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SMART PUBLIC RESTROOM (Using IOT)

INTRODUCTION:

- Smart public restrooms use the Internet of Things (IoT) to monitor and maintain cleanliness and hygiene. IoT is a network of objects that are connected through the internet and have sensors, software, and other technologies embedded to enable data transfer.
- After using the toilet, the flush system will start automatically. Then there are two sensors first is Ammonia sensor and another one is odour sensor measure odour into the washroom. If odour is present more than natural odour then room freshener system will ON automatically it maintain good smell in washroom.

To build an IoT sensor system and Raspberry Pi integration for smart parking, we will need the following components:

- **Raspberry Pi:** The Raspberry Pi is a small, inexpensive computer that can be used to run a variety of software applications, including IoT sensor systems.
- **IoT sensors:** There are a variety of IoT sensors available, depending on the specific data you want to collect. Some common sensors used in smart public restrooms include occupancy sensors, temperature and humidity sensors, air quality sensors, and supply level sensors.

- **Breadboard and jumper wires:** A breadboard and jumper wires are used to connect the IoT sensors to the Raspberry Pi.
- **Power supply:** The Raspberry Pi and IoT sensors need to be powered. You can use a USB power adapter for the Raspberry Pi and a battery pack or wall adapter for the IoT sensors.
- **Enclosure:** It is recommended to house the Raspberry Pi and IoT sensors in an enclosure to protect them from dust and moisture.
- **Software:** You will need to install software on the Raspberry Pi to collect and process the data from the IoT sensors. There are a number of different software options available, such as Node-RED and Python.

Once you have all of the necessary components, you can follow these steps to build and integrate your IoT sensor system with the Raspberry Pi:

- Connect the IoT sensors to the Raspberry Pi using the breadboard and jumper wires.
- Install the necessary software on the Raspberry Pi.
- Configure the software to collect and process the data from the IoT sensors.
- Test the system to make sure it is working properly.
- Place the Raspberry Pi and IoT sensors in the enclosure.
- Deploy the system in the smart public restroom.

Python scripts:

Python scripts for smart public restroom using IoT can be used to automate a variety of tasks, such as:

- Collecting and processing data from IoT sensors
- Controlling actuators
- Generating alerts

Here is an example of a Python script that can be used to collect and process data from an occupancy sensor:

```
import time
import board
import pwmio
import adafruit_mcp9601

# Create an MCP9601 object
mcp9601 = adafruit_mcp9601.MCP9601(board.I2C())
```

```
# Set the sampling rate to 1 Hz
mcp9601.sampling_rate = 1

# Start the sensor
mcp9601.start()

# Create a list to store the sensor readings
sensor_readings = []

# Loop forever
while True:
    # Read the sensor value
    sensor_value = mcp9601.read()

    # Add the sensor value to the list
    sensor_readings.append(sensor_value)

    # Wait for 1 second before reading the sensor again
    time.sleep(1)

    # If the list of sensor readings is full, calculate the average sensor value
    if len(sensor_readings) == 10:
        average_sensor_value = sum(sensor_readings) / len(sensor_readings)
        print(average_sensor_value)

        # Clear the list of sensor readings
        sensor_readings = []

# Stop the sensor
mcp9601.stop()
```

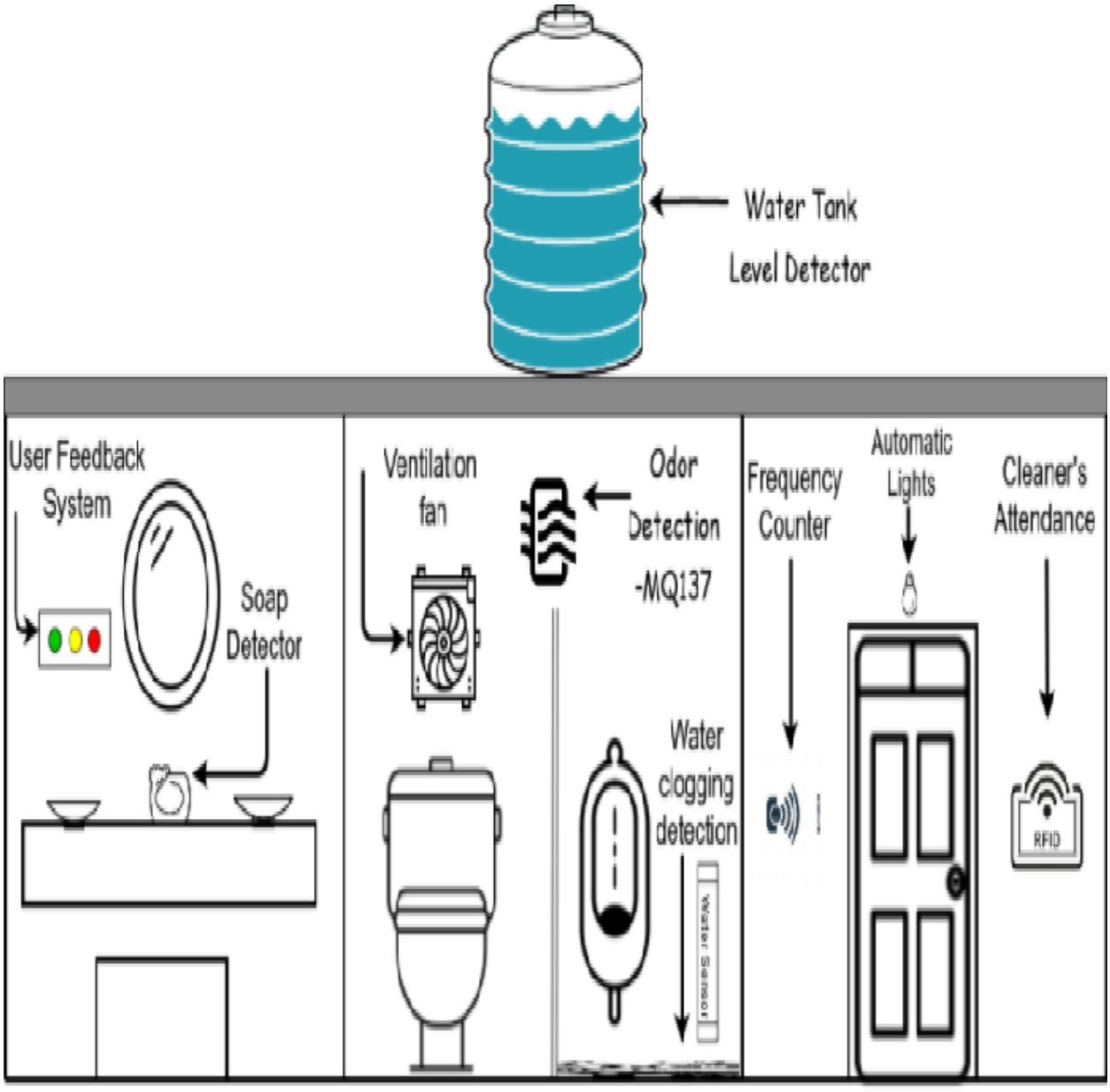
This script will read the occupancy sensor value every second and calculate the average sensor value over a 10-second period. The average sensor value is then printed to the console.

Send data to the cloud or mobile app server:

There are a number of different cloud platforms and mobile app servers that can be used for IoT applications. Some popular options include:

- **Cloud platforms:** Amazon Web Services (AWS) IoT Core, Microsoft Azure IoT Hub, Google Cloud IoT Core
- **Mobile app servers:** Firebase, AWS IoT Core Device SDK, Microsoft Azure IoT Hub Device Provisioning Service

Flowchart:



Conclusion:

- Smart public restrooms are still in their early stages of development, but they have the potential to revolutionize the way we use public restrooms. By using IoT technology to monitor and automate various aspects of the restroom, smart restrooms can help to improve hygiene, reduce costs, and improve the user experience.
- As the technology continues to develop and become more affordable, we can expect to see more and more smart public restrooms popping up in cities and businesses around the world.
- In conclusion, smart public restrooms using IoT are a promising technology that has the potential to make public restrooms cleaner, more efficient, and more user-friendly.