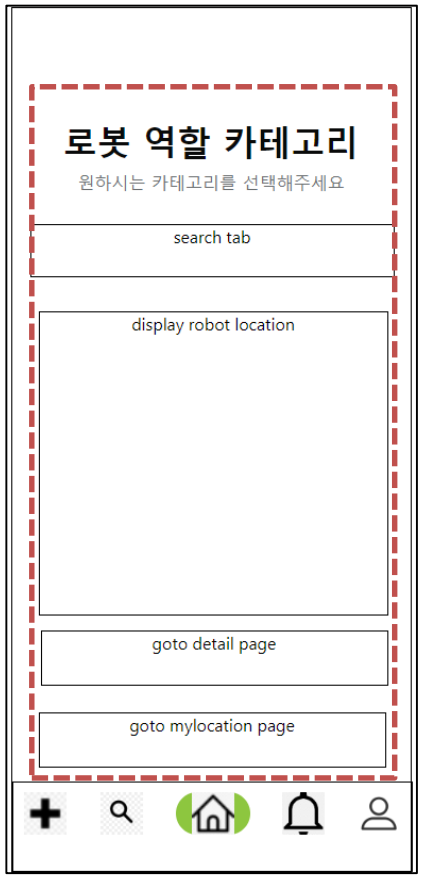
3 Front-End

- Single page application



Update only components

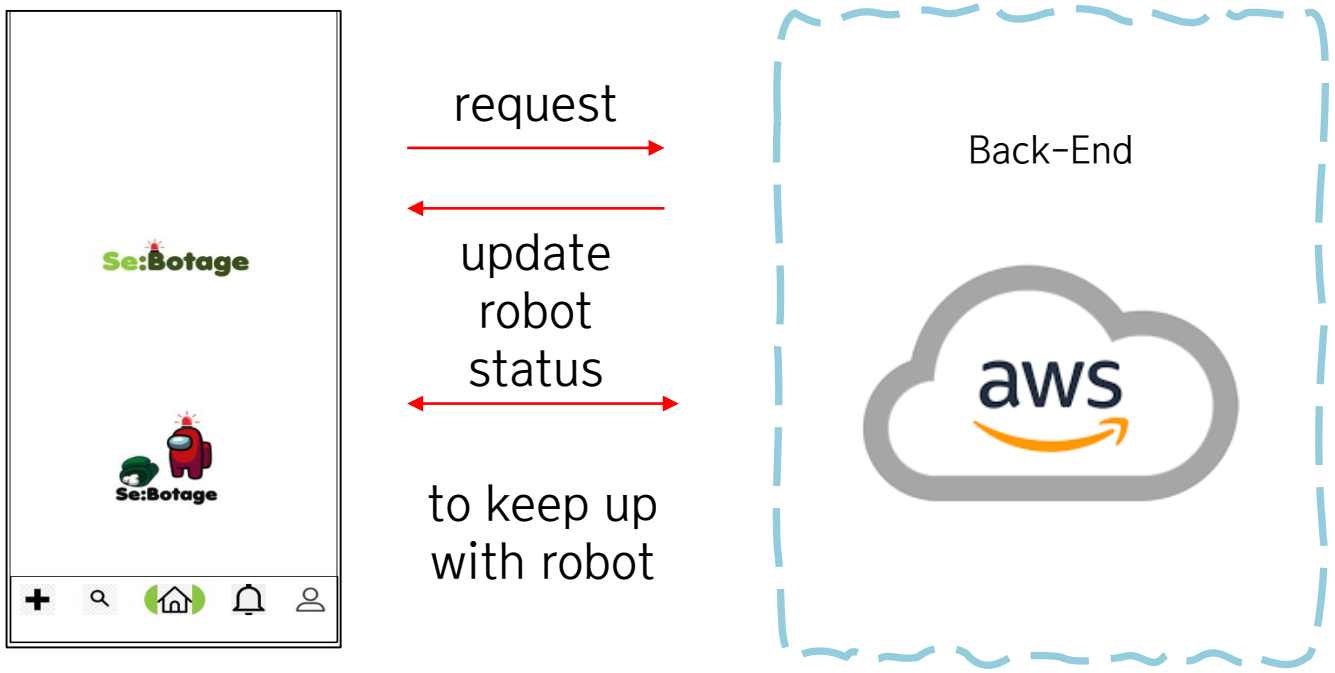
fast view rendering
without server request
without moving to other html



3 Front-End

- Rest API vs Websocket API

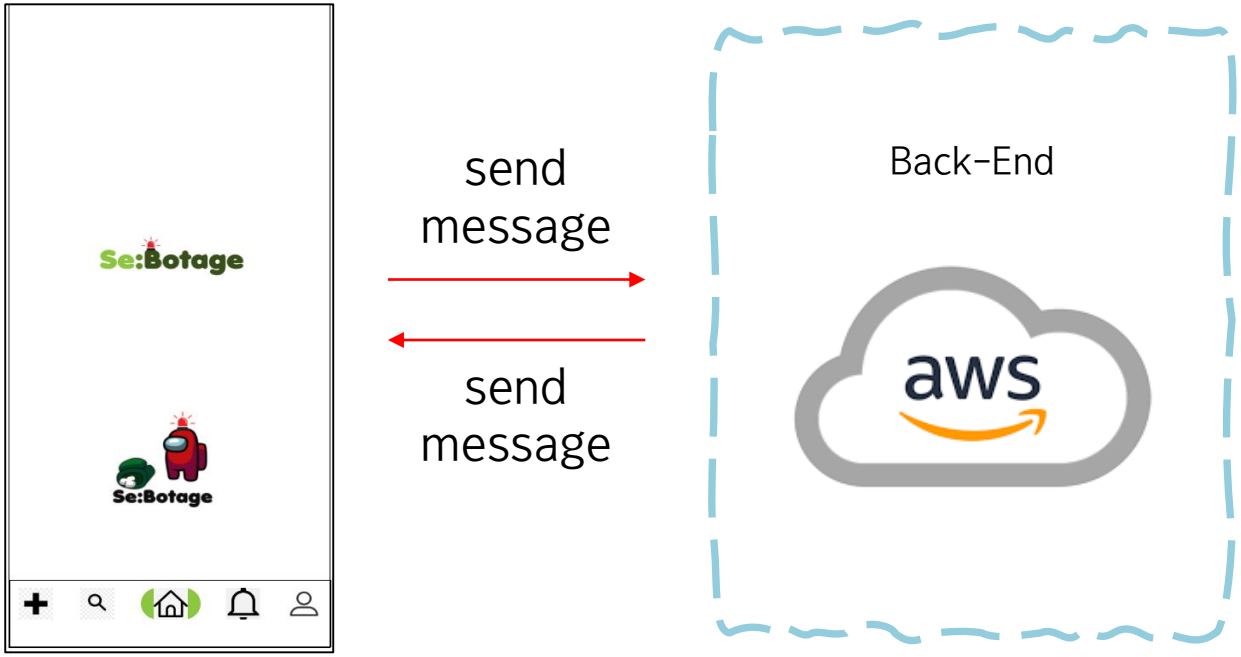
REST API (HTTP)



single response for single request
need continuous request for update location of robot
→ lots of server load

- Rest API vs Websocket API

WEBSOCKET API



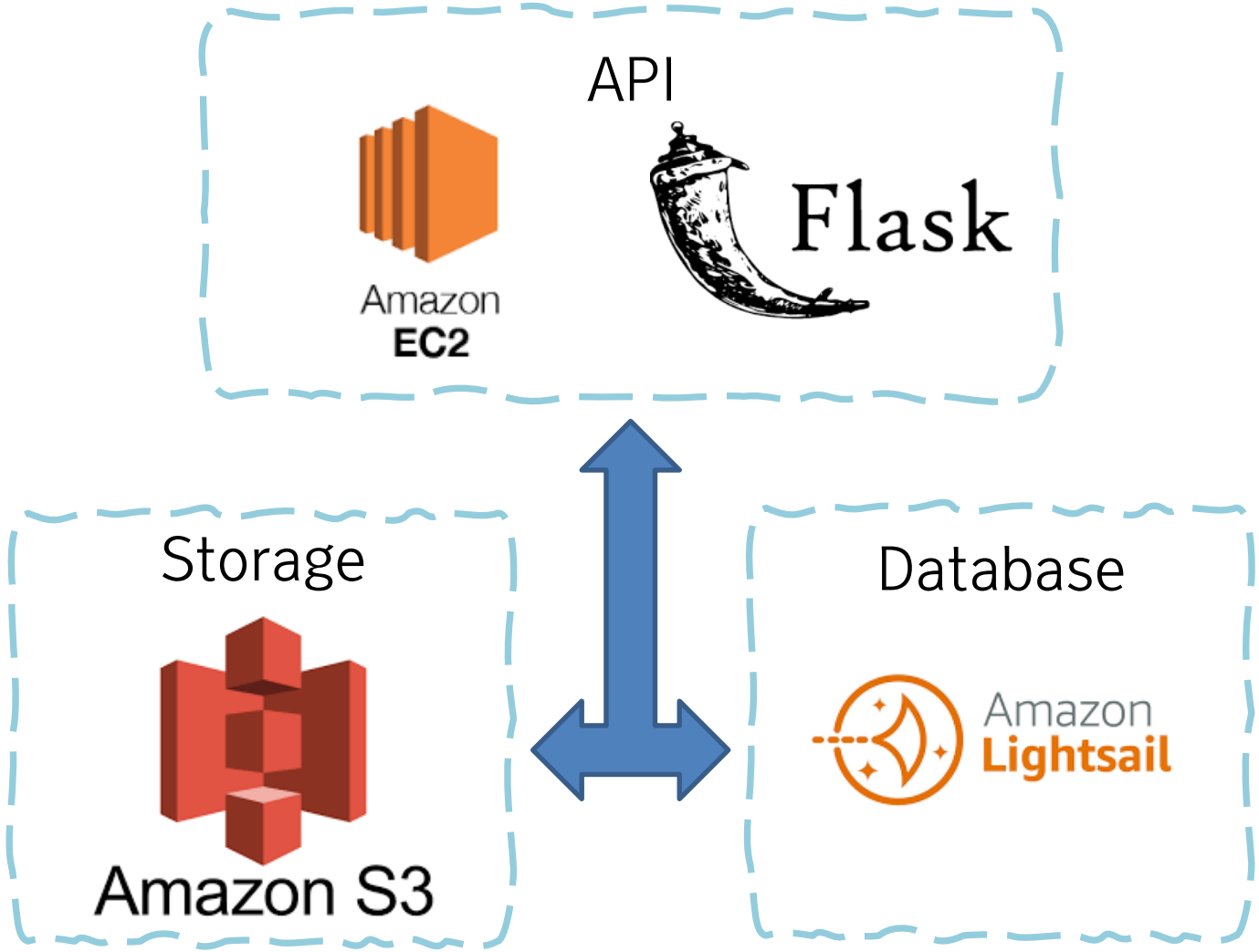
send message from both client and server → less server load

4

Back-End

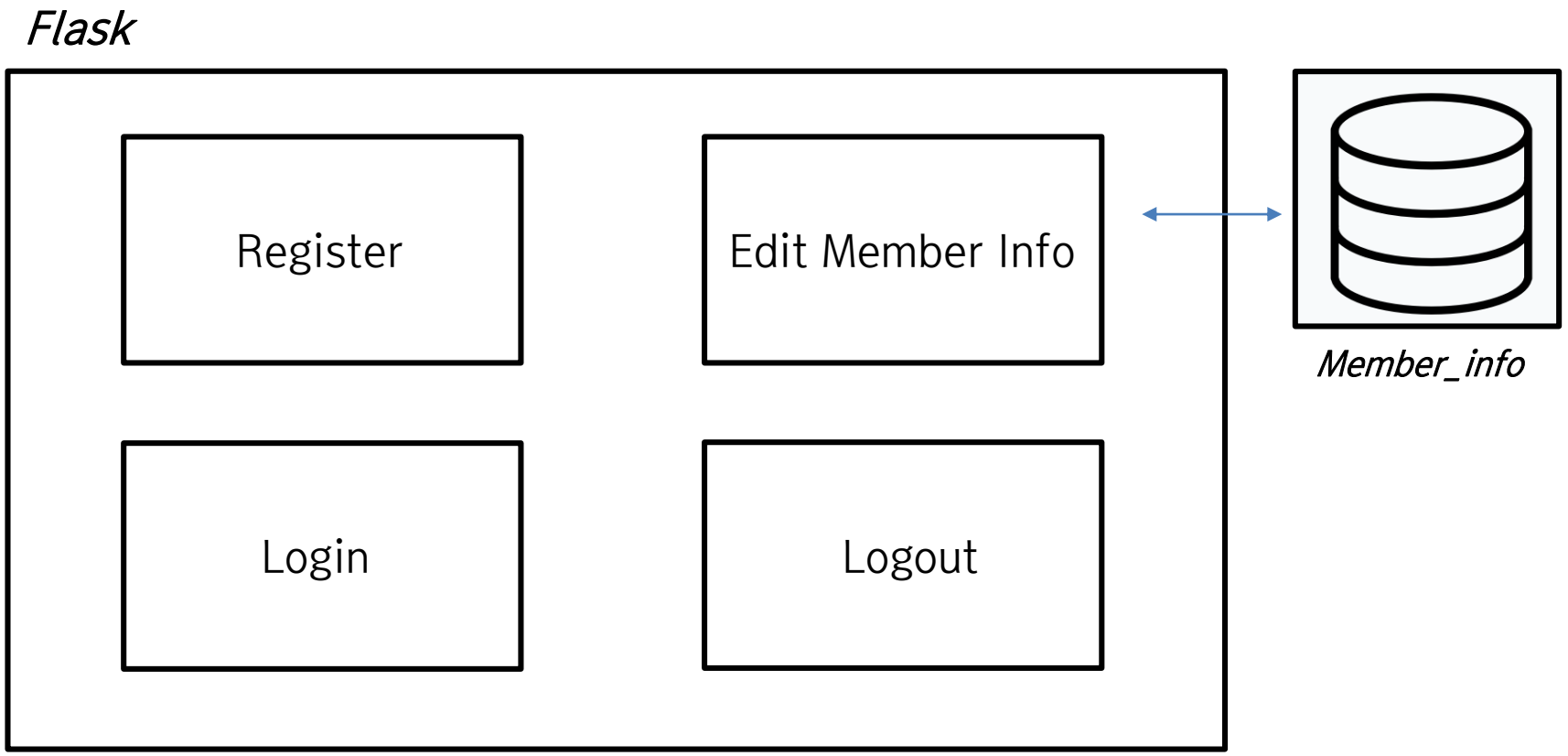
4 Back-End

- Storage / Database



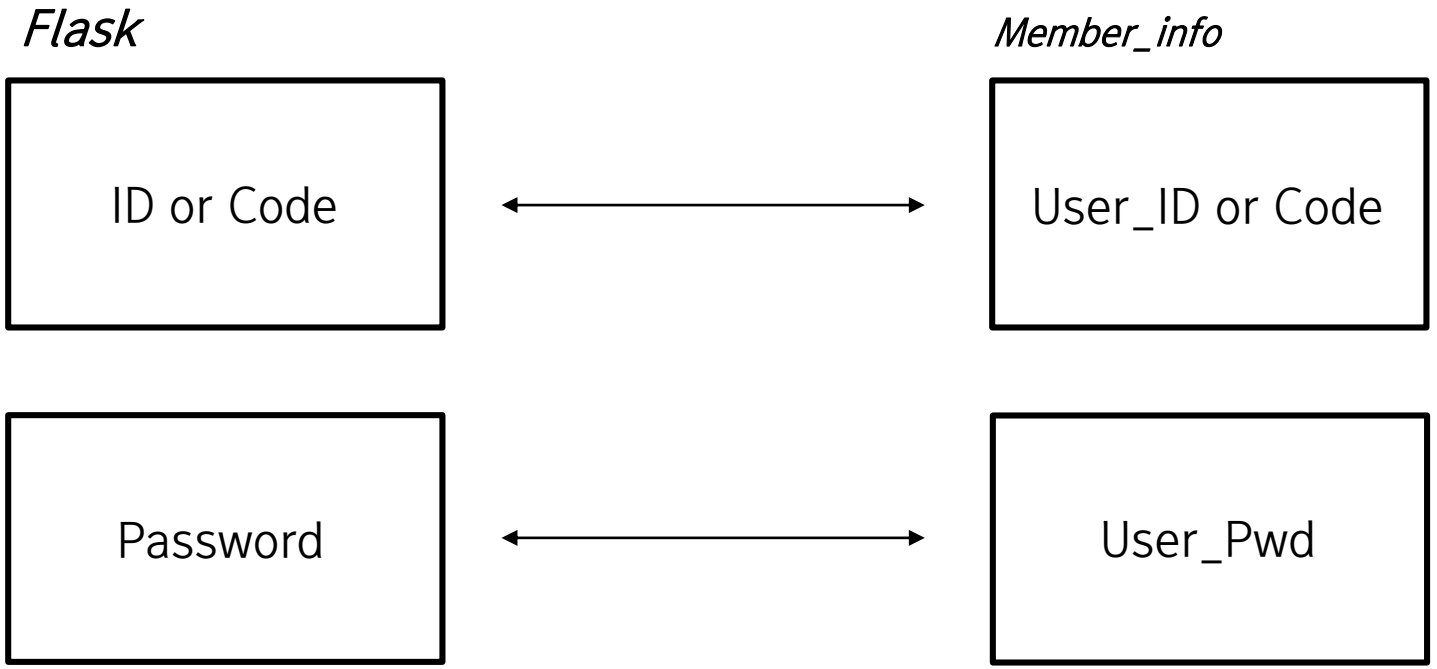
- Member Management

Back-End Member Management



- Member Management

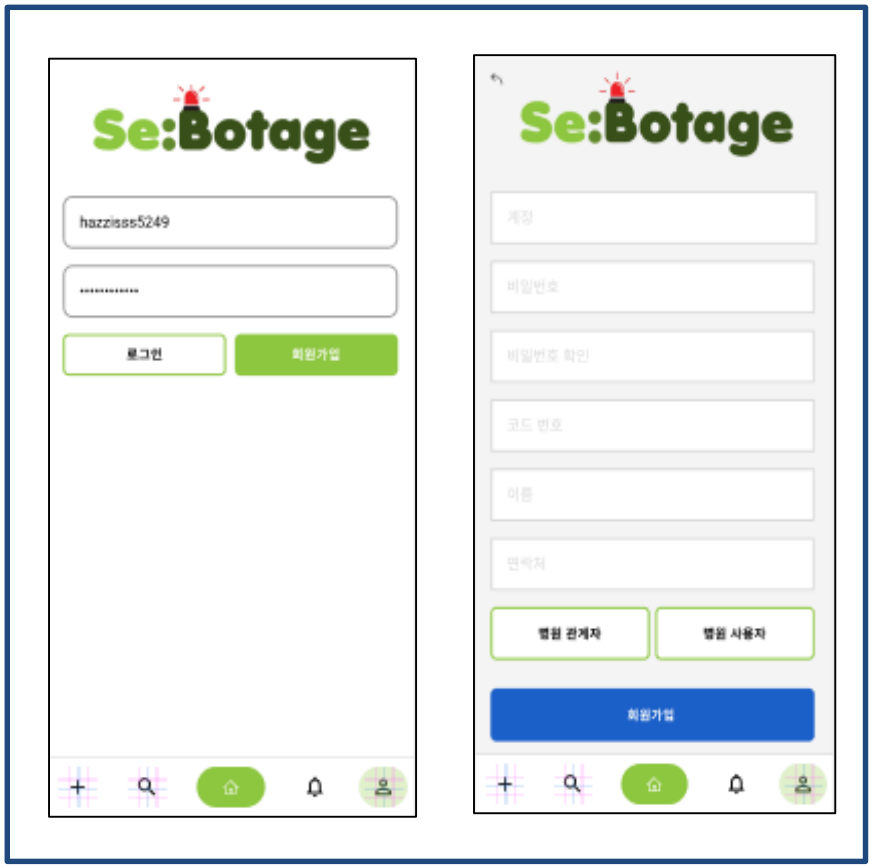
Back-End Login



4 Back-End

- Link Front-End and Back-End

Front-End



Back-End

Flask

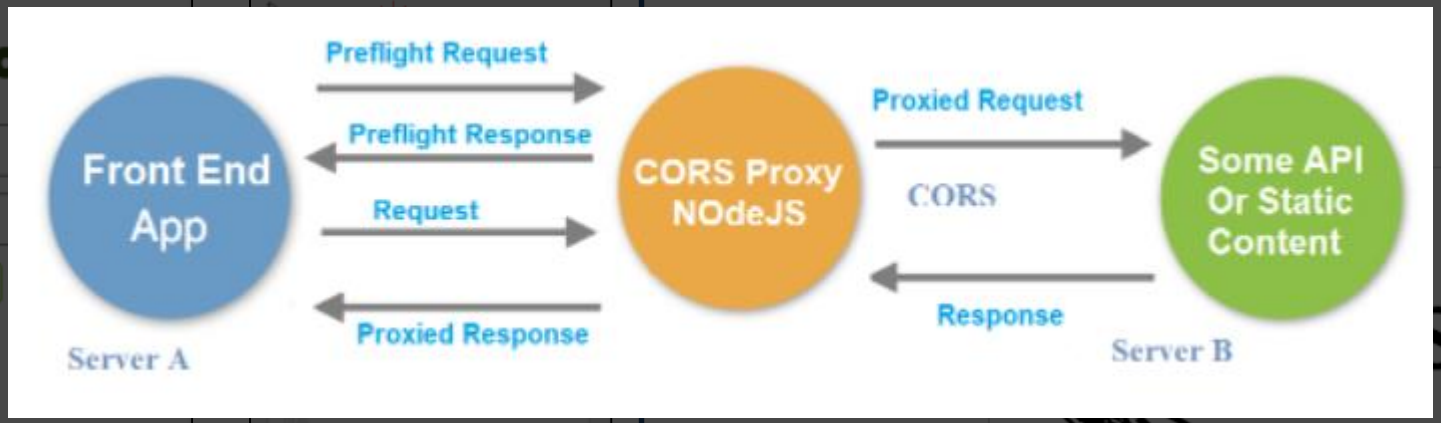
4 Back-End

- Link Front-End and Back-End

Front-End

“CORS Proxy”

Back-End



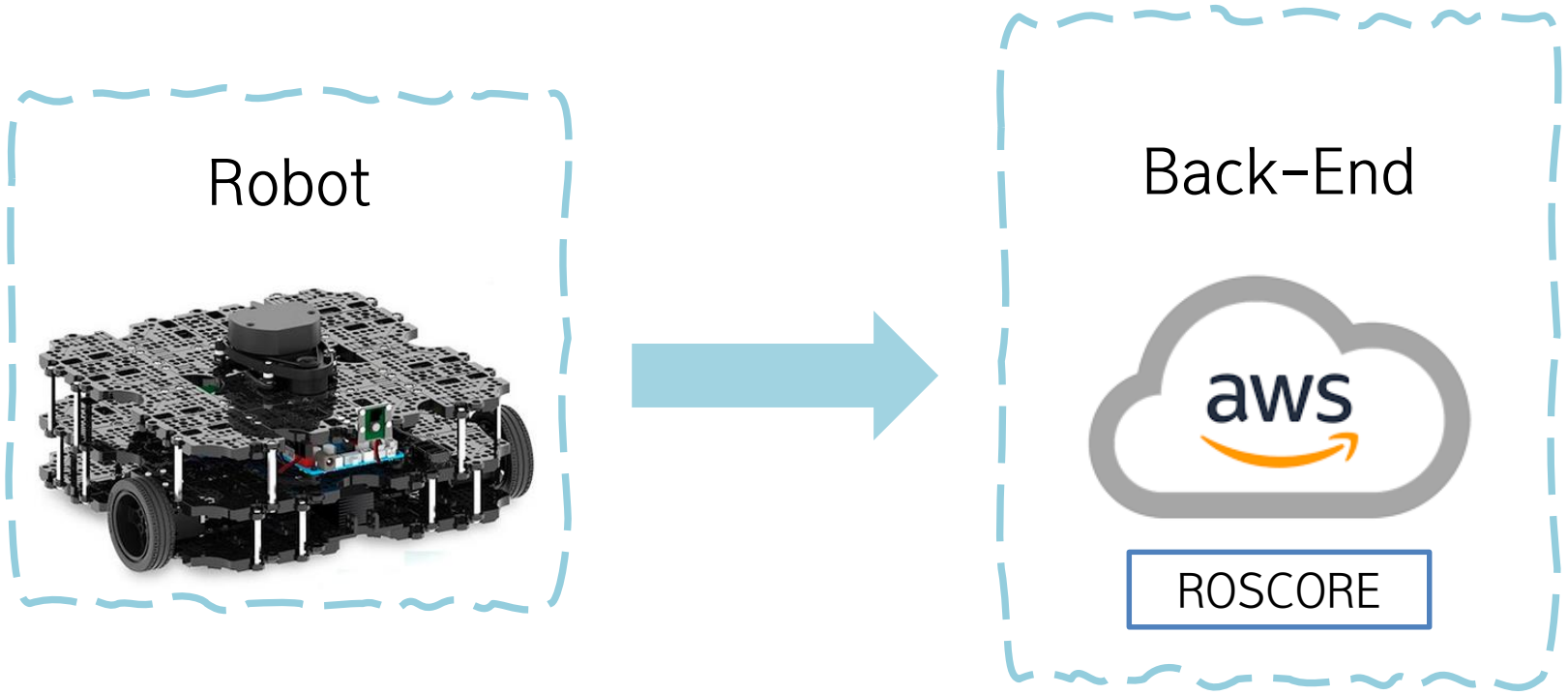
resources on the same address and on the same port → Okay

If you request a resource from another source, it is blocked by default for security reasons

→ Sending and receiving requests and responses through one proxy between servers in the request process

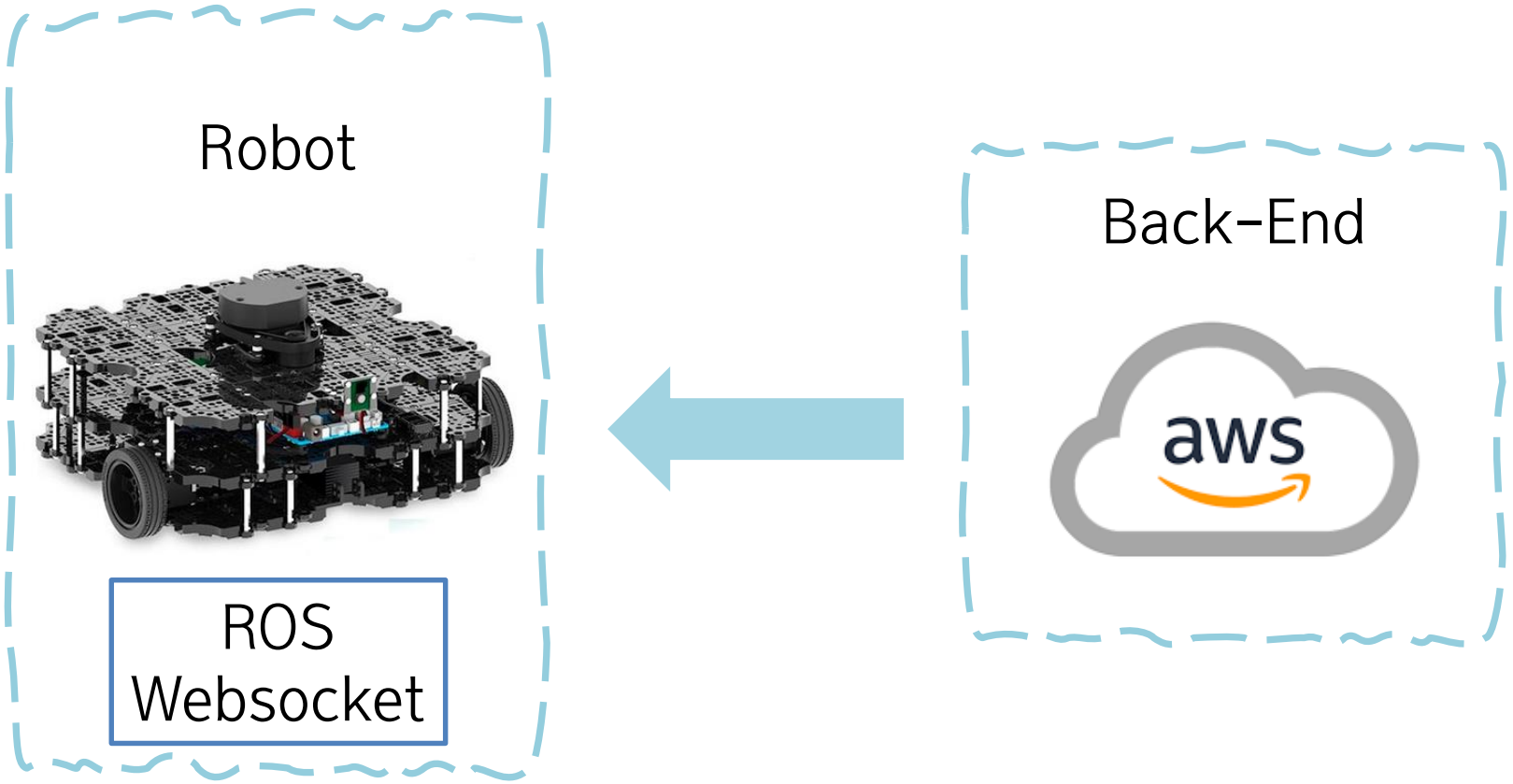
4 Back-End

- Server based robot



4 Back-End

- Server based robot



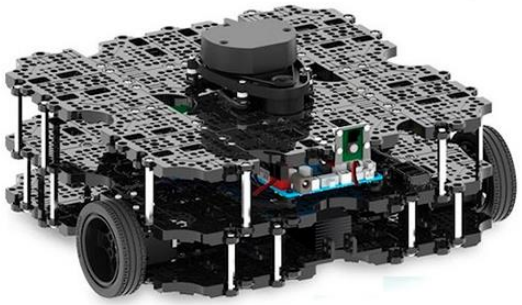
5

Future Goal

5 Future Goal

- Robotics

Robot



Walking assistance

service

Implementation of perfect walking assistance driving function
final service through connection with backend server

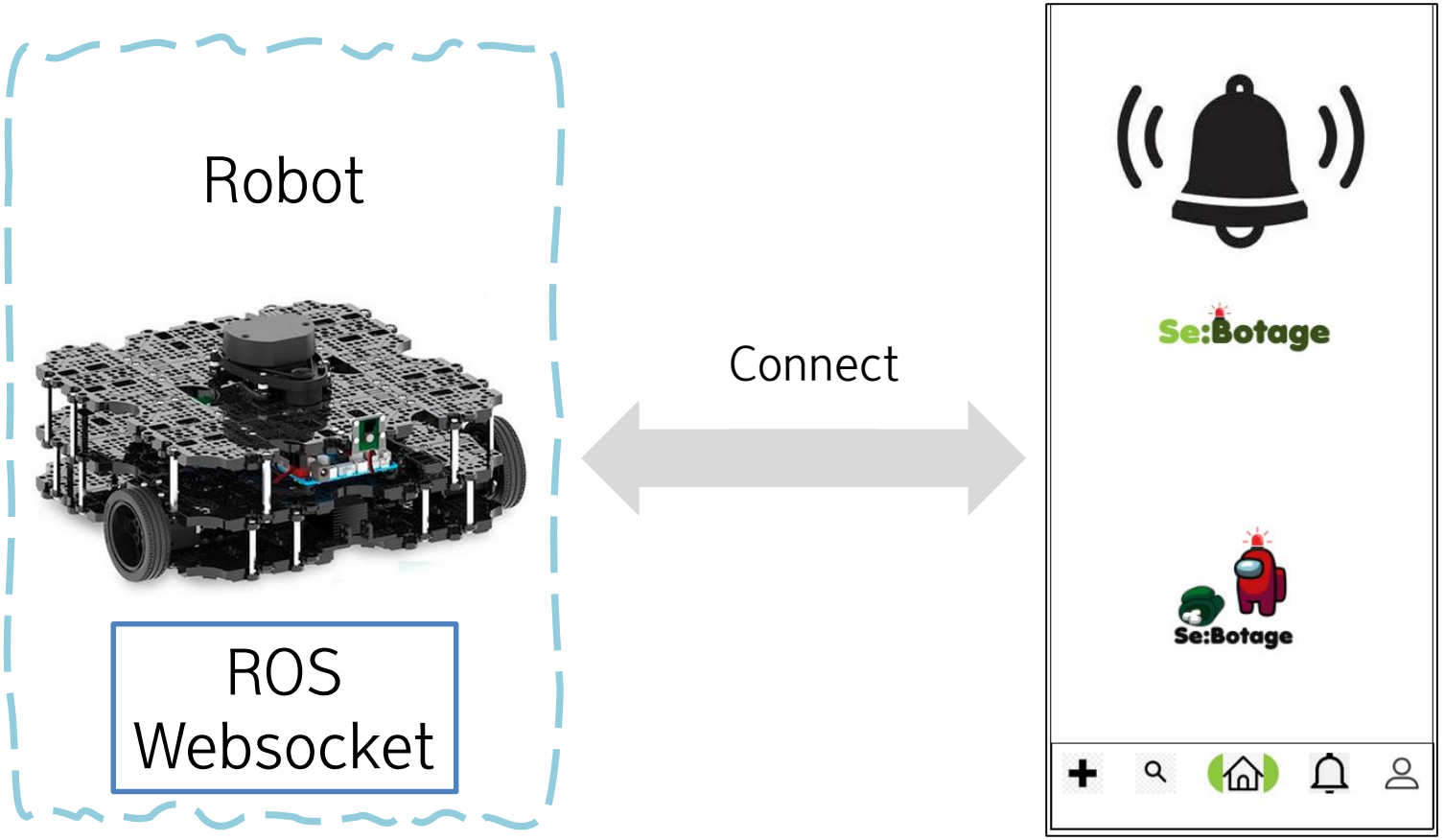
5 Future Goal

- Front-End

Develop function : get location of robot, send stroll path …

5 Future Goal

- Back-End



Connecting the robot to the app,
Opening the captured photo in emergency

THANK YOU