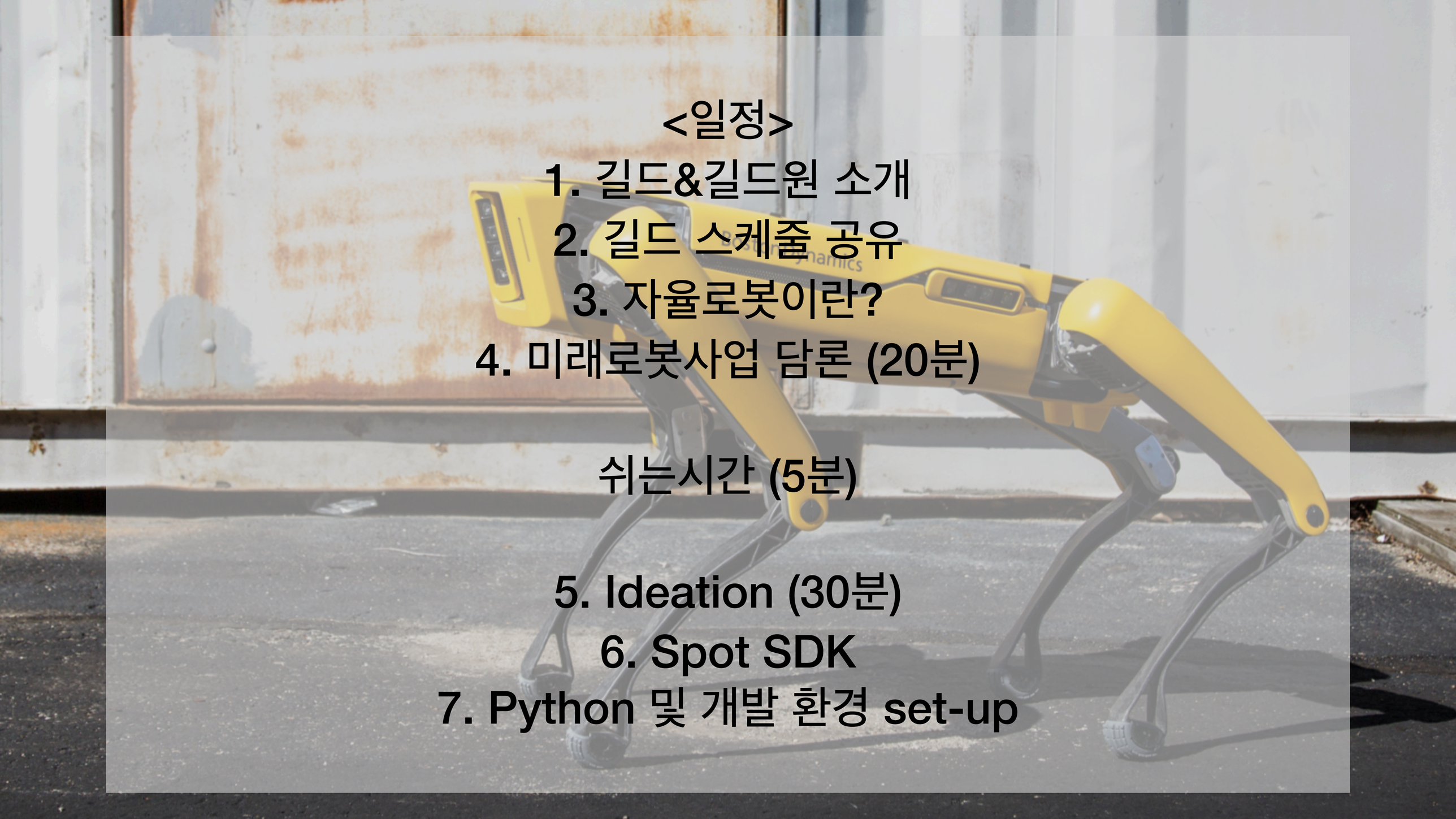
SPOT길드 1회 5.29.21



<일정>

1. 길드&길드원 소개
2. 길드 스케줄 공유
3. 자율로봇이란?
4. 미래로봇사업 담론 (20분)

쉬는시간 (5분)

5. Ideation (30분)
6. Spot SDK
7. Python 및 개발 환경 set-up

Hello World,

자기소개와 길드를 선택한 이유 또는 기대하는 부분을 자유롭게 말씀해주세요. :)

Spot길드 총 일정

No.	주제	날짜
1	길드소개 및 자율로봇 (Spot SDK)	5.29
2	[Sensing] Mapping	6.12
3	[Planning] Visual SLAM	6.26
4	[Acting] Controller	7.10
5	[Sensing] Detection & Tracking	7.24
6	[Planning] VR/AR & Simulation	8.7
7	[Acting] Imitation Learning	8.21
8	[Sensing] NLP (Text & Speech)	9.4
9	[Planning] Path Planning	9.18
10	[Acting] Reinforcement Learning	10.2

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4	[Acting] Controller	7.10 ★ 제안서
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8	[Sensing] NLP (Text & Speech)	9.4 ★
9	[Planning] Path Planning	9.18
10	[Acting] Reinforcement Learning	10.2 ★ 제로원데이

Autonomous ROBOT이란?

Autonomous ROBOT이란?

SENSE

Sense a potentially dynamic environment.
Sense its own status.

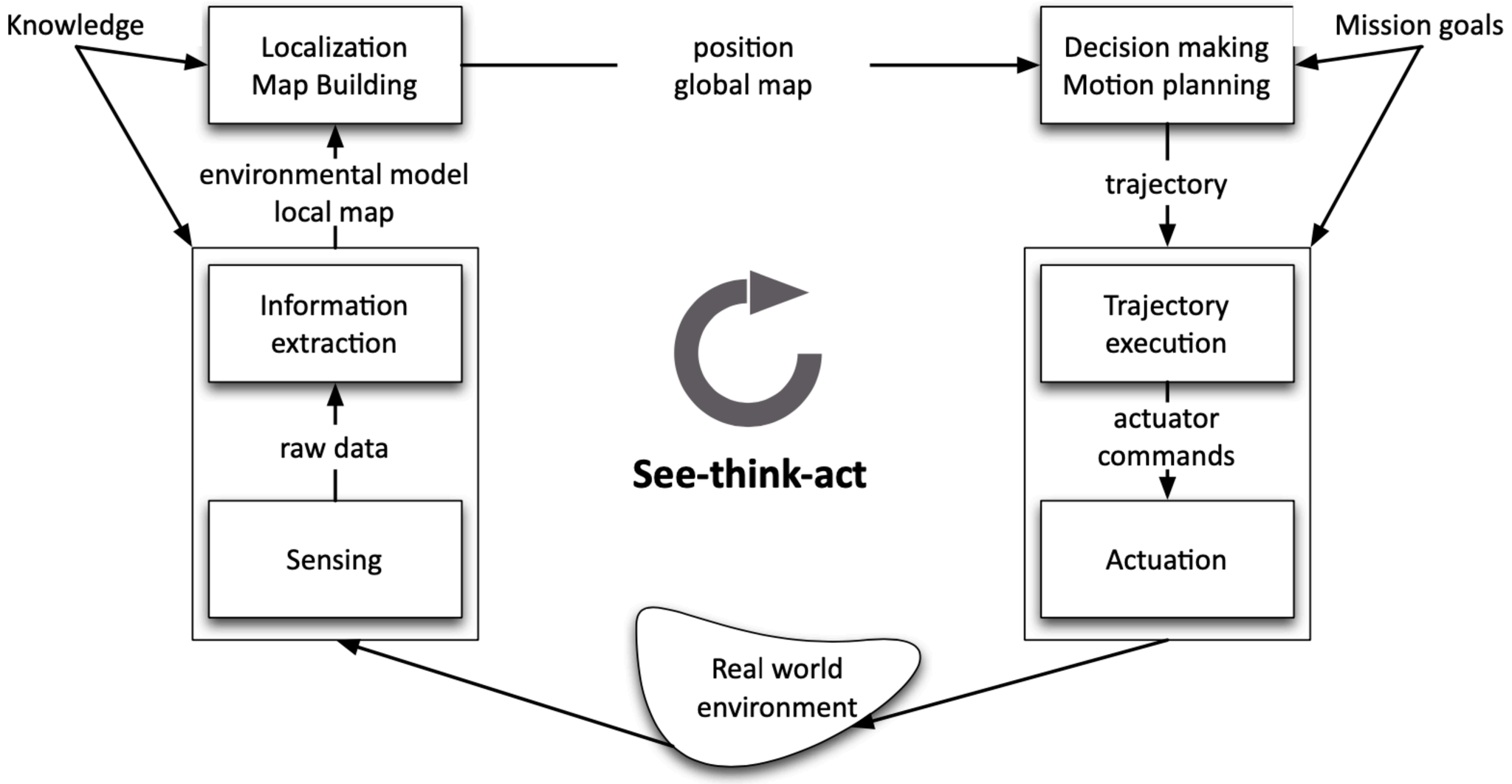
PLAN

Determine current location.
Determine goal.
Plan path or trajectory

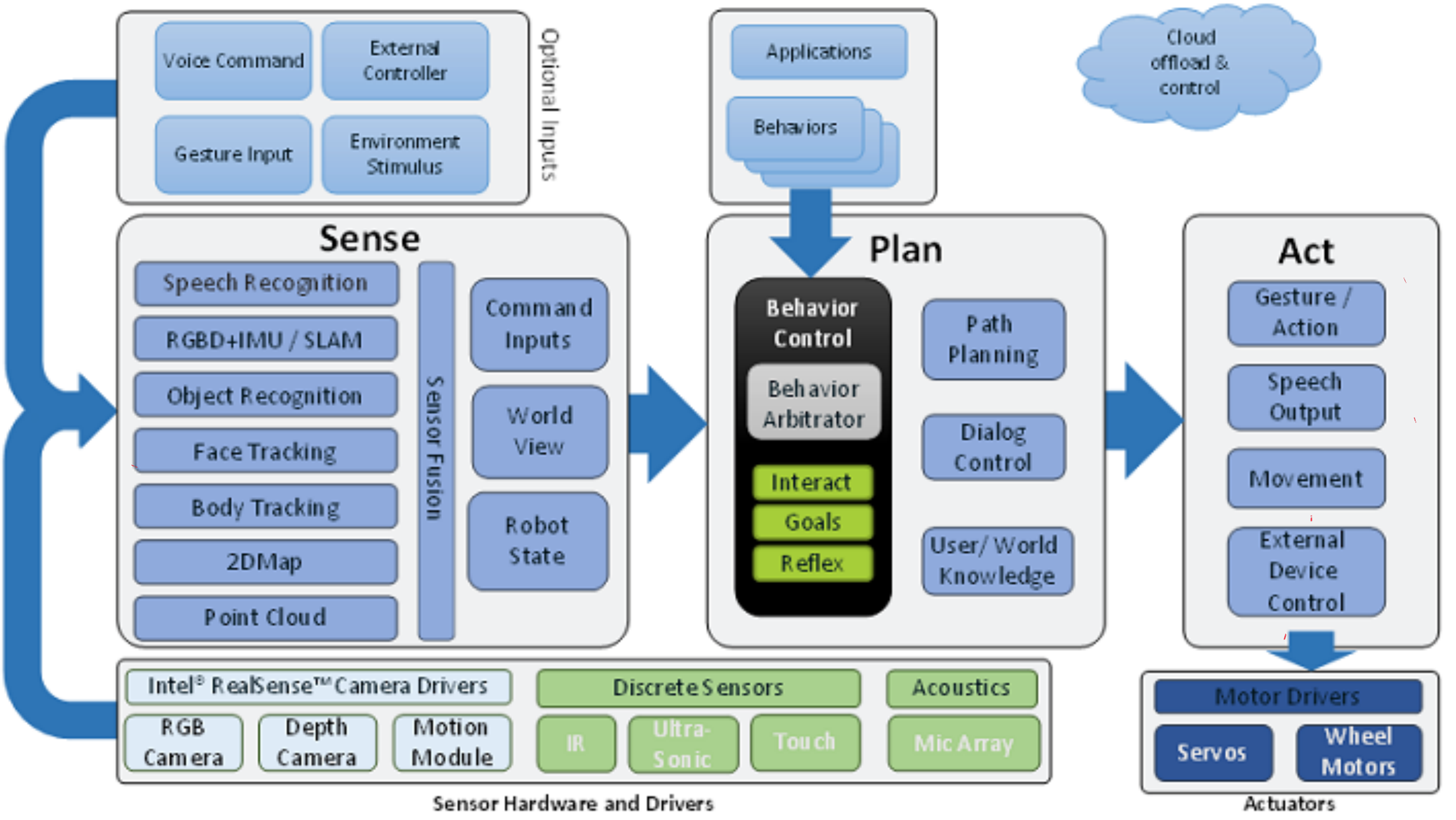
ACT

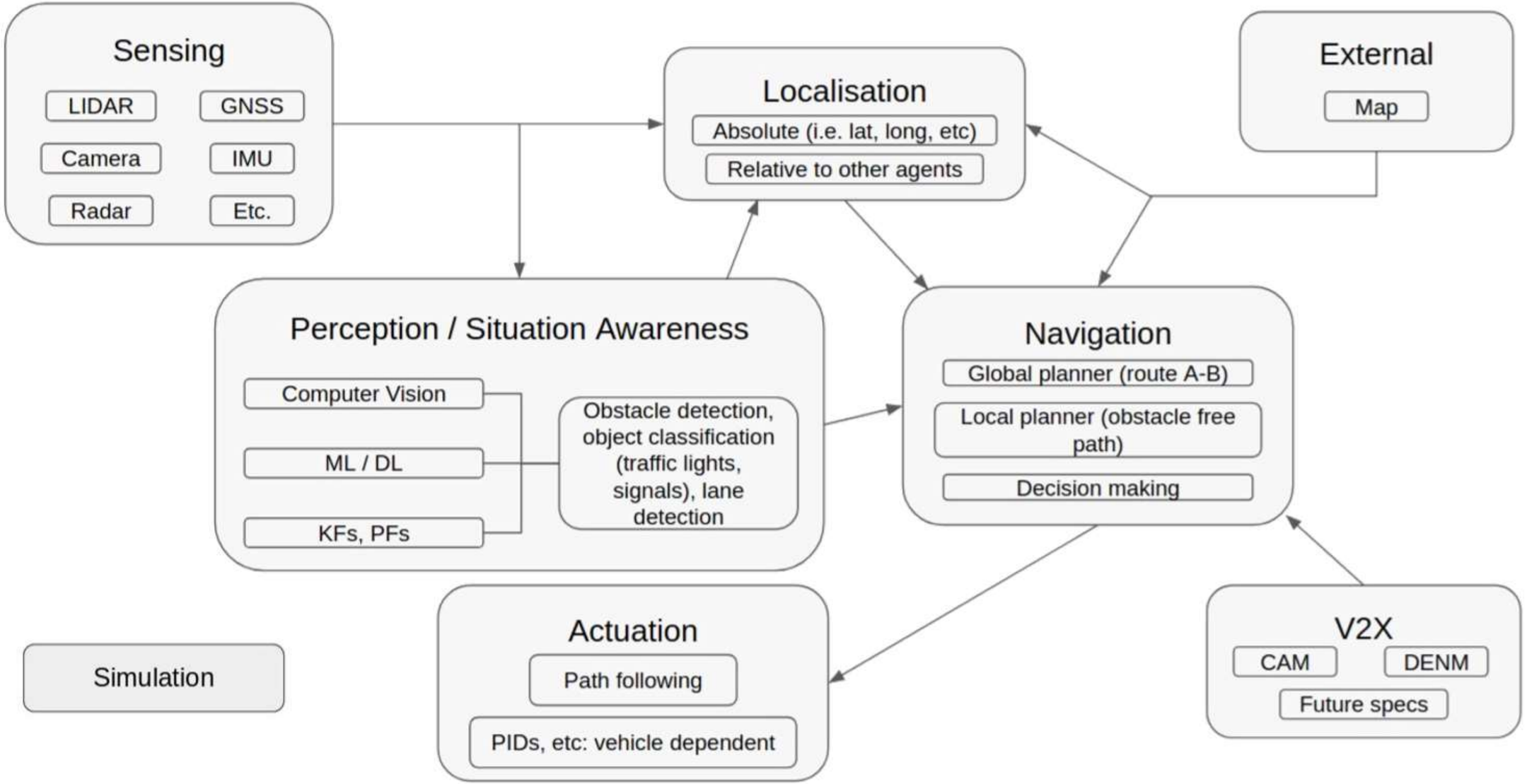
Actuate joints.
Navigate from one location to another.
Interact with humans.

The see-think-act cycle



slide from CS 237A stanford


Voice Command
External Controller
Gesture Input
Environment Stimulus
Optional Inputs
Applications
Behaviors
Cloud offload & control
Sense
Speech Recognition
RGBD+IMU / SLAM
Object Recognition
Face Tracking
Body Tracking
2DMap
Point Cloud
Sensor Fusion
Command Inputs
World View
Robot State
Plan
Behavior Control
Behavior Arbitrator
Interact
Goals
Reflex
Path Planning
Dialog Control
User/ World Knowledge
Act
Gesture / Action
Speech Output
Movement
External Device Control
Intel® RealSense™ Camera Drivers
RGB Camera
Depth Camera
Motion Module
Discrete Sensors
IR
Ultra-Sonic
Touch
Acoustics
Mic Array
Sensor Hardware and Drivers
Motor Drivers
Servos
Wheel Motors
Actuators



slide from CS 237A stanford

User Application	System Integration	Application	Release		
Algorithmic Software	2D+3D Perception, Tracking, Class.	AI/ML based Scene Understanding	Localization	Route Planning, Decision Making	Motion Planning and Control
Framework Software	Abstraction of hardware, middleware, OS, interfaces	Middleware	Safety Support	Security Support	Diagnostics
Operating System	Kernel	Scheduler	Driver		
Functional Safety	Regulations, Homologation	Security	Safety	Verification	Validation
Testing	Unit tests	Regression Tests	Integration Tests	SIL/HIL Tests	Vehicle Tests
Design	User Experience	Interior Interaction Design	Exterior Interaction Design		
Development Tools	Development Environment	Visualization	Simulation		
Data Processing	Data Recording	Data Playback	Data Annotation	Data Management and Analytics	
Operations	Fleet Management	Fleet Routing	Tele-Operation	Remote Diagnostics	
Mapping	Creation	Annotation	Update	Distribution	
Maps	Topological Layer	Relational Layer	Physical Layer		
Sensors	GNSS	INS/IMU	Lidar	Camera	Radar
Components	Computing	Cloud Connectivity	In-Vehicle Connectivity	Data Recorder	Data Storage
Vehicle	Interfaces to:	Drive Train	Braking System	Steering System	Electronics

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slide from CS 237A stanford

Apollo 5.0

Cloud Service Platform

- HD Map
- Simulation
- Production components
- Data Pipeline
- Security
- OTA
- DuerOS
- V2X

Open Software Platform

- Map Engine
- Localization
- Perception
- Prediction
- Planning
- Control
- HMI
- Apollo Cyber RT
- RTOS
- V2X Adapter

Hardware Development Platform

- Computing Unit
- GPS/IMU
- Camera
- LiDAR
- Radar
- Ultrasonic Sensor
- HMI Device
- Black Box
- ASU
- AXU
- V2X OBU

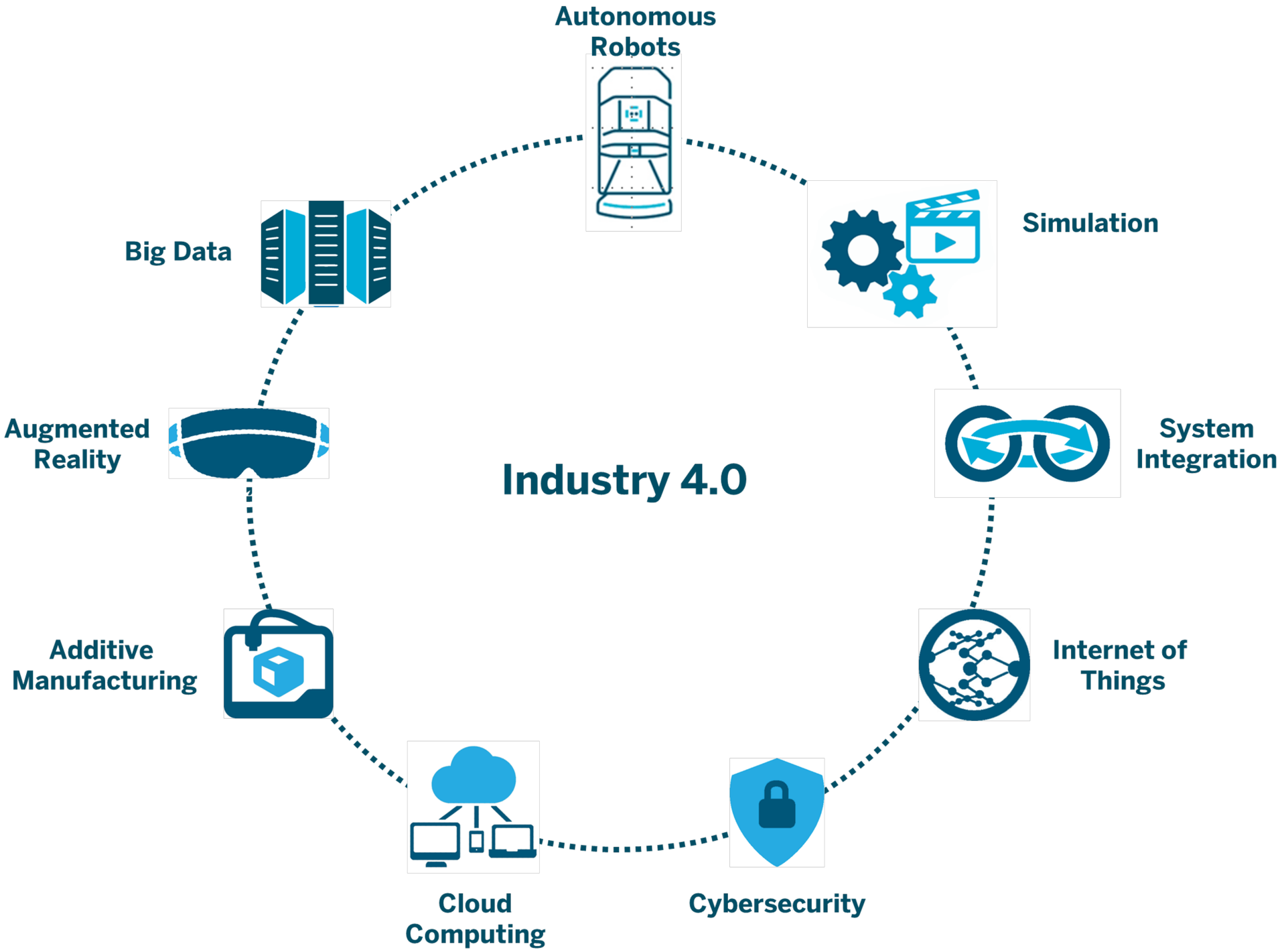
Open Vehicle Certification Platform

- Certified Apollo Compatible Drive-by-wire vehicle
- Open Vehicle Interface Standard

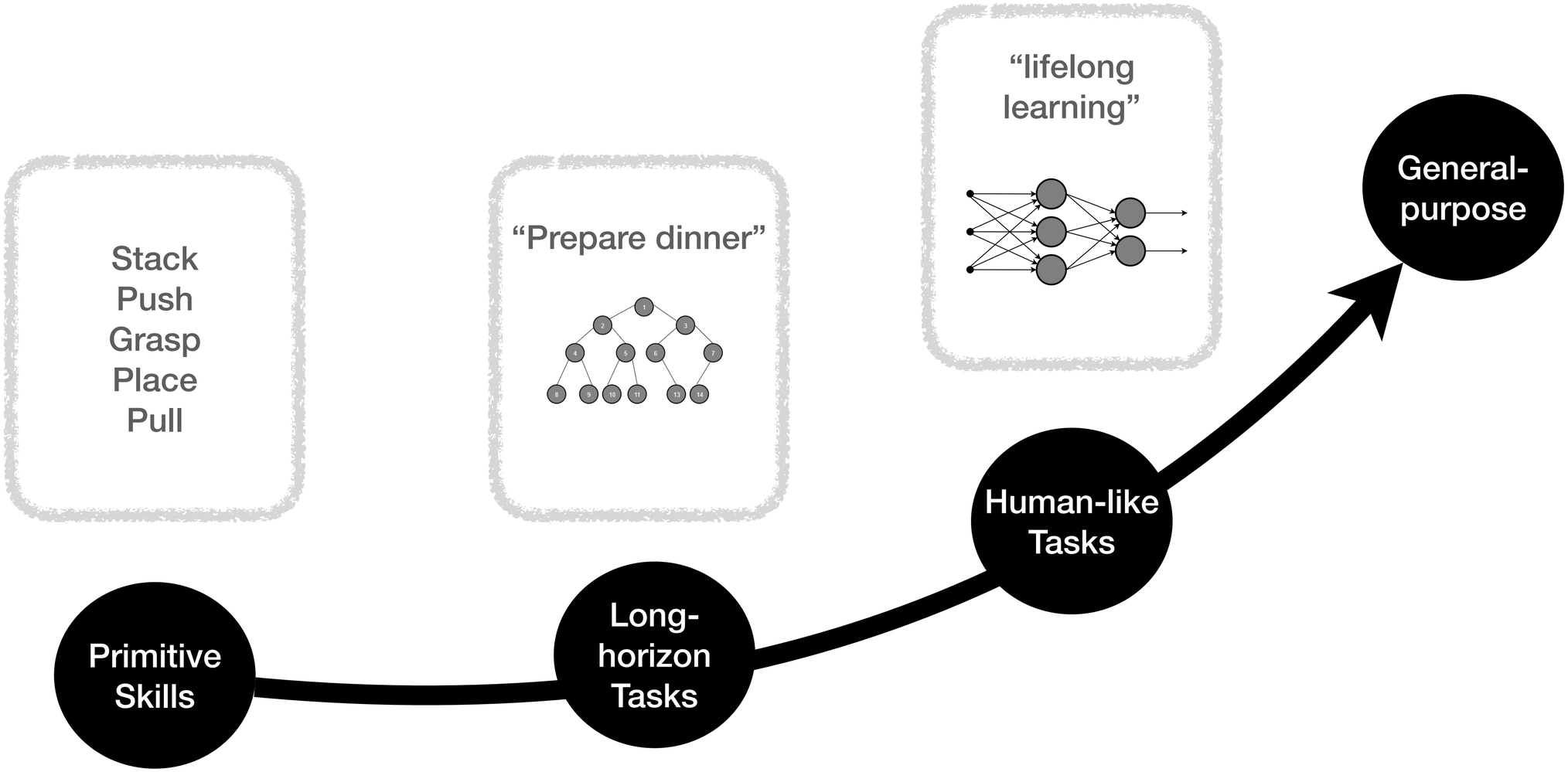
New Service Offering

Feature Update

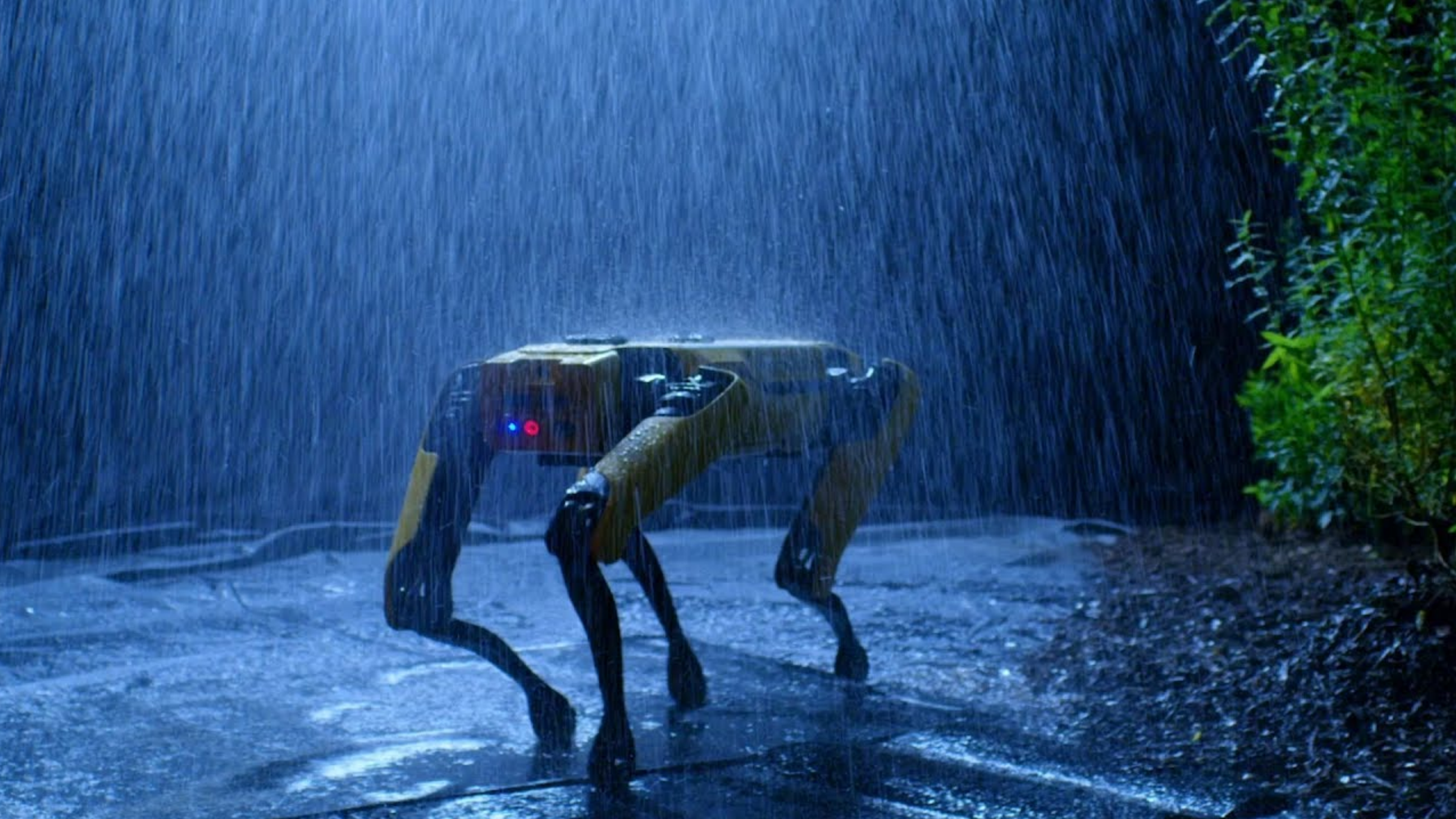
slide from CS 237A stanford


Industry 4.0
Autonomous Robots
Simulation
System Integration
Internet of Things
Cybersecurity
Cloud Computing
Additive Manufacturing
Augmented Reality
Big Data

Roadmap to Autonomy



Slide From Yuke Zhu's talk



Brand manifesto | Kia

“Movement That Inspires.”

–*KIA*자동차

Break Time

“Movement That Inspires.”

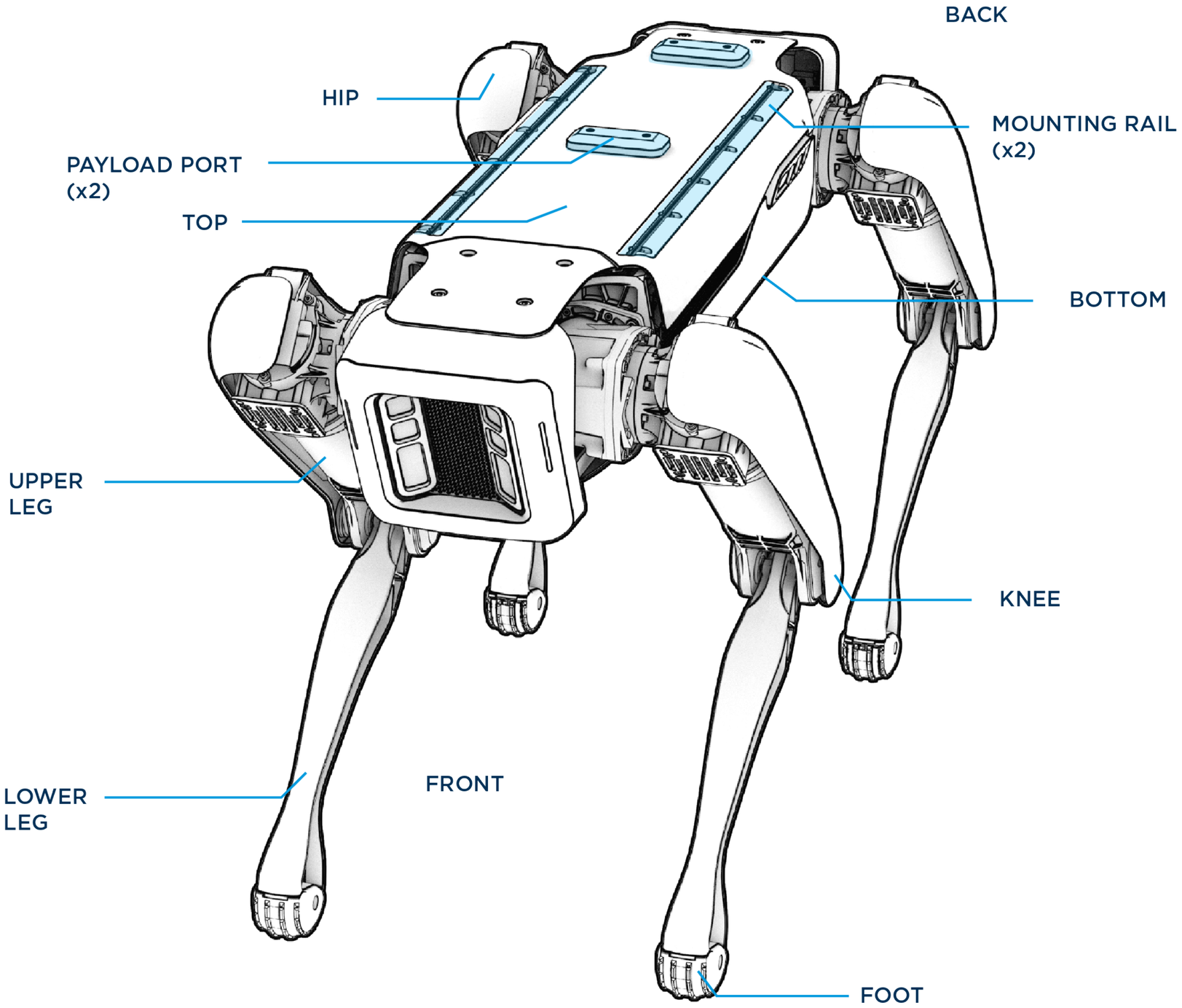
–KIA자동차

Ideation

Spot API Overview

SPOT HW

- 5 pairs of stereo camera
- 2 actuators in each hip
- 1 actuate in each knee
- Typical Runtime 90min
- Max Payload 14kg



Spot Autonomy

Spot

autonomy

robot

core

GraphNav
graph-nav-service
recording-service

Missions
robot-mission

Choreography
choreography

Docking
docking

State
image
local-grid
robot-state
world-objects

Control
estop
lease
power
robot-command
spot-check

Data
data-buffer
data-service
data-acquisition
data-acquisition-store

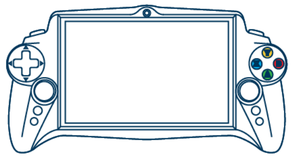
Base
auth
directory
log-annotation
robot-id
time-sync

Payloads
directory-registration
payload

Server

Network

Client python™



Spot

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Robot Operating System (ROS)

Client python™

SPOT®
ROS Package
ROS
CLEARPATH
ROBOTICS™

Lab1.1: 환경설정

1. Install Python3.6
2. Install ROS1 Melodic

(+option: ROS2 Dashing)

3. Make account & Install Unity

Lab1.2: Play

4. Teleop Turtlebot3
5. Fast prototyping with Colab

(Body & Hand Pose)

- TRT_POSE https://colab.research.google.com/drive/1Q2OUObK8o9RldZGmD0WC2GExK6Q9Qwon?usp=sharing

- OPENPOSE https://colab.research.google.com/drive/1RGIqOm23P8apzhS9cpmhU7WsV6VS7kb0?usp=sharing

- Tutorial https://colab.research.google.com/github/filipefborba/HandRecognition/blob/master/project3/project3.ipynb#scrollTo=l20Rj1HP7LB-

- YOLO https://colab.research.google.com/drive/1RGIqOm23P8apzhS9cpmhU7WsV6VS7kb0?usp=sharing

감사합니다!

Thank You!