



AUTONOMOUS SURVEILLANCE ROBOT

자율 순찰 로봇

4조 A.S.R 팀

팀원 : 김경진, 김민서, 이은창, 한정탁

멘토 : 이성민(LG전자), 문새마로(TmaxSoft)



CONTENTS

1 CONTENTS & GANTT CHART

2 ABSTRACT

3 ARCHITECTURE

4 TECHNOLOGIES

5 DEMONSTRATE

6 Q & A



WHY WE NEED ROBOT?
WHAT WE WANT TO DETECT?

WHAT WE MADE ON OUR PROJECT



AUTONOMOUS ROBOT

**ROS BASED
SLAM & NAVIGATION
AUTONOMOUS DRIVING
USING
TURTLEBOT3 BURGER**



MASK DETECT



FIRE DETECT



WEB SERVICE

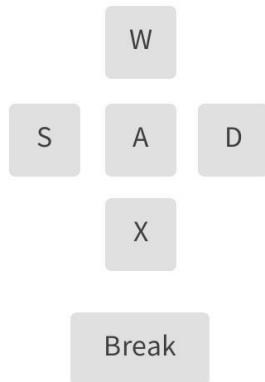
**MONITORING & CONTROL
ON WEB**

**DEEP LEARNING AI MODEL
REAL-TIME OBJECT DETECTION**

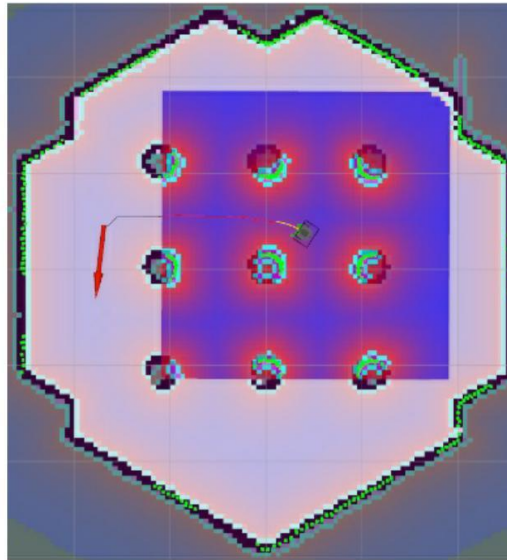
ON OUR WEB PAGE

3. Architecture

ROBOT CONTROLLER



NAVIGATION MONITORING

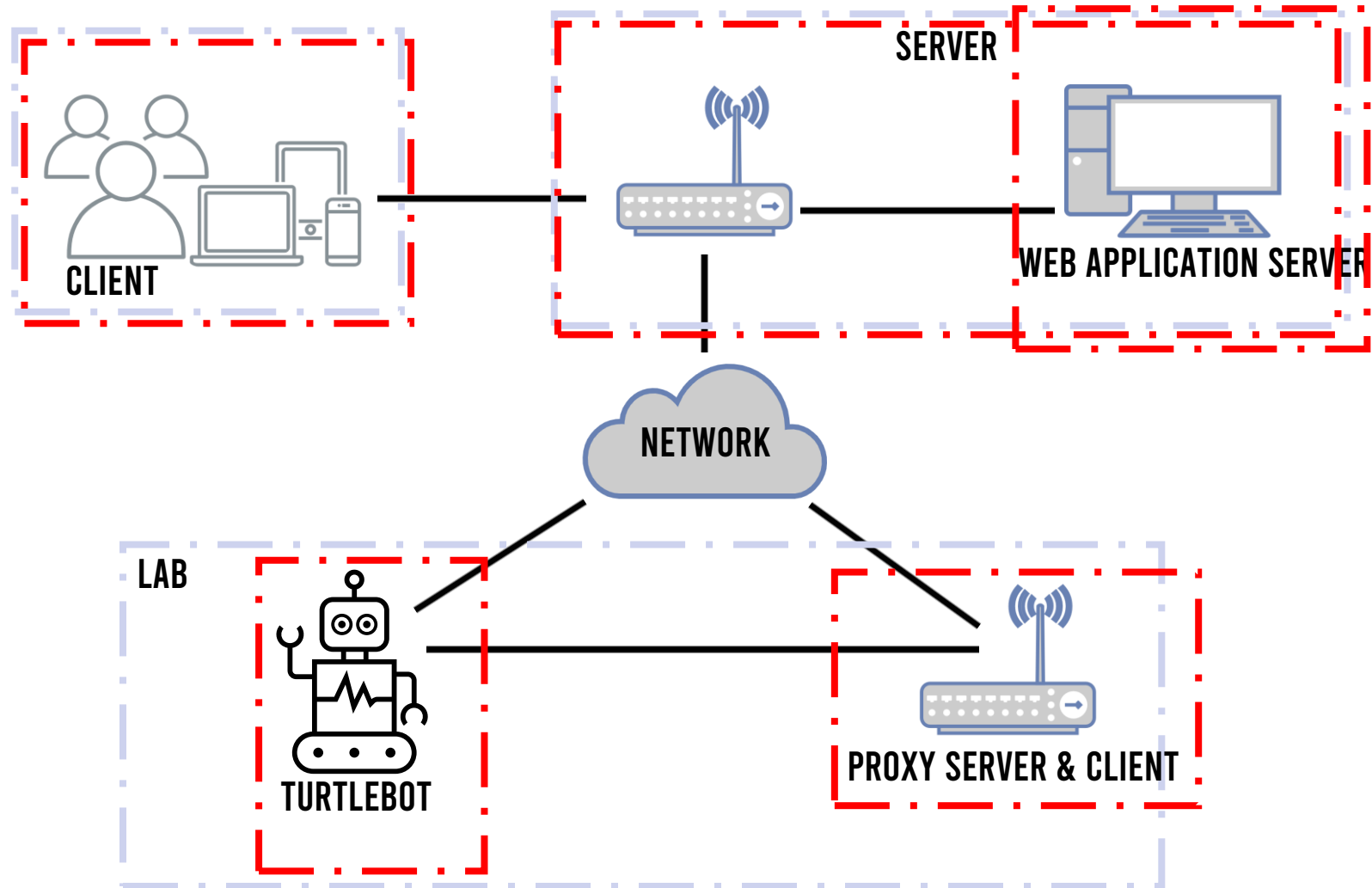


CAMERA VIDEO & DETECTION MONITORING



SYSTEM ARCHITECTURE

3. Architecture



TECHNOLOGIES

3 MAIN TECHNOLOGIES WE USED

자율 주행

SLAM & NAVIGATION

통신

ROS

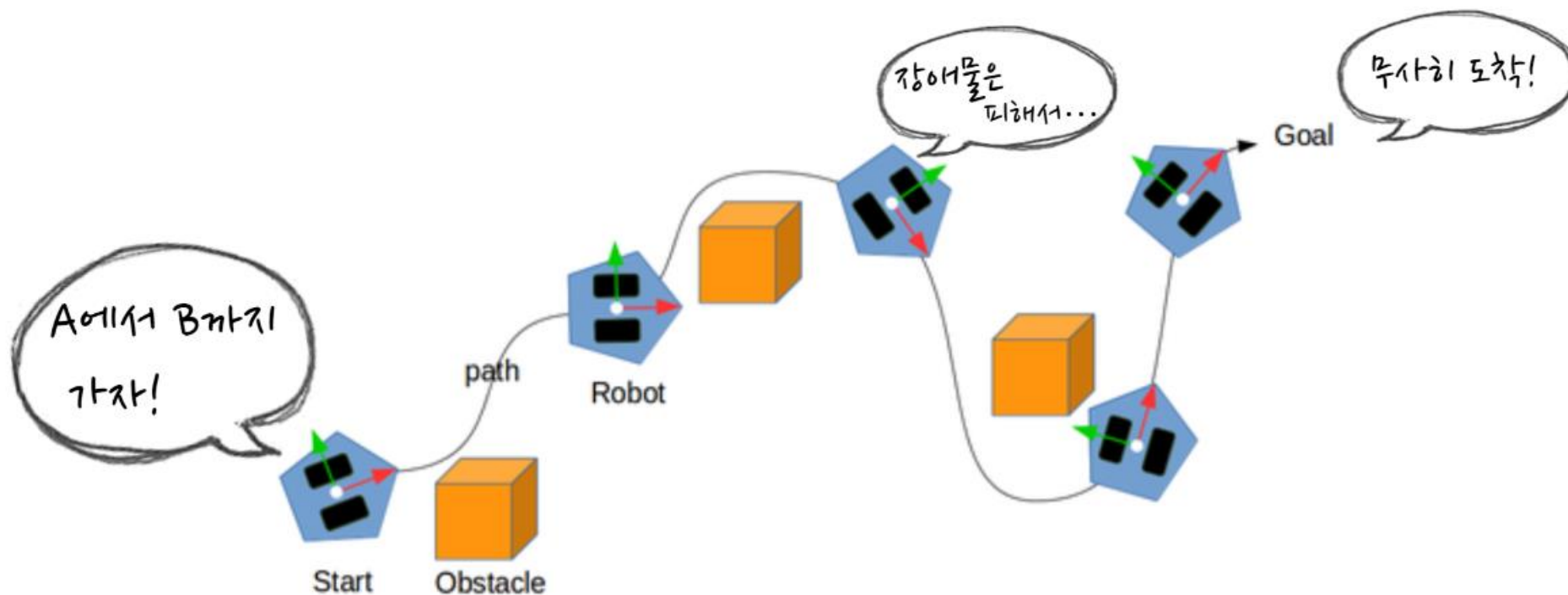
영상 인식

YOLO



AUTONOMOUS DRIVING?

4. Technologies



AUTONOMOUS DRIVING?

4. Technologies

위치



센싱



지도



경로



위치 + 센싱 → 지도

SLAM

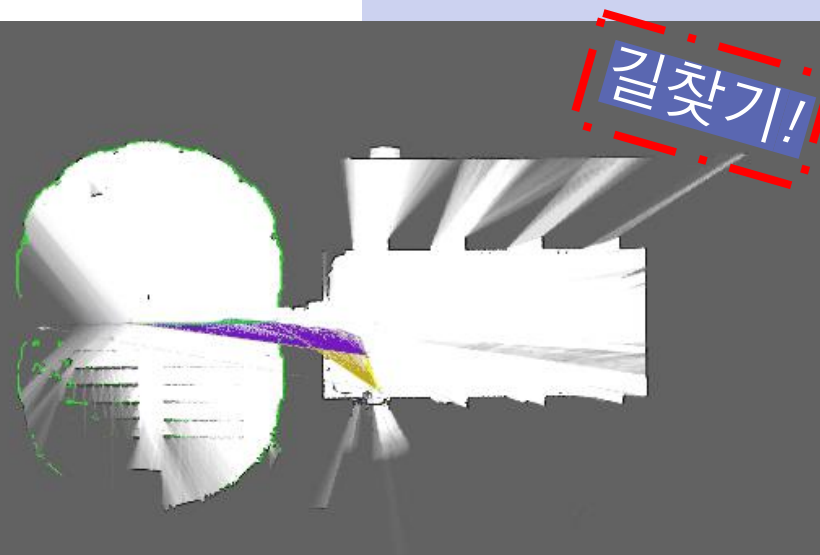
위치 + 센싱 + 지도 → 경로

NAVIGATION

SIMULTANEOUS LOCALIZATION AND MAPPING

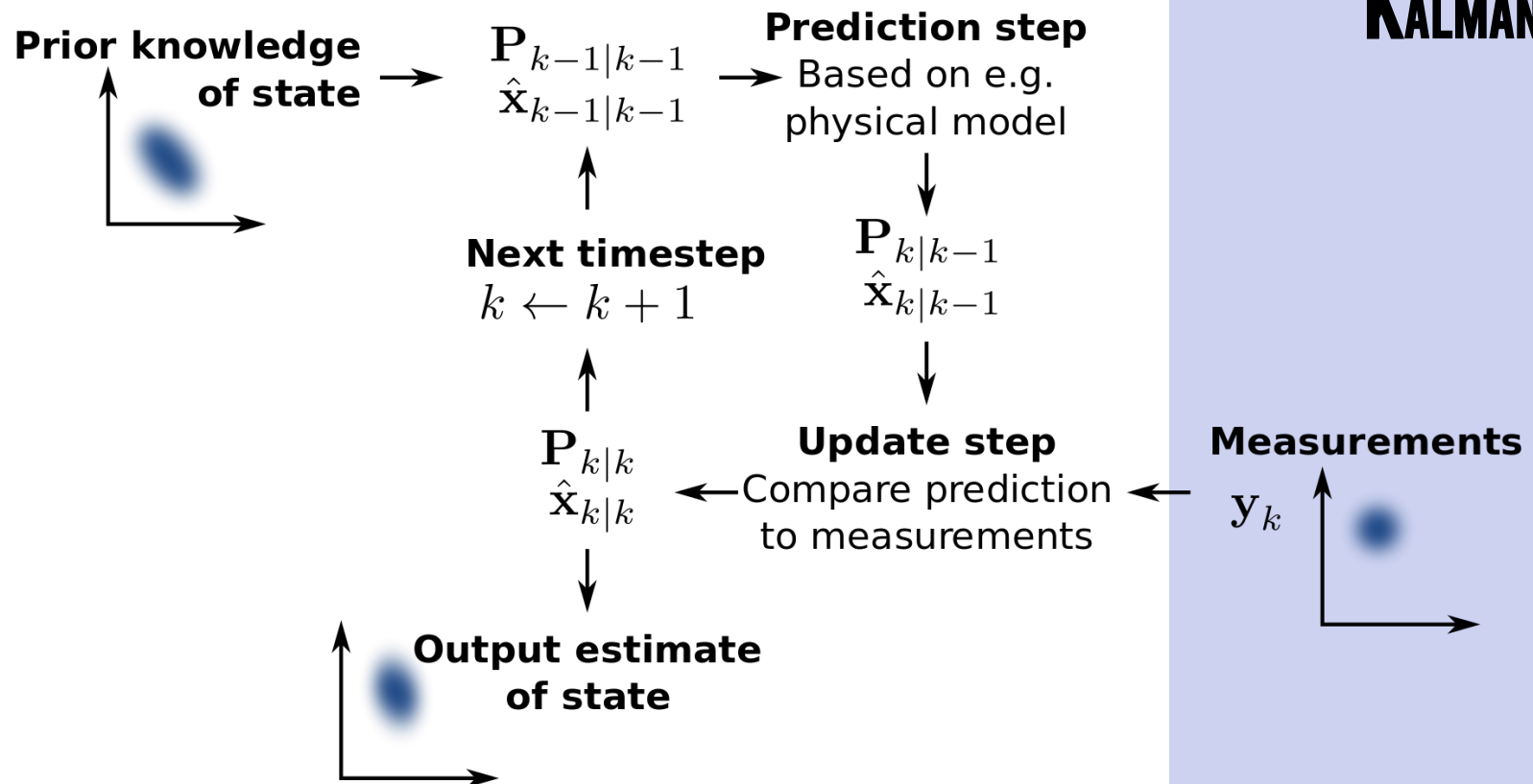
& NAVIGATION

동시적 위치추정 및 지도작성



SIMULTANEOUS LOCALIZATION AND MAPPING

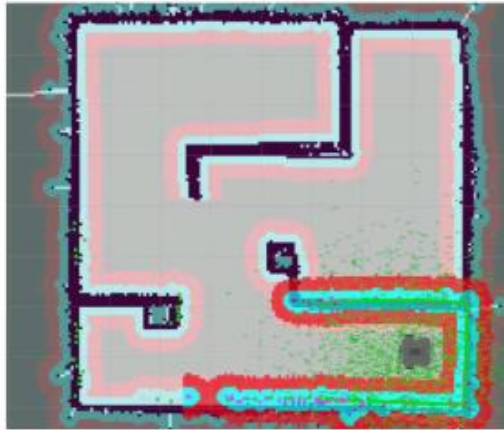
& NAVIGATION



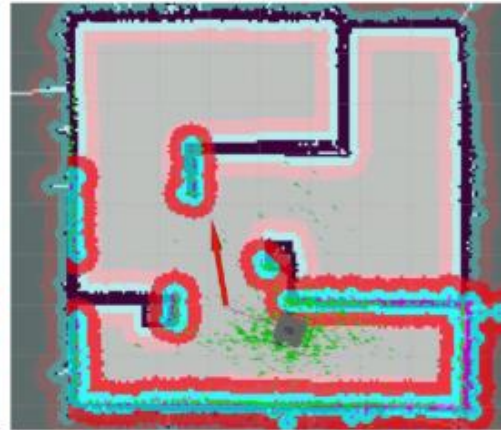
KALMAN FILTER

SIMULTANEOUS LOCALIZATION AND MAPPING

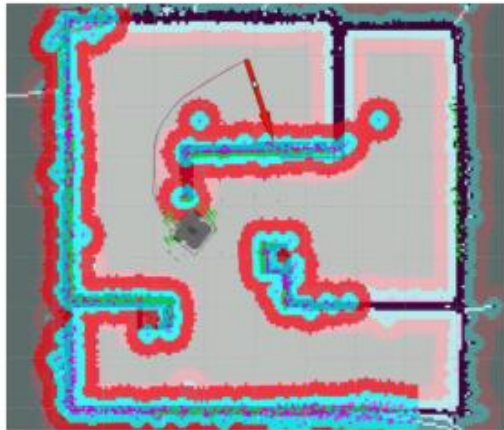
& NAVIGATION



(t1)



(t2)



(t3)



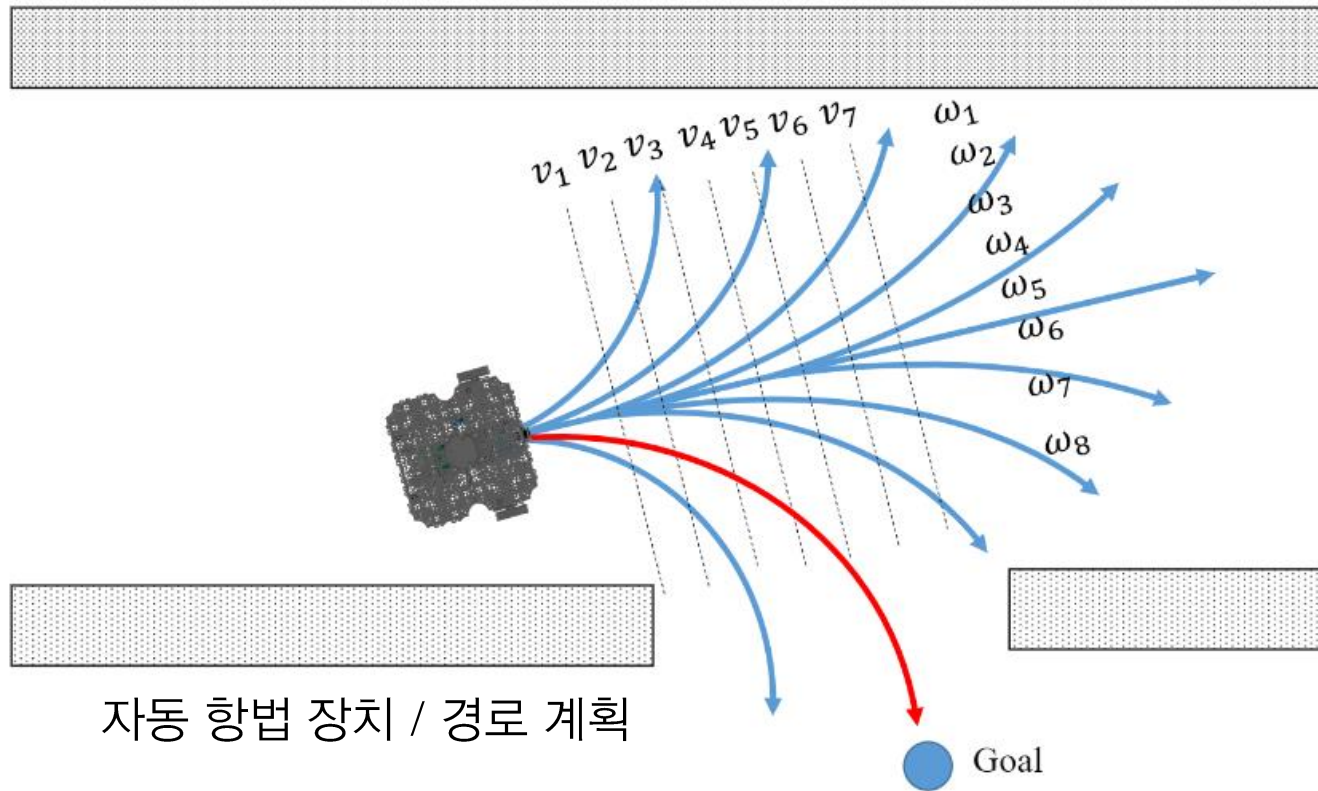
(t4)

**PARTICLE FILTER
&
MONTE CARLO
LOCALIZATION**

SIMULTANEOUS LOCALIZATION AND MAPPING

4. Technologies

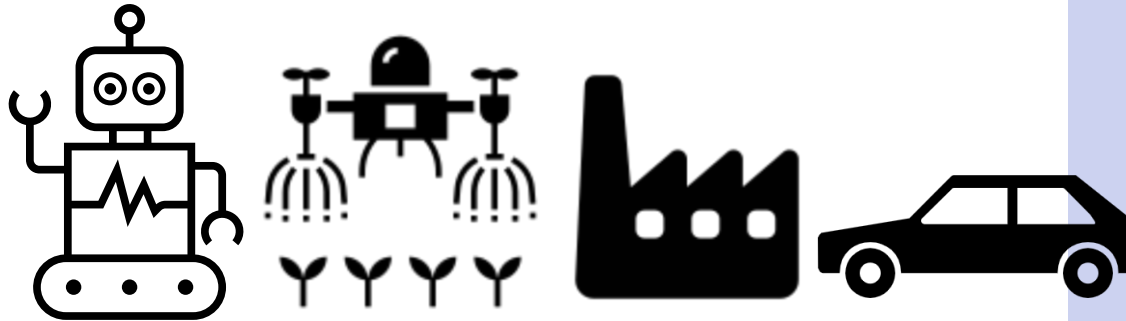
& NAVIGATION



DYNAMIC WINDOW APPROACH

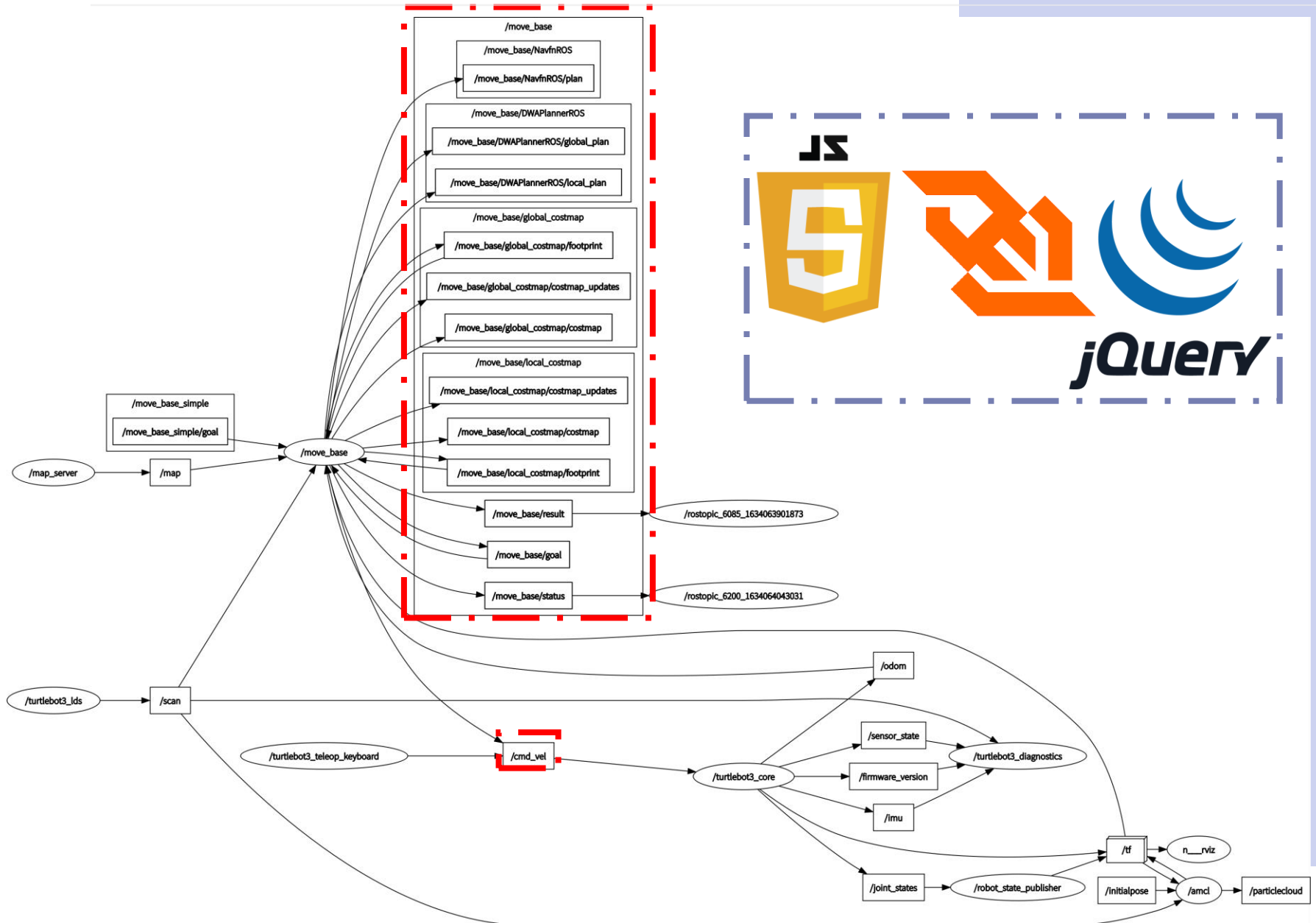
ROS ROBOT OPERATING SYSTEM

로봇 개발에서 사용하는
TCP 기반의 통신 미들웨어



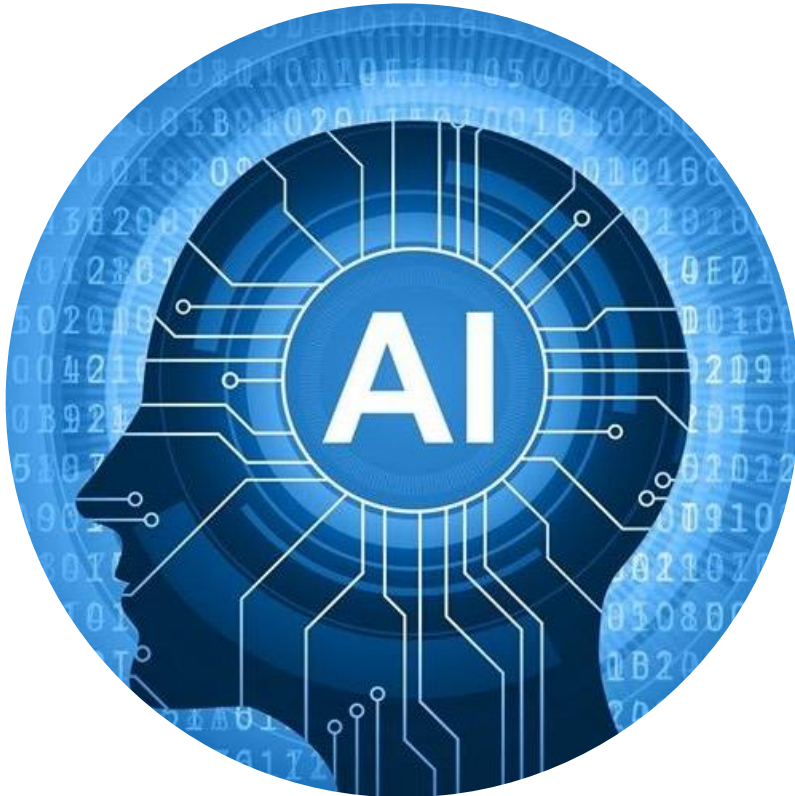
NETWORK

4. Technologies



ARTIFICIAL INTELLIGENCE

4. Technologies



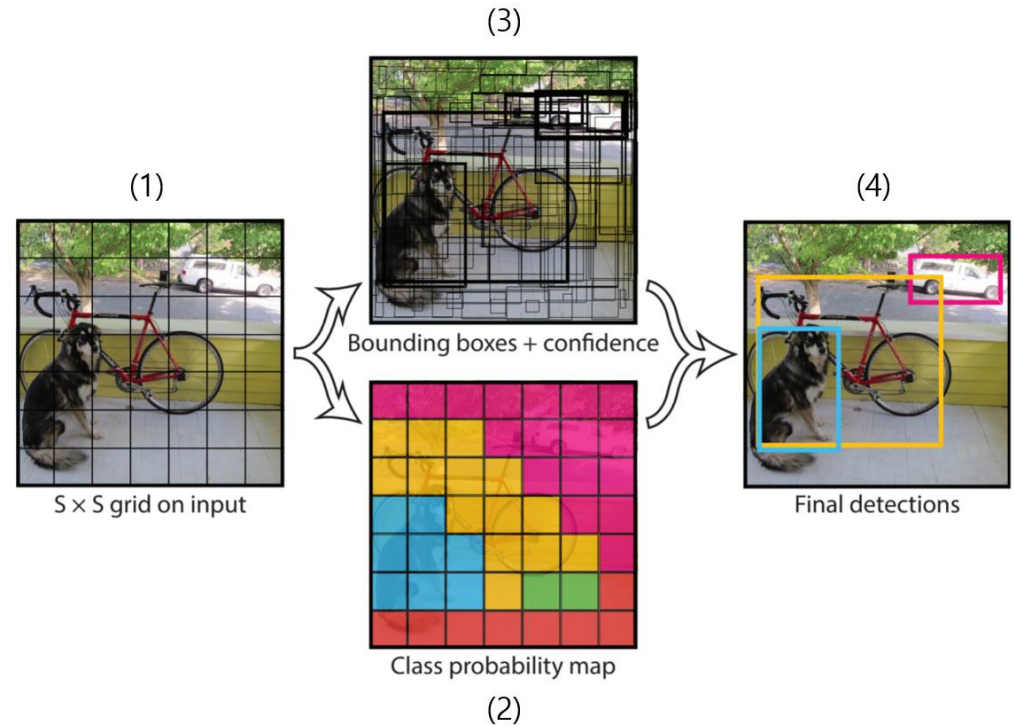
REAL-TIME OBJECT DETECTION

4. Technologies

WHY IS YOLO?

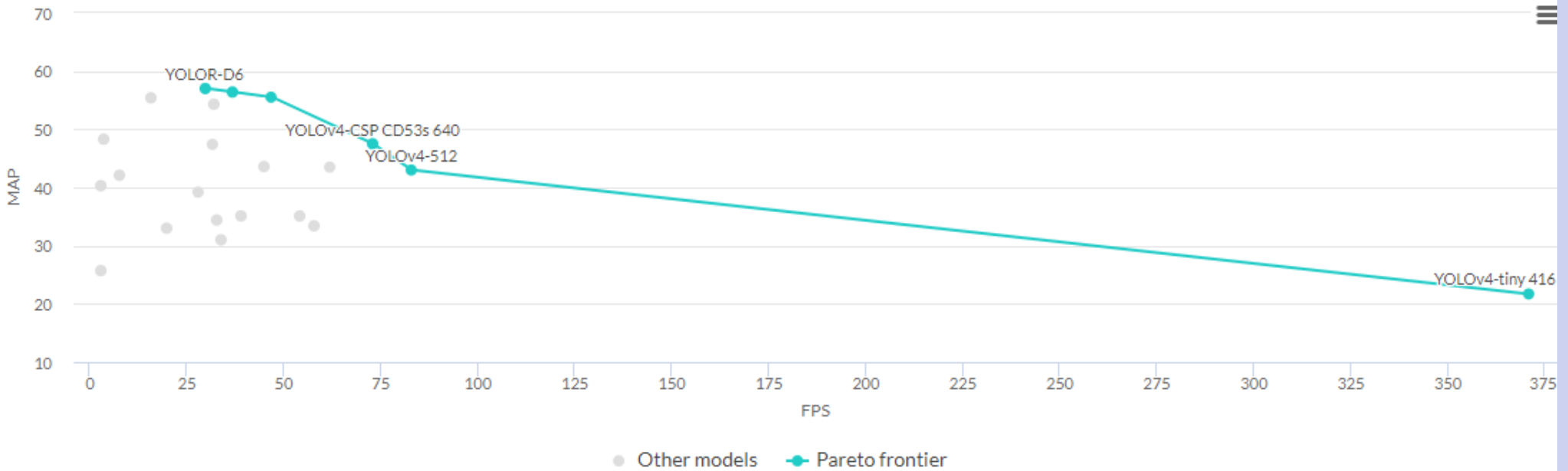
YOLO

YOU ONLY LOOK ONCE



REAL-TIME OBJECT DETECTION

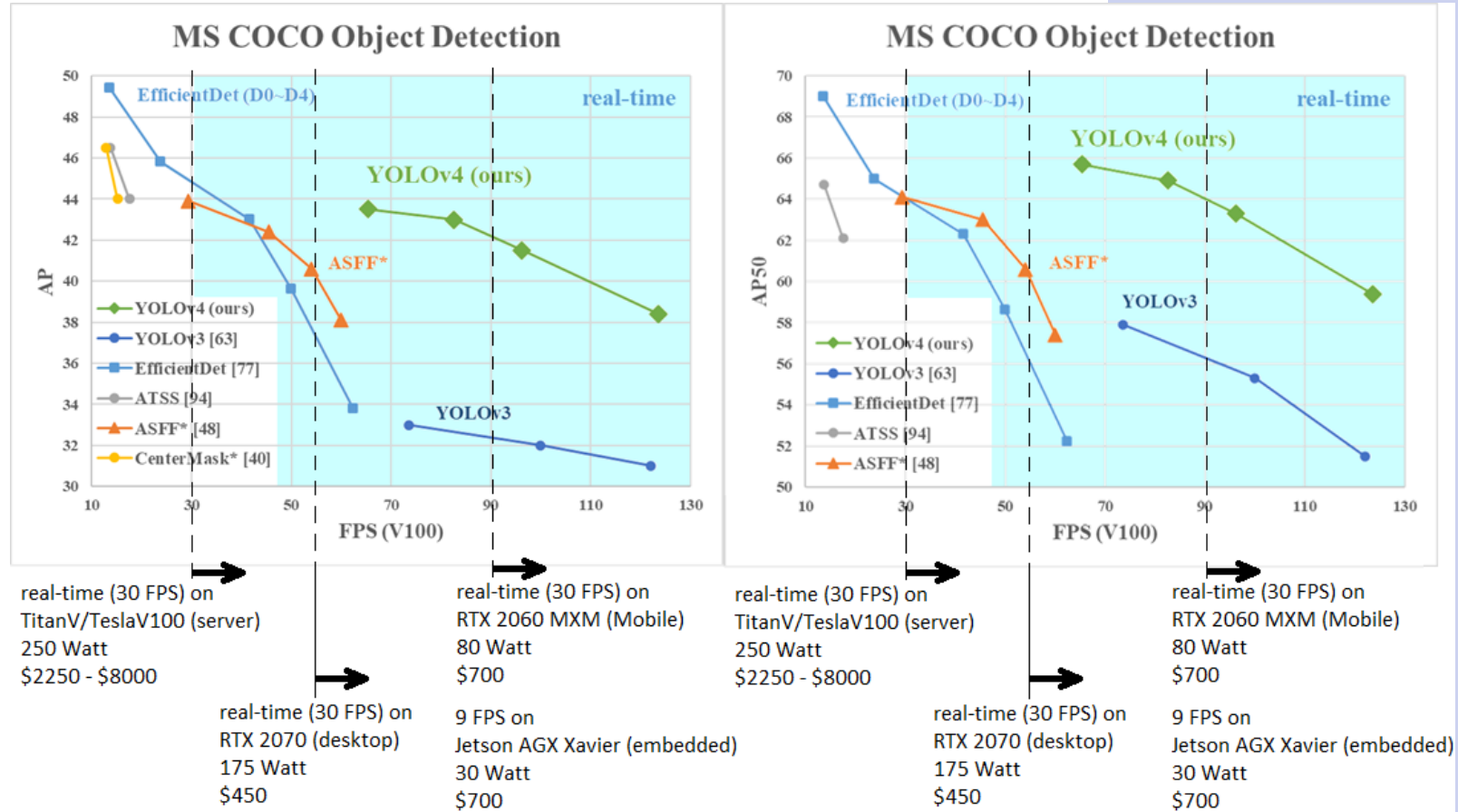
4. Technologies



REAL-TIME OBJECT DETECTION

4. Technologies

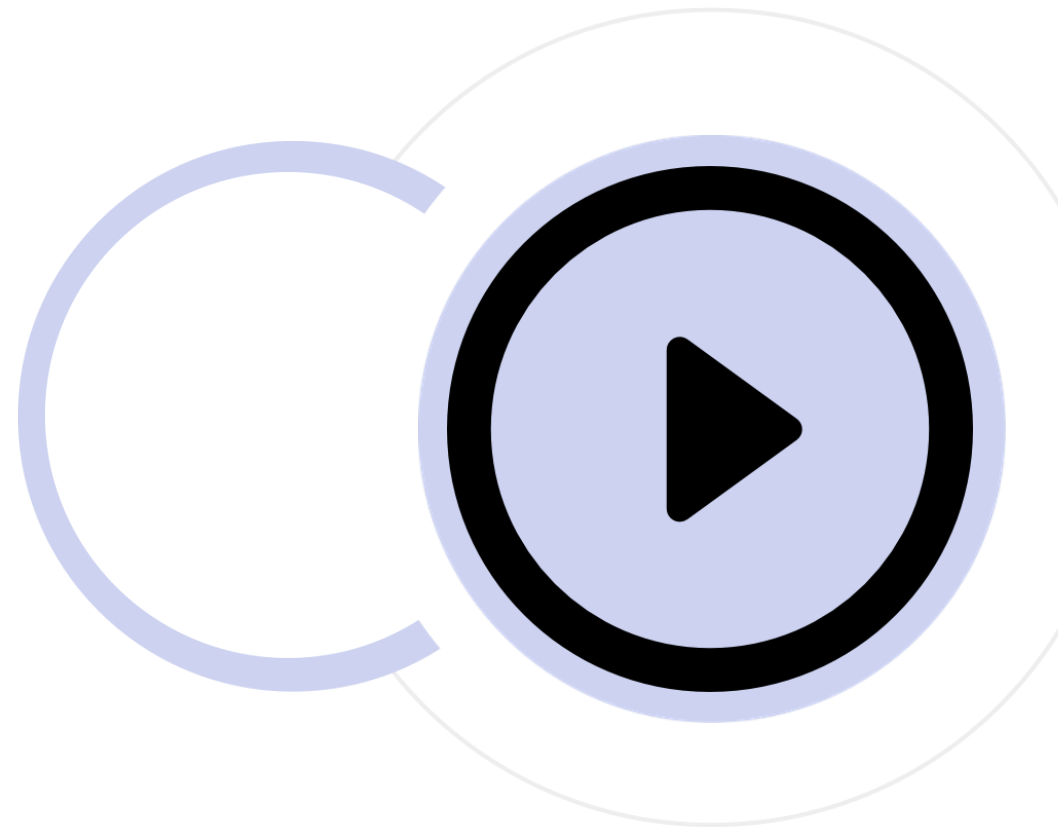
DIFFERENCES BETWEEN YOLO AND OTHER OBJECT DETECTIONS



FPS is measured on the Tesla V100 GPU.
For other GPUs with 7.x architecture,
the FPS is estimated based on the TFlops ratio.

DEMONSTRATE

PLEASE ENJOY THE SHOW





THANK YOU!