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BOA303

Building a seamless car parking experience with AI/ML and IoT

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Parking can be messy

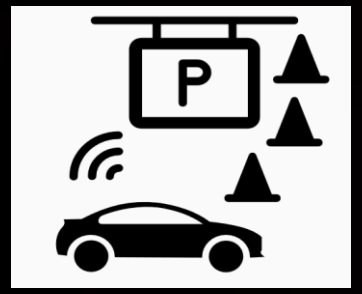
- Finding a spot
- Parking solutions are expensive
- Humans



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Tech needs for parking systems

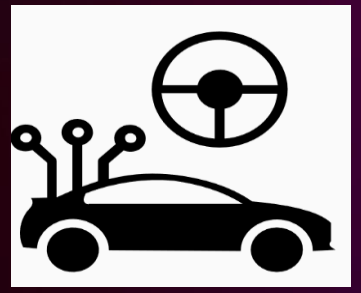
KEY TRENDS DRIVING THE FUTURE OF PARKING



Find a spot automatically



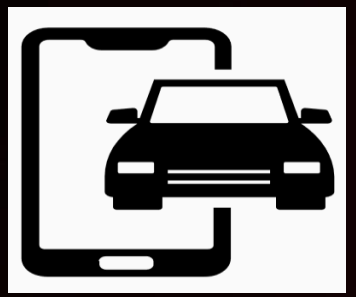
Reserve a spot before arriving



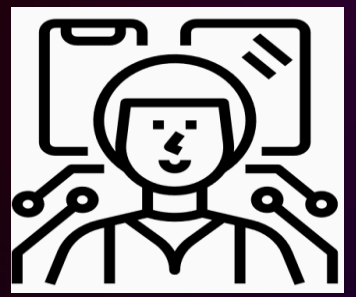
Integrating autonomous vehicles



Disconnected operation



Real-time app notifications



Virtual payment

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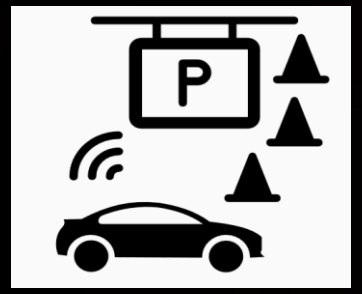
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We always come back to Amazon Go

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Our focus for this demo

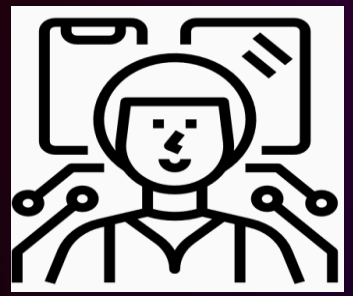
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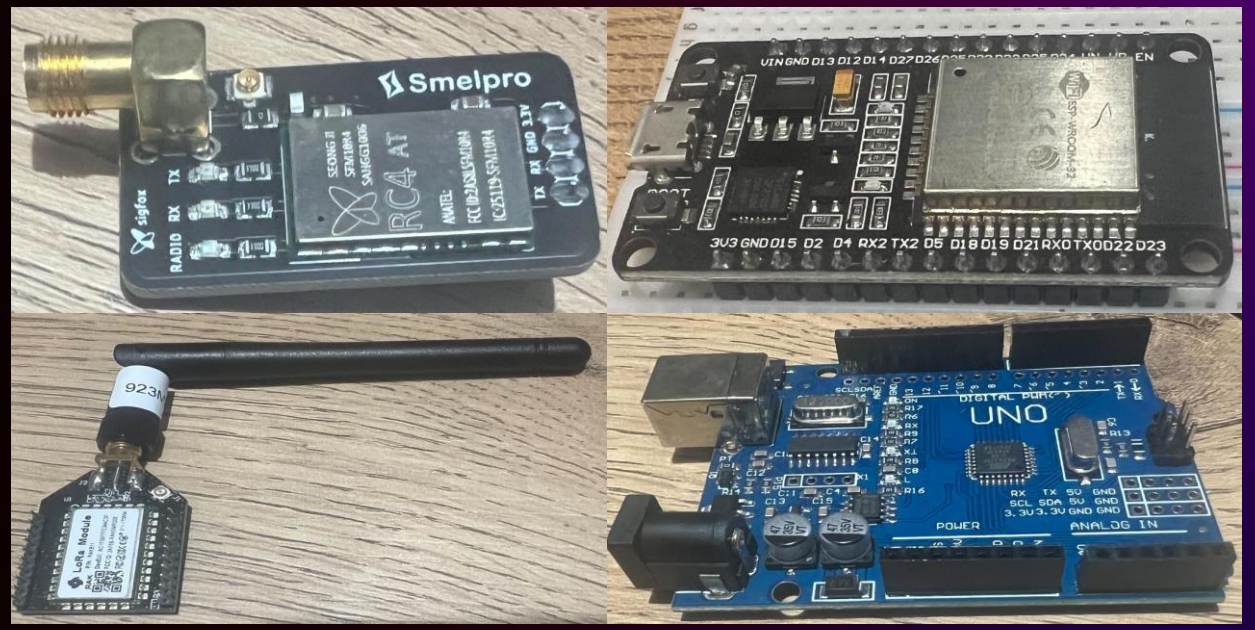
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What is necessary to build an IoT solution?

To build an IoT solution we need to start defining:

- Sensor or sensors
  - Radar/ultrasonic/IR/both
- MCU and package
  - Arduino/RPi4/ESP32
- Communication technology hardware/protocol
  - MQTT/LoRaWAN/Zigbee/Sigfox/WIFI

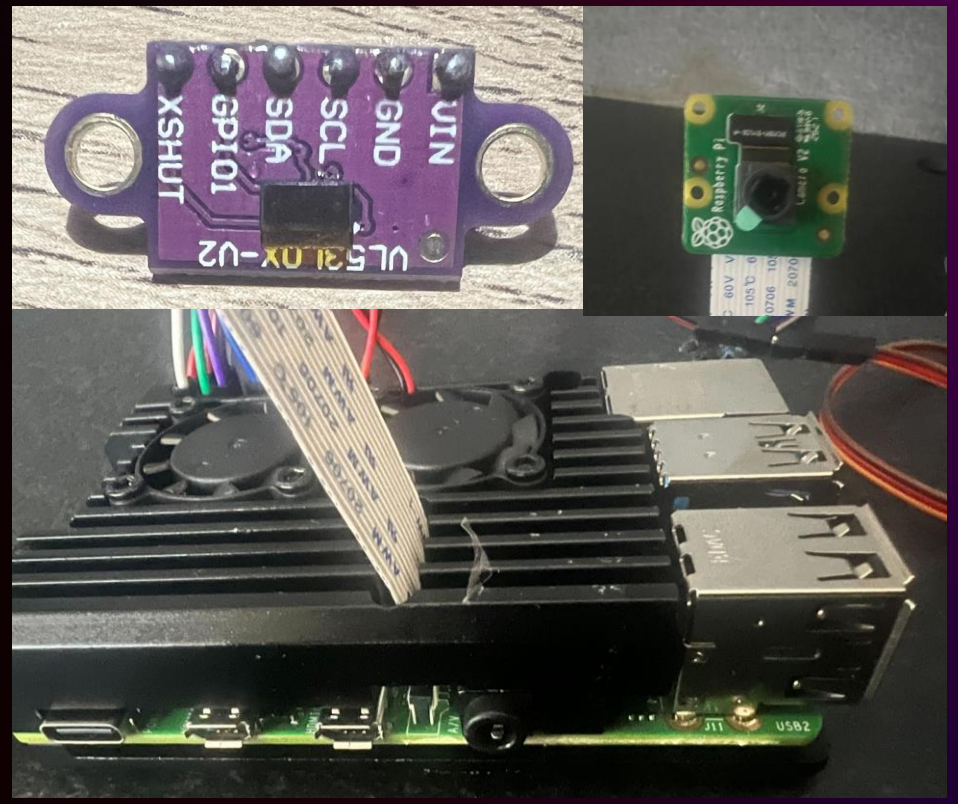


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Diving deep in IoT available solutions

We chose:

- Time-of-Flight ranging sensor – VL53L0X
- Raspberry Pi 4B
- Raspberry PI Camera
- Servo Motor to emulate the gate
- Ethernet / WIFI



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Under the hood

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How does it works?



Time-of-Flight Sensor	RPI camera	AWS Lambda functions	AWS IoT Core



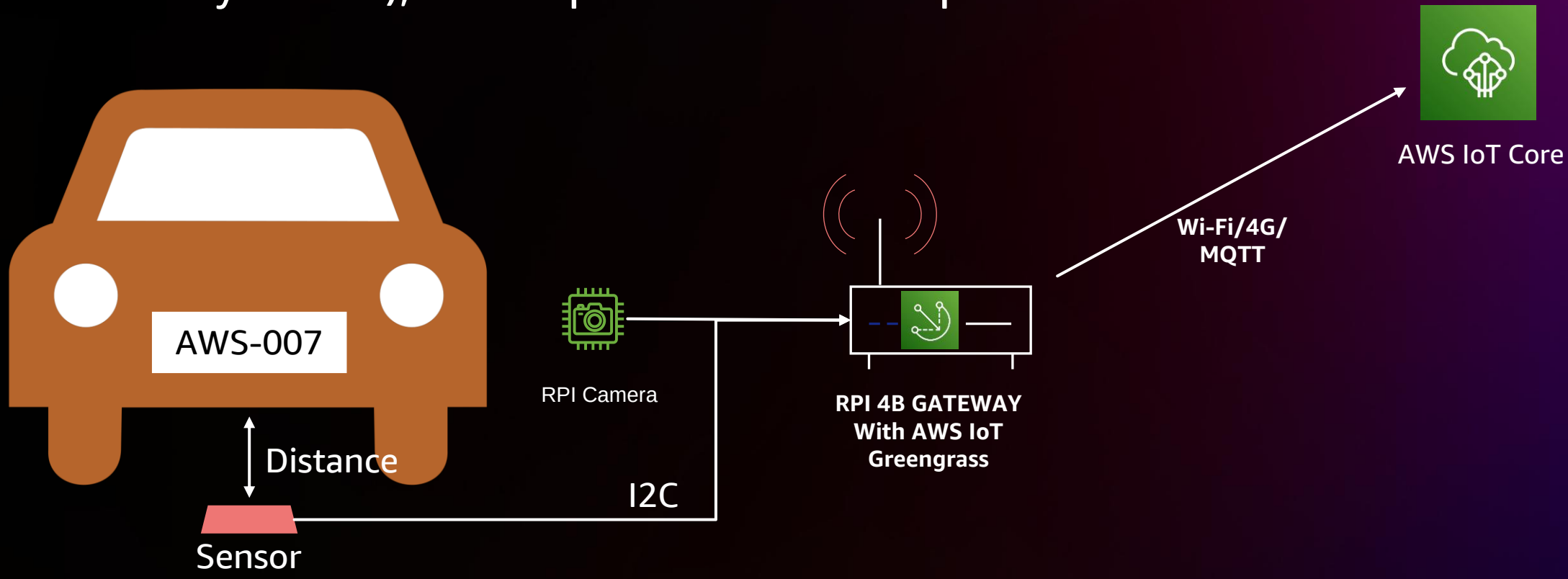
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Whiteboard

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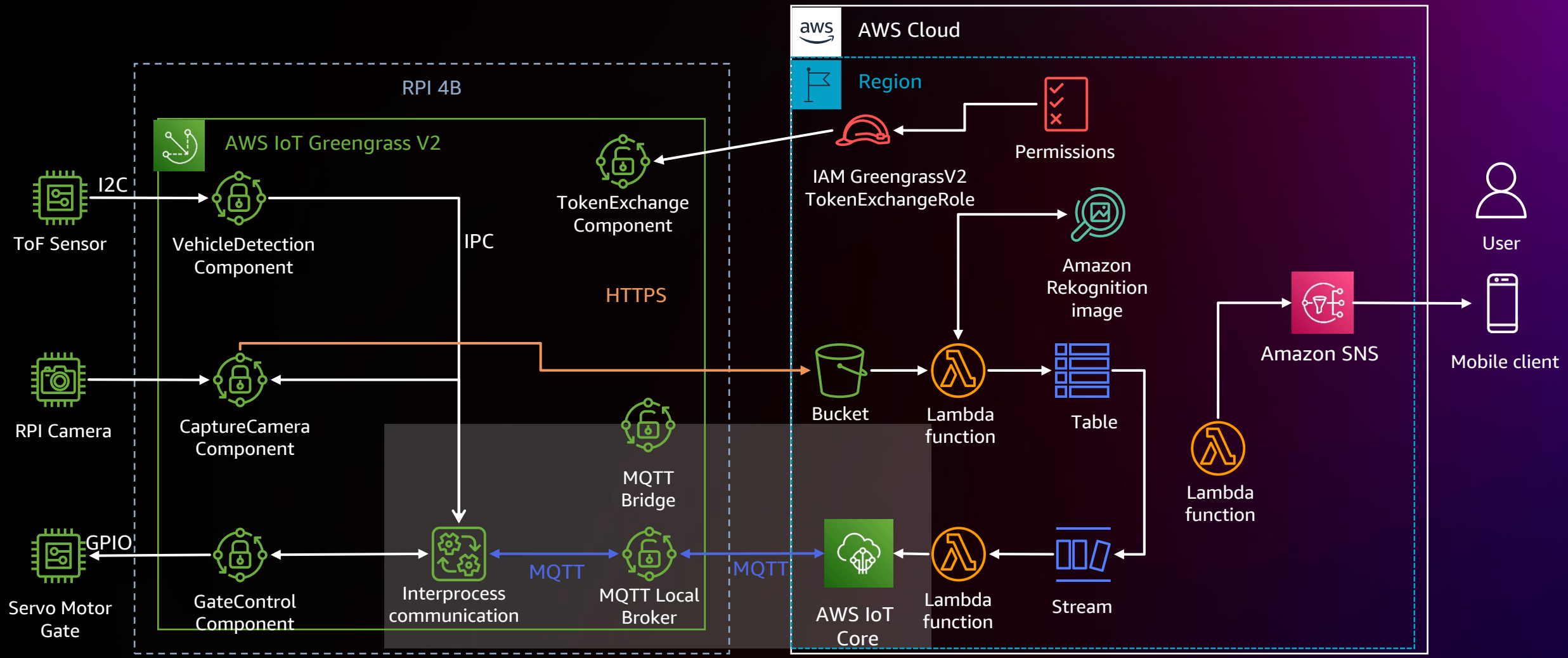
Logic of the parking gate car detection

The Time-of-Flight sensor gives us a distance number. Depending on the distance, we can calculate if it's a car or if an error occurred (such as a dirty sensor), then a picture of the car plate is taken.



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Architecture of the solution



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What’s next

- Everything working offline
- Integration with smart cars through APIs
- Security features like movement detection near the car
- Complying with industry standards
- Your ideas or feedback!

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Wrap up

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Thank you!

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