OLAF

PROJECT

실내 길안내 로봇

TEAM 11 ELSA
2020 Capstone Design

김다훈 김선필 배한울 윤찬우 김명수

OLAF

프로젝트 소개

OLAF

Introduction

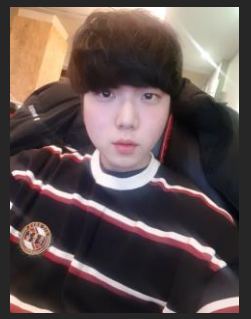
TEAM: ELSA


15김다훈


14김선필


13김명수


15윤찬우


15배한울

PROJECT: OLAF

프로젝트 목표:

실내에서 사용자가 원하는 목적지까지 안내하는 로봇 제작

NVIDIA ubuntu ROS KINETIC KAME TURTLEBOT3 ARDUINO IONIC YOLO

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하드웨어 제작

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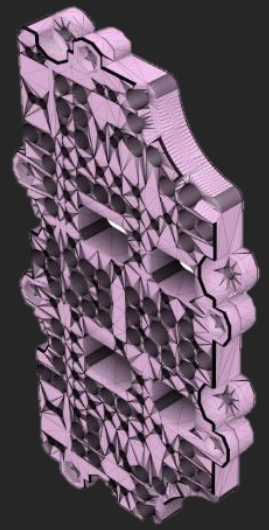
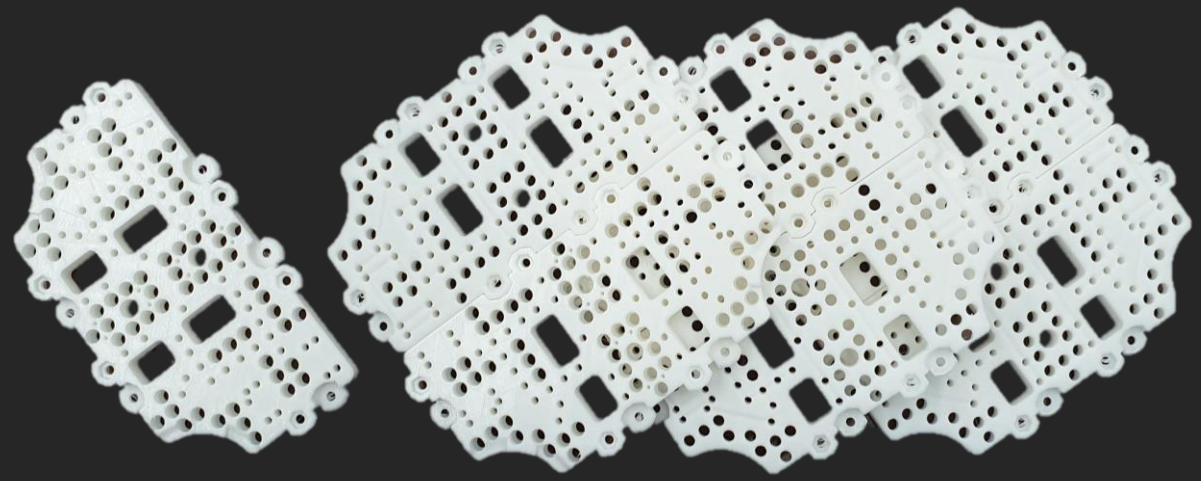
Hardware

- Make Robot Plate
- Actuator Test
- Make Axle Shaft
- Assemble
- Soldering Capacitor



3D Model



3D Printed Plate

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Hardware

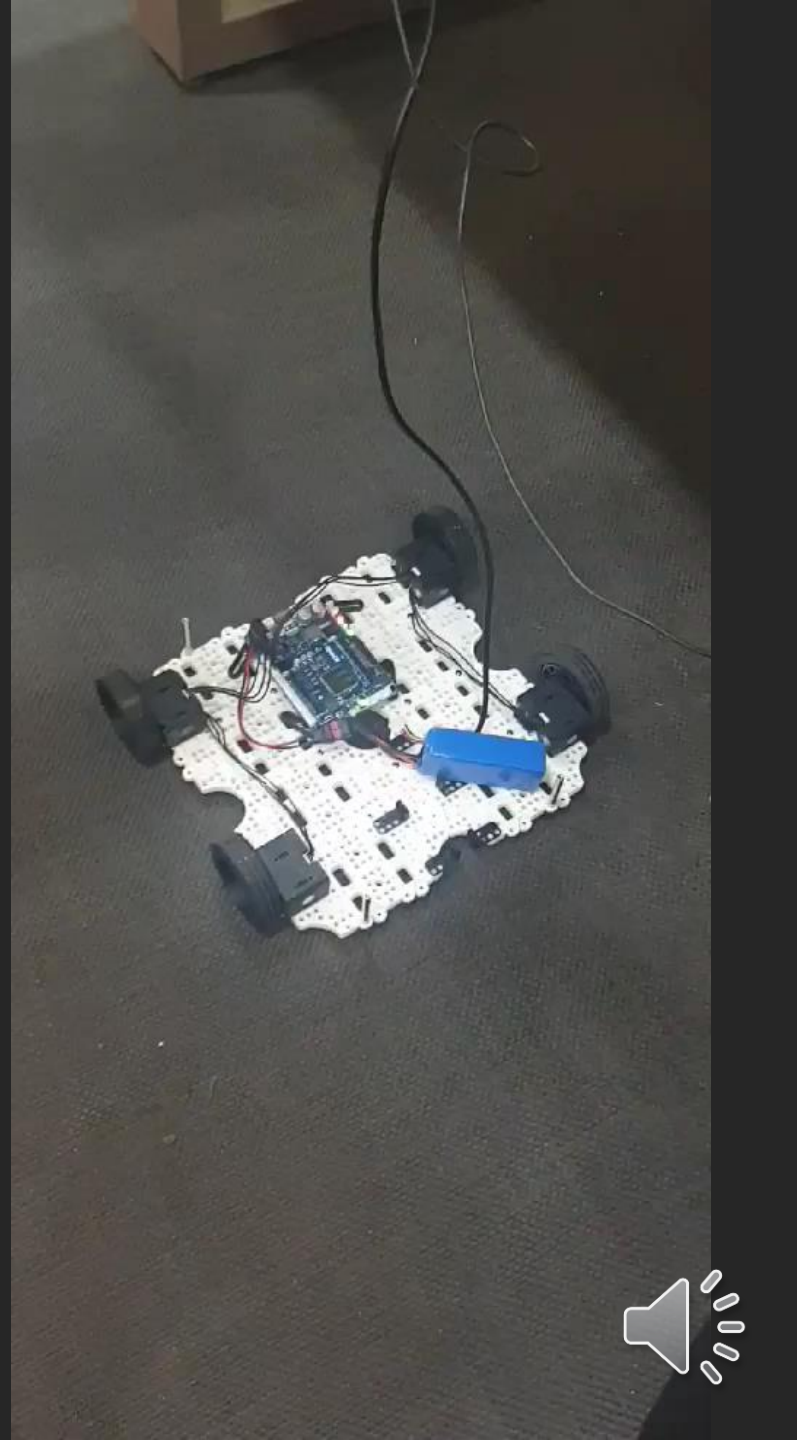
- Make Robot Plate
- Actuator Test
- Make Axle Shaft
- Assemble
- Soldering Capacitor

TEST :

OpenCR Board

+ Dynamixel Motor x4

+ Battery



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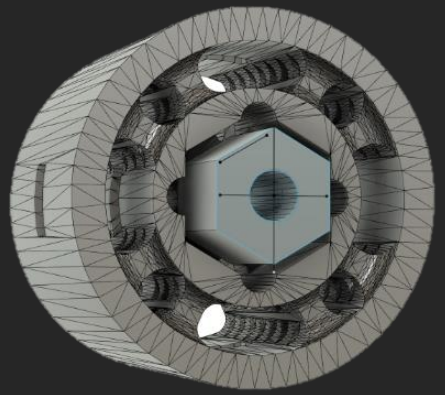
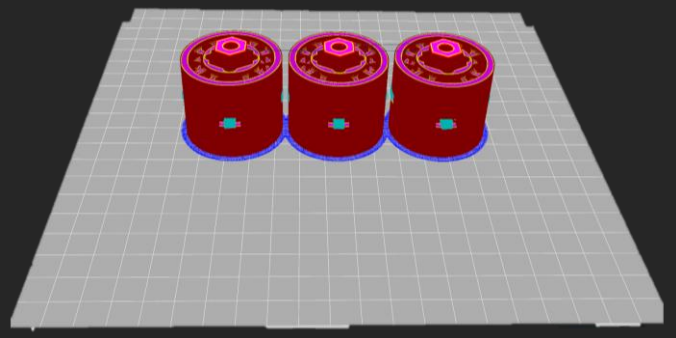
Hardware

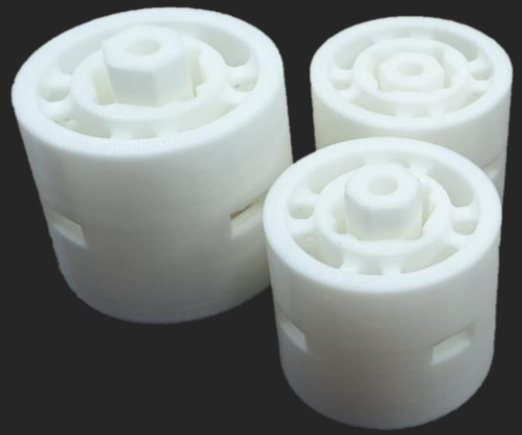
- Make Robot Plate
- Actuator Test
- Make Axle Shaft
- Assemble
- Soldering Capacitor



3D Model



Place Model to Print



3D Printed Axle Shaft

Combined with Wheel

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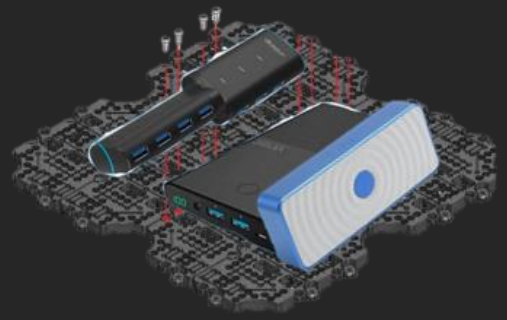
Hardware

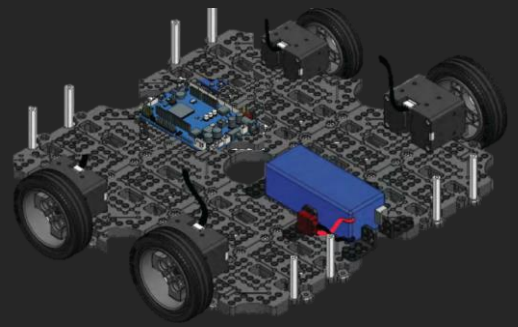
- Make Robot Plate
- Actuator Test
- Make Axle Shaft
- Assemble
- Soldering Capacitor

4th Floor

3rd Floor



2nd Floor



1st Floor

Completed Robot

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Hardware

- Make Robot Plate
- Actuator Test
- Make Axle Shaft
- Assemble
- Soldering Capacitor

Soldered TX2 Board

E/C 63V 4700UF
(85℃) LUG 타입

Capacitor

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소프트웨어 개발

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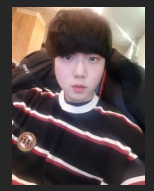
Software







방향키로 로봇을 조종 가능하도록 구현한 노드

W / S : speed up / down
A / D : rotate left / right

테스트를 위해서 개발됨

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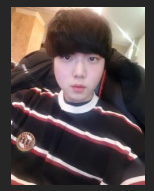
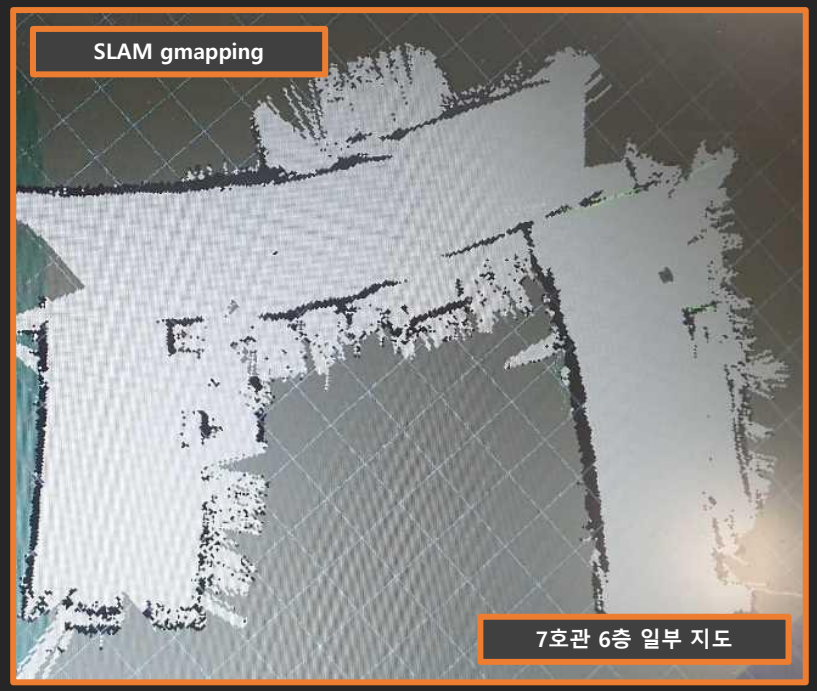
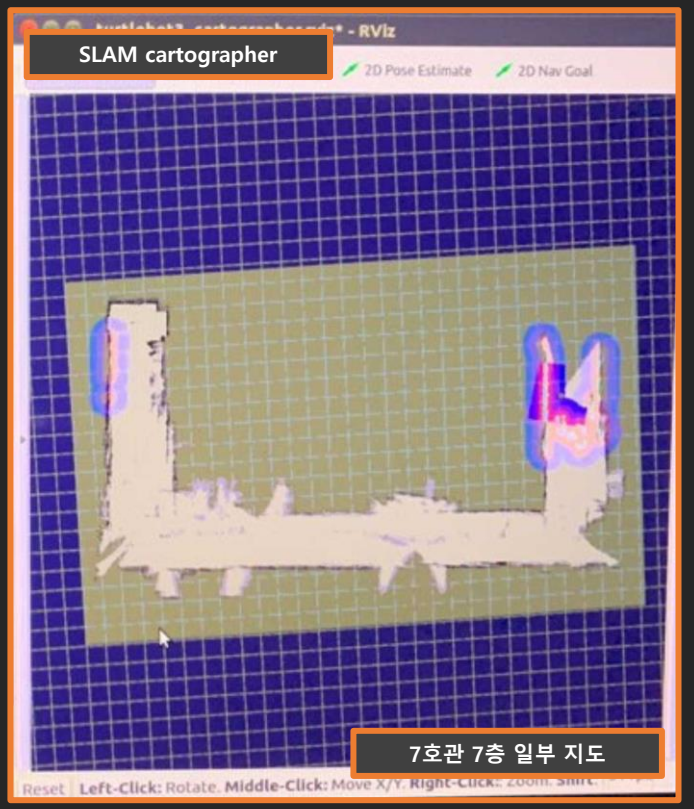
Software



SLAM: 사용되지 않음





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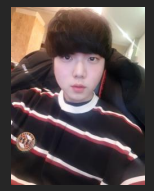
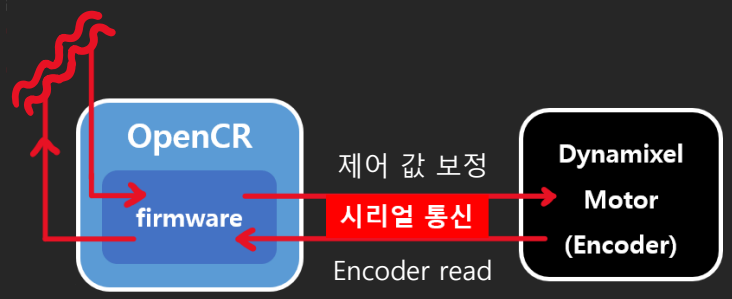
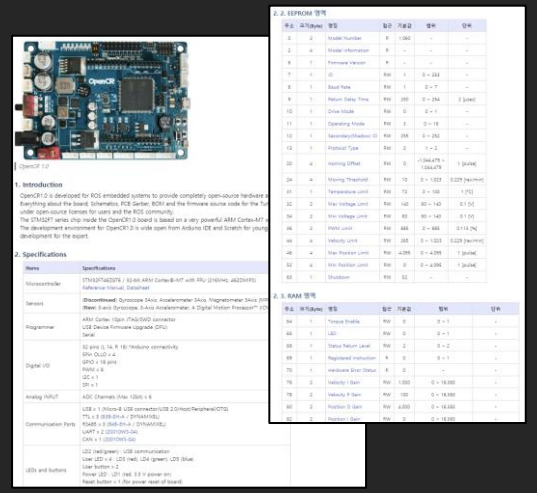
Software



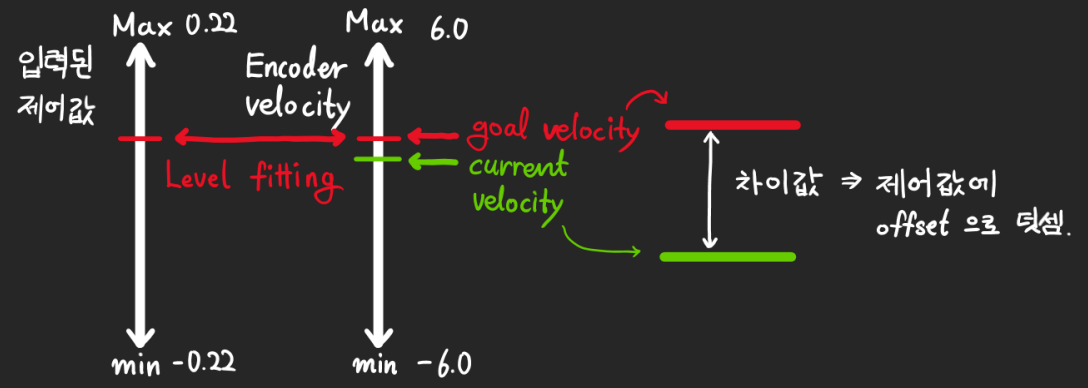
구조 :



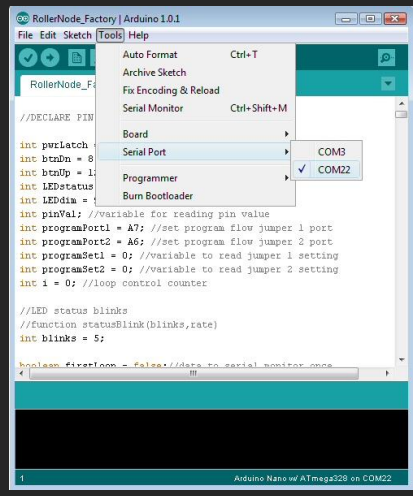


보드, 모터 매뉴얼 참고

제어 :



현재 속도에 Offset을 가감하여
목표 속도와 현재 속도의 차이를 줄이는 방식



아두이노 펌웨어 코딩

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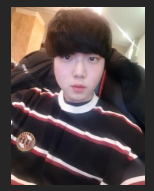
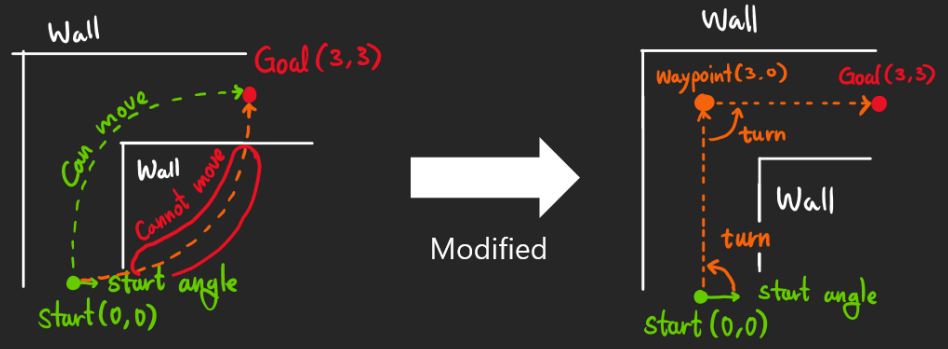
Software

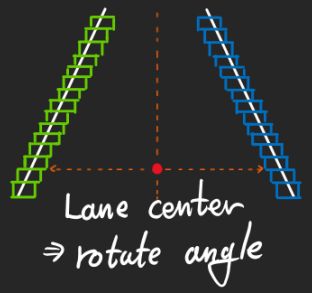


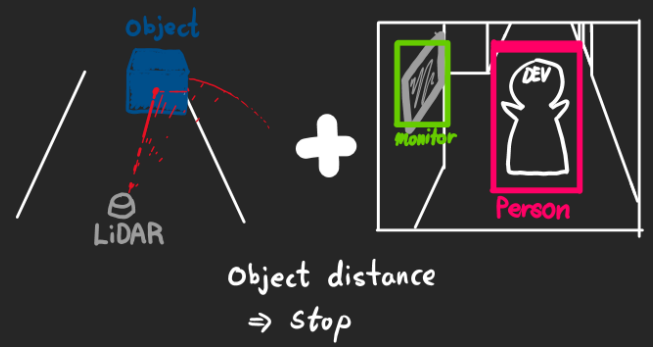



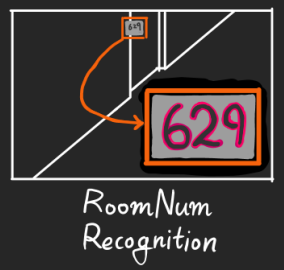
Modified



Added







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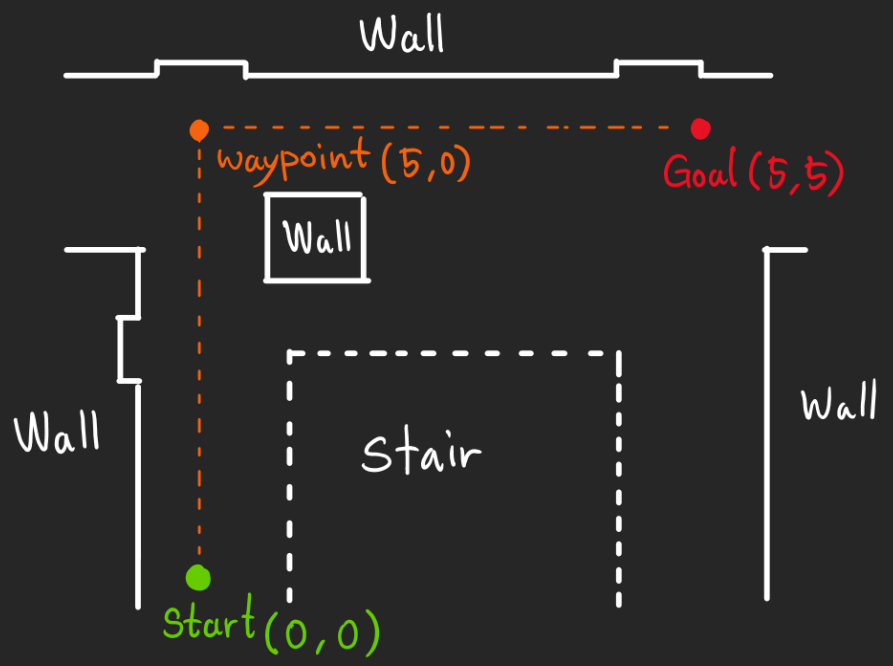
Software



미래관(7호관)의 내부 구조가 직각 경로로 이루어져 있음

목표 좌표를 입력 받아 직각 경로를 반환

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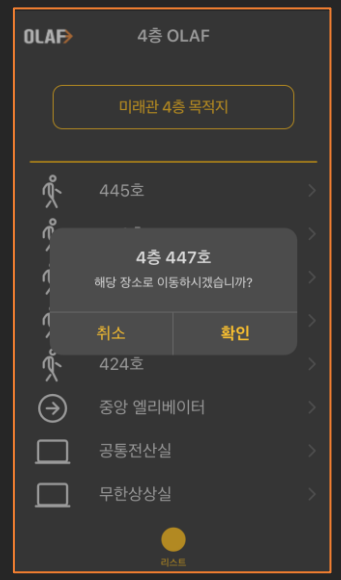
Software

- Teleop node
- SLAM
- Encoder correction
- Pointop node
- Path Calculation
- Server
- Data Share Protocol
- Lane Detection
- Obstacle Detection
- RoomNum Recognition

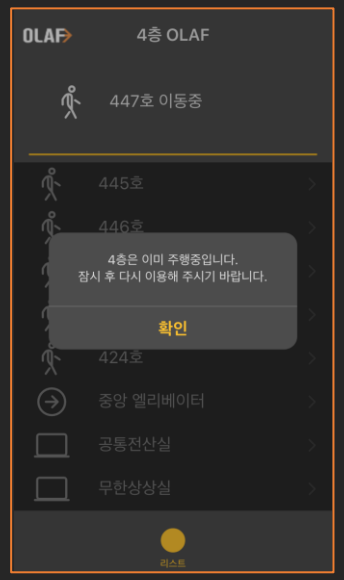
Web Server UX / UI

입력 대기

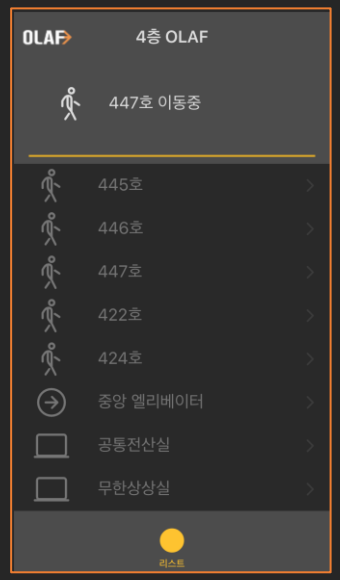
층 선택



목적지 입력



주행 중 입력 방지



이동 중

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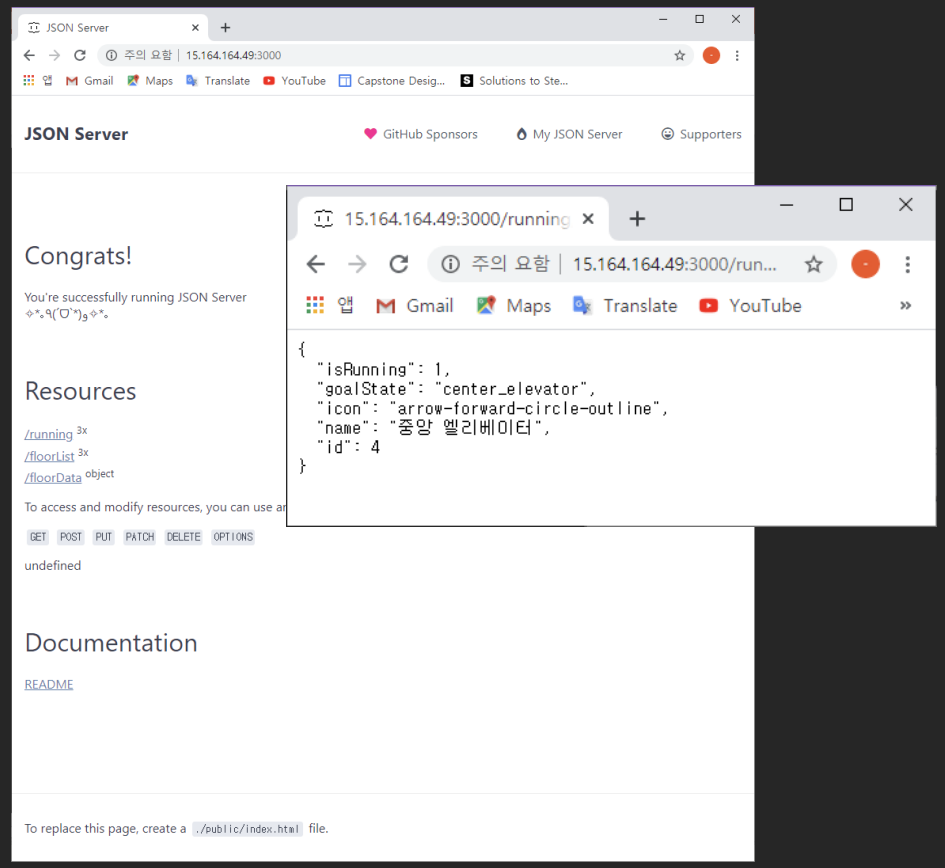
Software

JSON Server

JSON serve는 사용자와 로봇의 중간 다리 역할이다.

Python의 Dictionary와 같은 형식으로 데이터를 표현한다.



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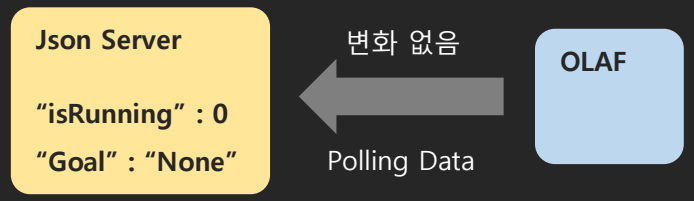
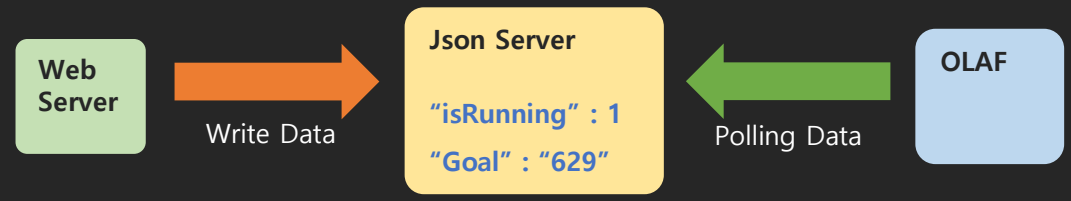
Software

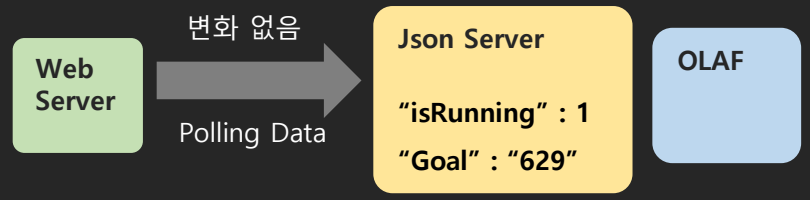
1. 대기 중



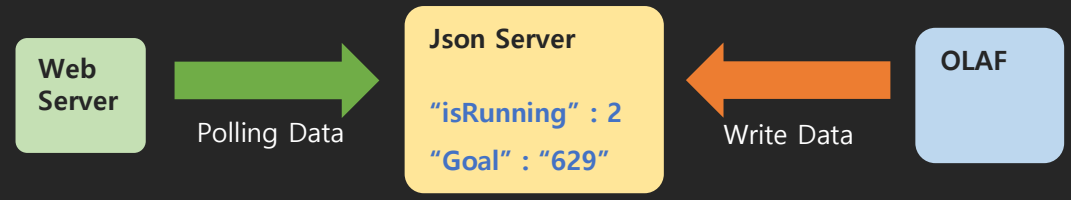
2. 사용자 입력



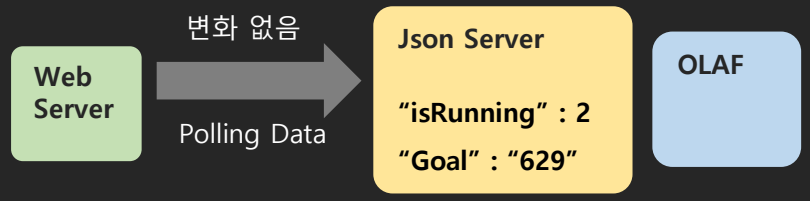
3. 안내 중



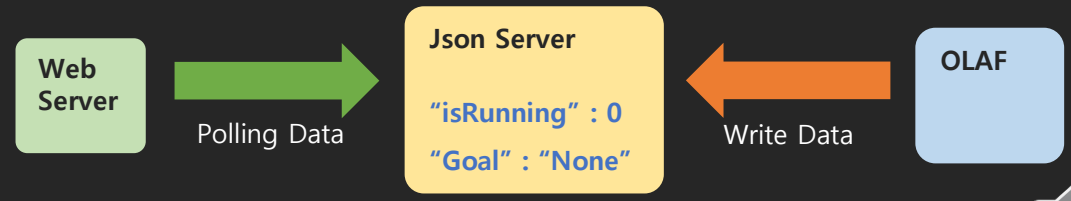
4. 목적지 도착



5. 원점 회귀 중



6. 원점 도착



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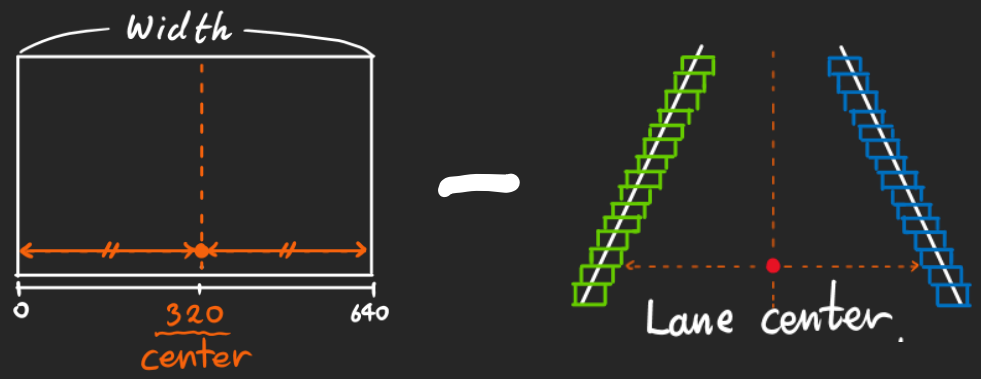

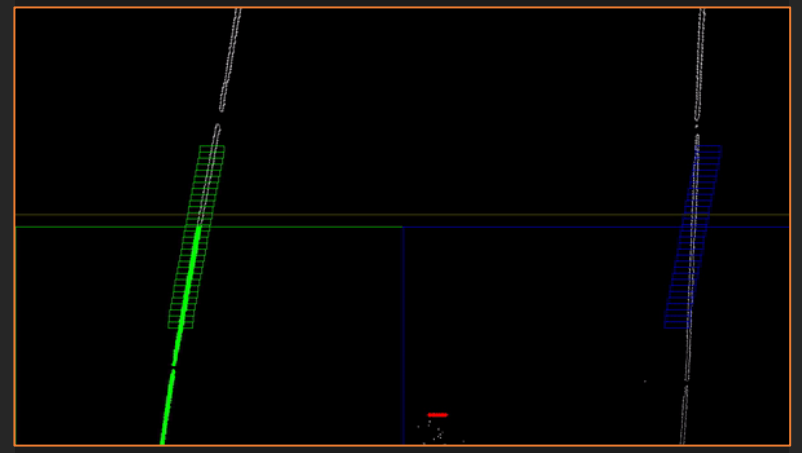

인식된 양쪽 차선의 X좌표 중심과
카메라 해상도 폭 중심의 차이를 계산하여
정방향 주행에서 벗어난 정도를 인지

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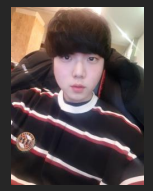
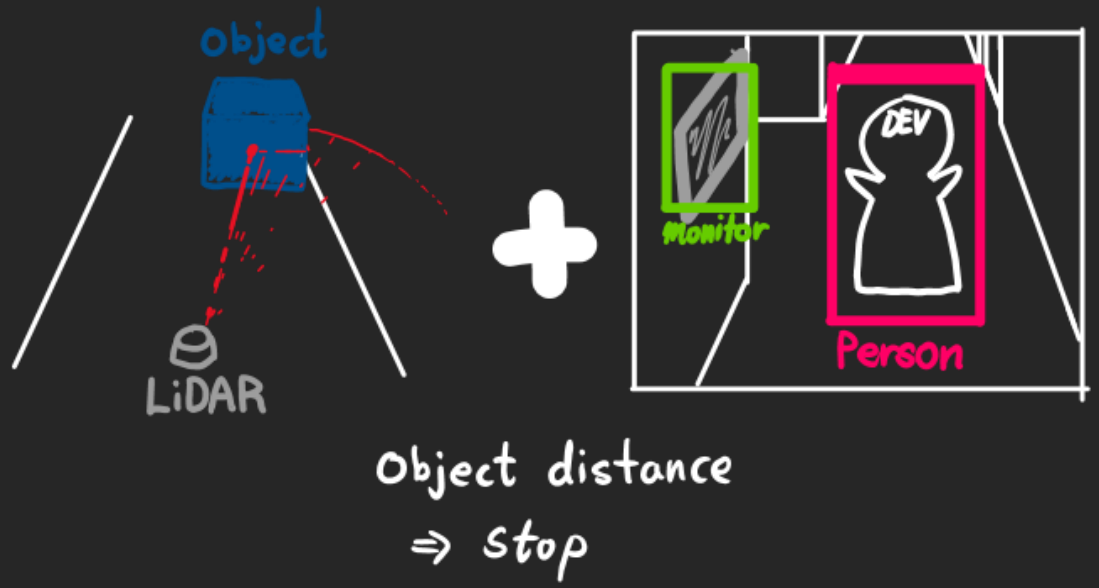
Software





2D LiDAR 정보와 YOLO v3의 사물 인식을 조합하여
진행 경로상에 사람이 있을 경우 정지

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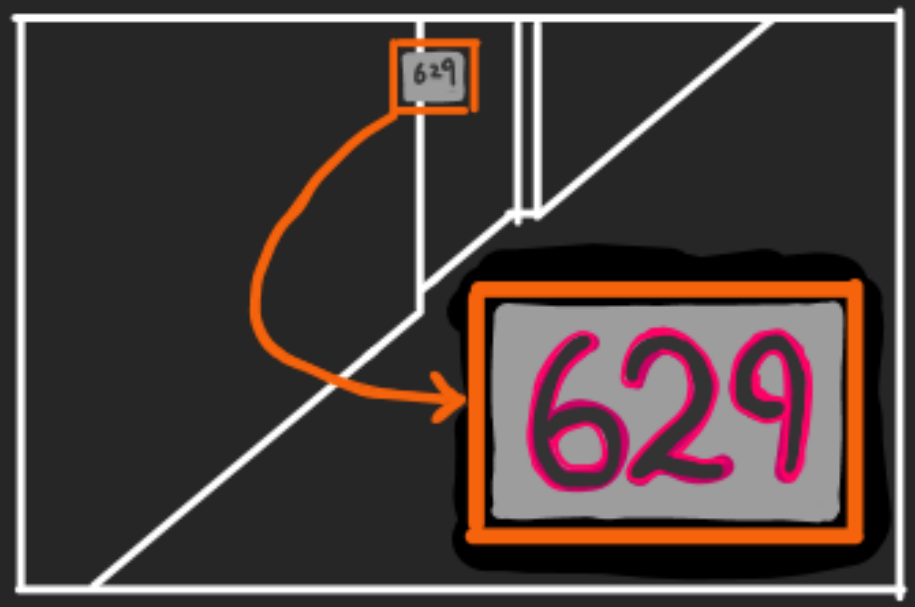
Software



방문 위의 번호판 영역을 인식하여 잘라내어
잘라낸 영역의 번호를 인식한다.
인식한 번호를 통해 위치정보를 보조한다.

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THANK YOU