IoT Project | Automated Guided Vehicle

A robot with manual and auto operation modes which is used to transport packages from the warehouse to production lines

* Solution 1: Get the package from operation staff, then transport to the desired production line by defined route on the floor via sticked RFID cards and Bluetooth Low Energy stations

Providing monitoring and controlling user interface via web app, API endpoints for intergrating with other systems

* Solution 2: Get the package from operation staff, then transport to the desired production line by integrated camera and black line tapes on the floor
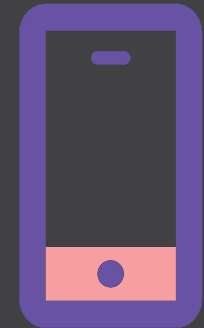
Multiple operating modes

Allowing admin or developer directly control AGV via web app

Manual mode

Via AGV integrated display

Warehouse operator or worker chooses pick up and delivery target location

Via mobile app

Operator or worker chooses delivery package part on MES Mobile app

Automated mode

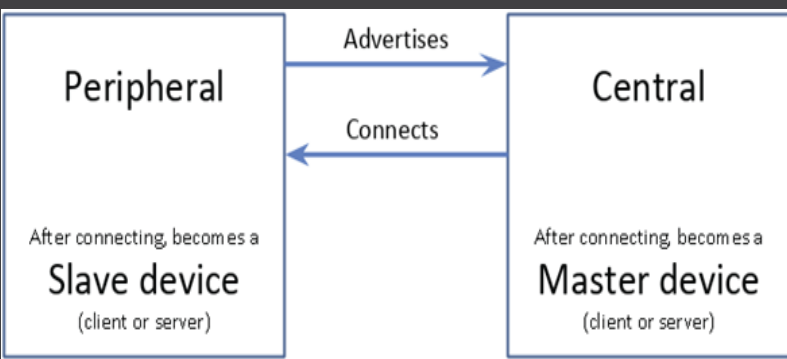# Navigation and position system | Bluetooth Low Energy

Working principle

BLE Profiles

Beacon position data

↓

BLE Profiles

↓

Processing to get corresponding coordinate

GAP Profile

Peripheral	Advertises →	Central
	← Connects	
After connecting, becomes a **Slave device** (client or server)		After connecting, becomes a **Master device** (client or server)

GATT Profile

Profile

Service
- Characteristic
- Characteristic
- Characteristic

Service
- Characteristic
- Characteristic

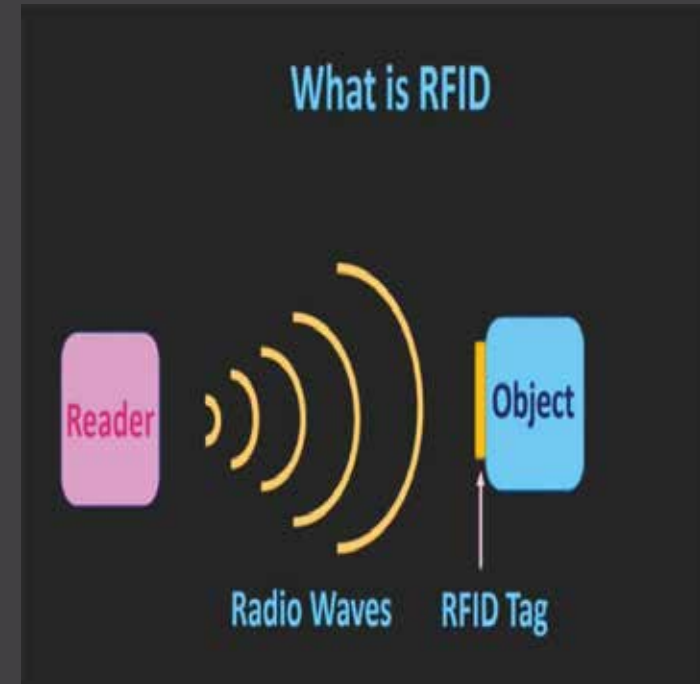## Working principle

Read data on card via card reader

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RFID card position data

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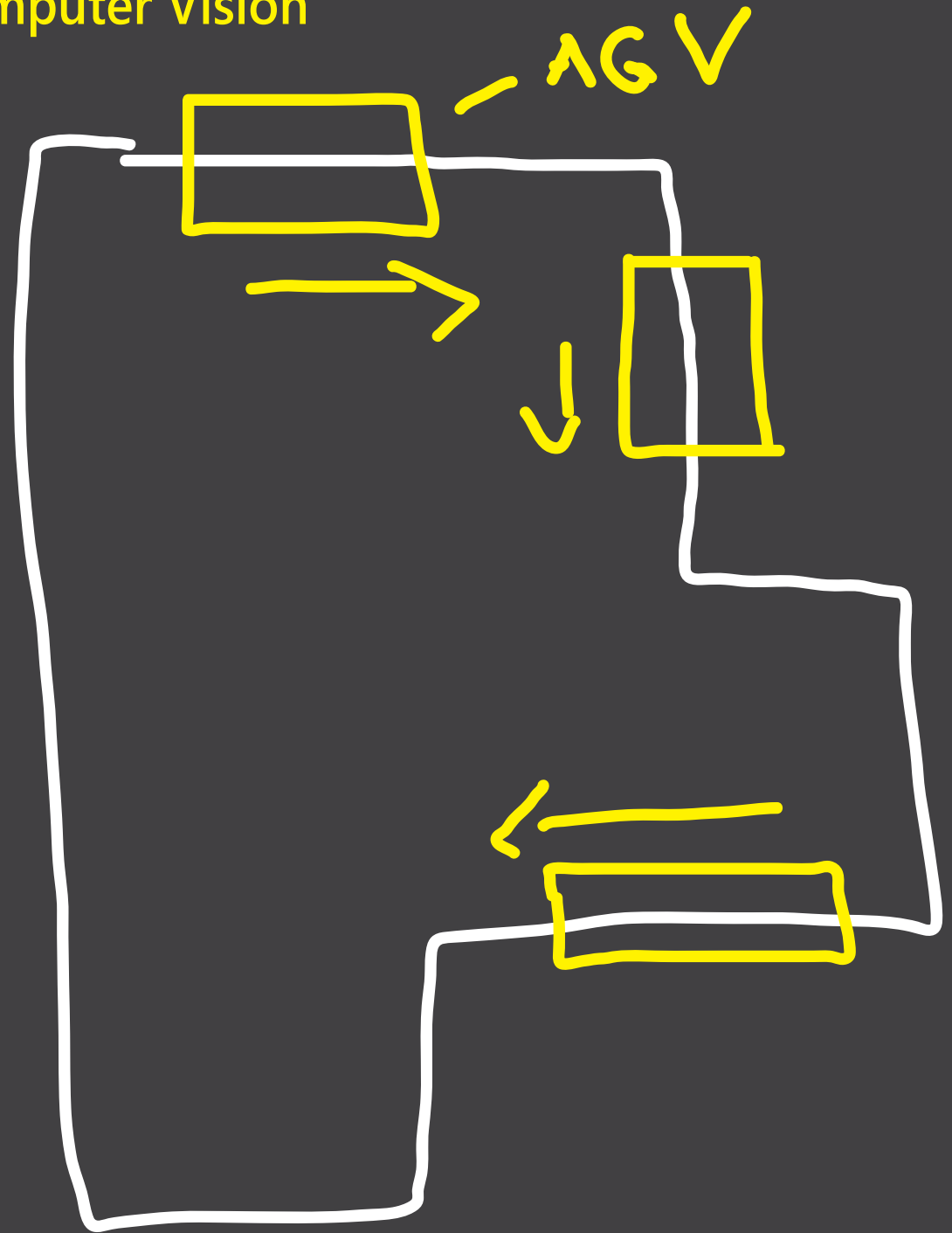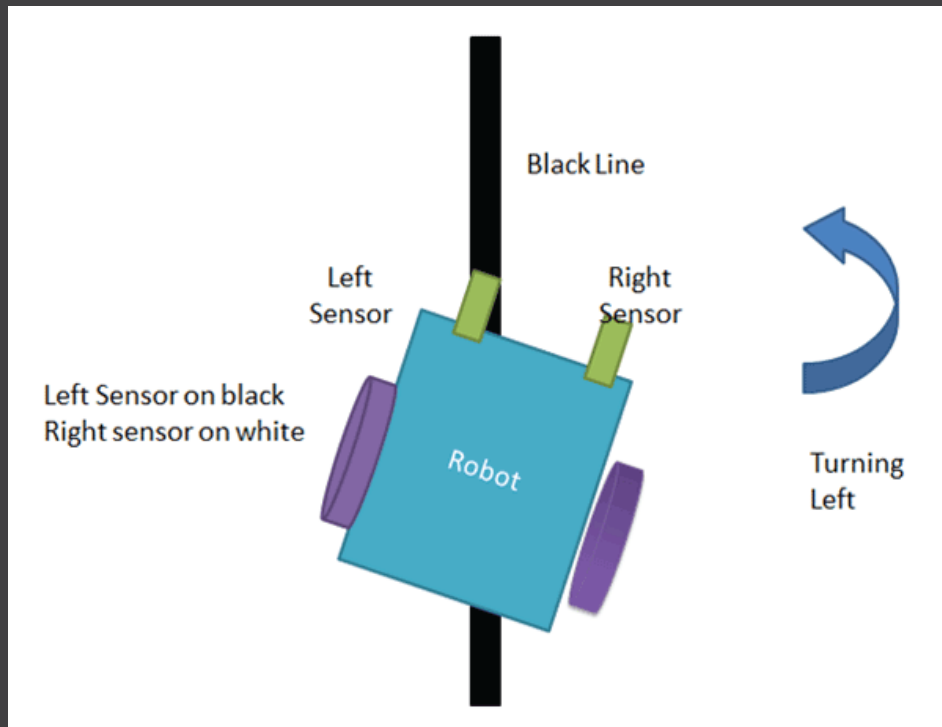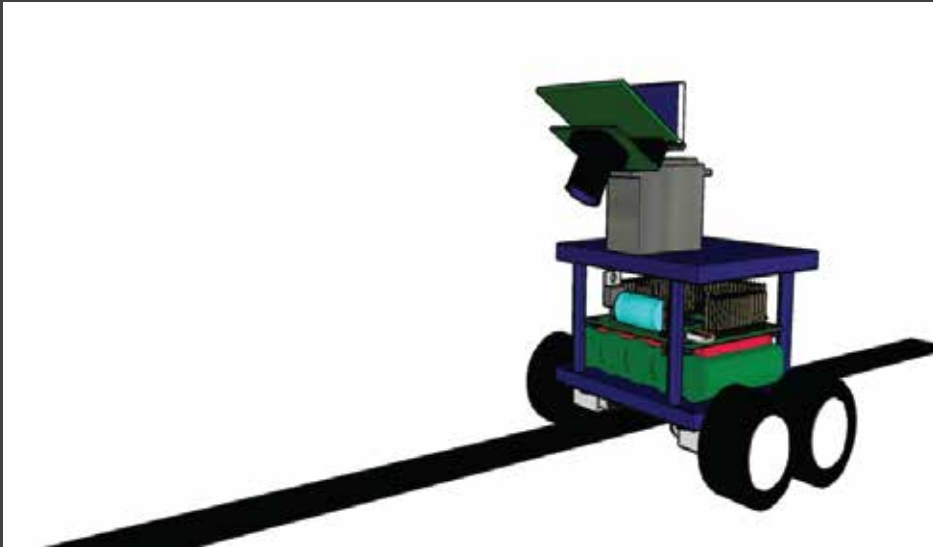**Processing to get corresponding coordinate**

Capibility

Write new data to RFID card

Change/Update data to RFID card

Navigation and position system | Computer Vision

Working principle

Black Line

Left Sensor

Right Sensor

Left Sensor on black
Right sensor on white

Robot

Turning Left
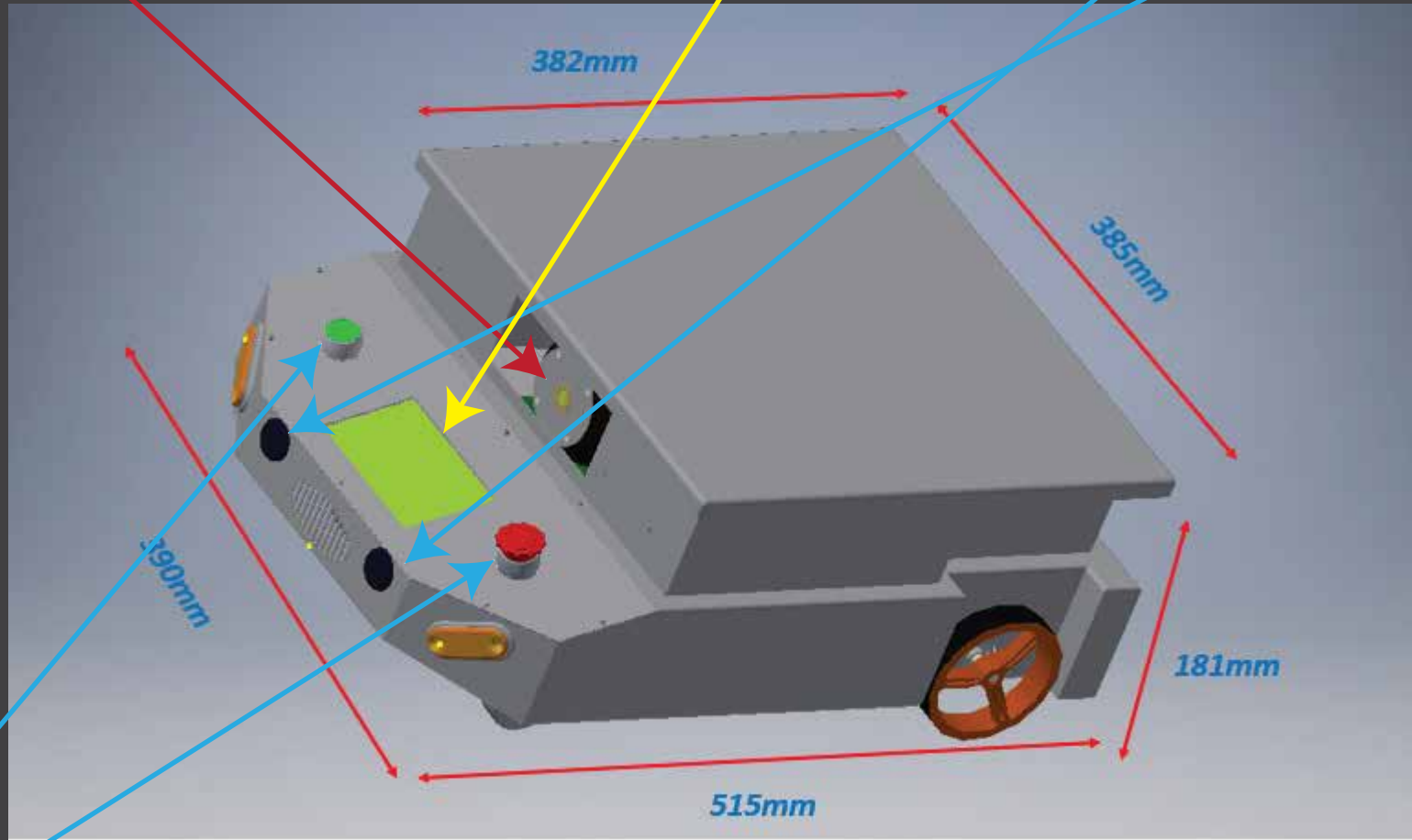
AGV

Hardware

Camera for monitoring easier

Touchscreen for manual configuration and display operating data

Sensors for avoiding obstacles

Start/Emergency Stop button

382mm

385mm

390mm

181mm

515mm

RFID Card Reader

IP Camera

Video data
for monitoring

Serial connection

ESP32
Development Board

Motor controller

DC motor and wheel

Serial connection

Raspberry Pi
Embedded Computer

Gets RSSI
from transmitter

Broadcasts
bluetooth data

ESP32
Development Board - BLE Receiver

ESP32 - BLE Transmitter

Serial connection

Battery Pack

LCD Touchscreen
for onsite operator

ESP32
Development Board

Gets distance
value from sensor

Laser pulse
with distance
data

VL53L0X laser sensor

Obstacle/Object