Smart parking lot to deal with flooding

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Abstract

The purpose of this innovation is to design an intelligent parking lot that can effectively deal with flooding. It is specially designed to help the parking lot in low-lying places, to avoid damaging the cars in bad weather. And giving a better protection to against flooding.

Creative point

1. Automatic lifting function gate:

Prevent water flooding in by detecting water level inside and outside of the parking lot.

2. Automatic parking lifting function:

The parking space that has car will rise to prevent water flooding in, by using AI object identification.

3. Promptly security warning:

Automatic Voice system and screen display, reminding people to pay attention to personal safety.

4. Automatic drainage function:

Solve flooding situation as soon as possible by draining water through the pump automatically.

Design background

Macau is a coastal city that is easy to be damaged by tide and sea level rising. When typhoon "Hato" came, low-lying places' parking lot was encountered by severe flooding, a lot of cars scrapped, some citizen was trapped in the parking lot until drowned. This phenomenon showed that when flooding come, low-lying parking lots' safety problem.
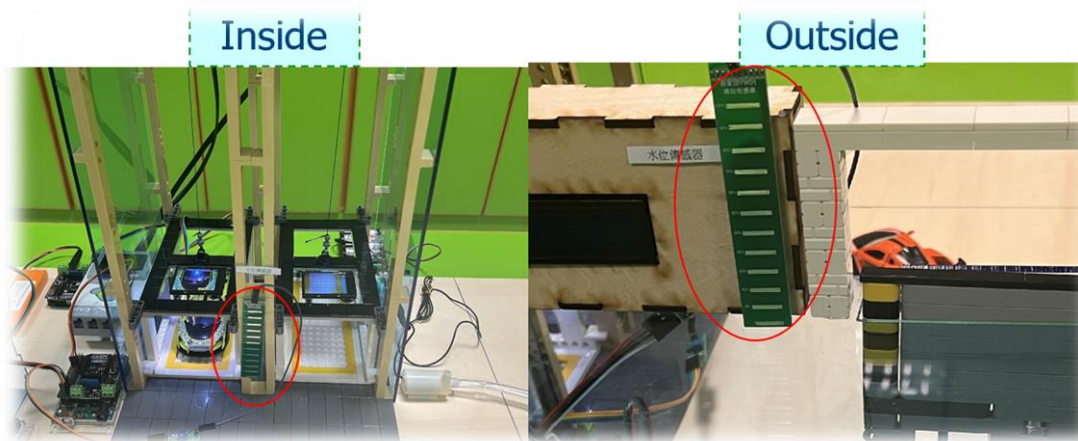
Consider that Macau's parking lot still have this problem, so our team decided to invent a parking lot that can deal with flooding, we discussed that which design, can make cars in parking lot to be free from flooding, and can also protect car owner's personal safety.
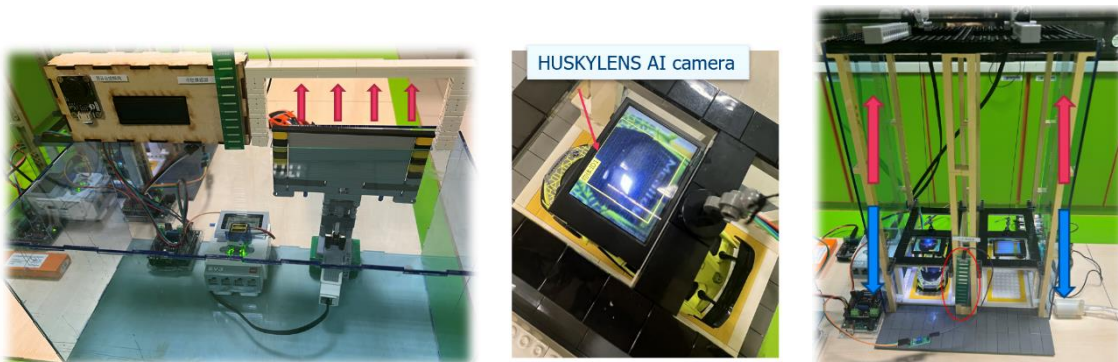
Innovation design

The innovation will be modeled to simulate the real parking lot.

The water height inside and outside the parking lot is different, so we decided to set the water level sensor both inside and outside, to detect water level anytime.

Also, currently, most of the Macau's low-lying parking lot cannot perfectly prevent water flooding in, so we designed a gate to prevent water, which comes out at the bottom, this design can prevent water more efficiently. The parking space in parking lot can rise or down by using object recognizing when the water level detecting.

Innovation function

According to Centers for Disease Control and Prevention, if water level reaches 30 cm, people will slip more frequently when walking. Royal Life Saving Society – Australia also said that if water level reaches 90 cm, people might higher injury chance. So, automatic water gate's rise and down will follow two rules.

1. If **Indoor's** water level sensor detects water level is higher than 50cm (simulated water level), automatic water gate will **rise** and close.
2. If **outdoor's** water level sensor detects water level is higher than 20cm (simulated water level), automatic water gate will **go down** and close.

When indoor's water level sensor detects the water level is over a specified value, which means the flooding situation become worse:

1. The gate outside the parking lot will automatically rise to prevent the water flooding into the parking lot.
2. The voice system of the parking lot will automatically remind people to evacuate as soon as possible, and the danger warning will be displayed through the screen.
3. Object recognition through the AI Camera, to determine whether there is a car in the parking space. After identifying which parking space has a car, the parking space will automatically rise through the motor to avoid the flooding.
4. At the same time, the water pump in the parking lot will drain the water automatically.
5. Until parking lot's water is gone completely, the parking space will go down and the gate will open again.

Expand function

Using IOT and weather forecast to make water gate's closing faster, more accurately and more efficiently preventing water to pour in.