**INTERNET OF THINGS -GROUP 5**

**TEAM MEMBER**

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**PROJECT TITLE: Smart water system**

**PHASE 4:** **Development part-2**

IoT-based smart water system. In this phase, the basic coding for data collection.

**Data Processing and Analysis:**

To make your smart water system more effective, you can perform data processing and analysis. For example, you can calculate water usage trends, detect leaks, and analyze water quality. Python is commonly used for data analysis. Here's a simple code snippet to calculate daily water usage:

**Coding:**

import pandas as pd

# Load data from IoT device

data = pd.read\_csv('water\_data.csv')

# Calculate daily water usage

data['Date'] = pd.to\_datetime(data['Timestamp'])

daily\_usage = data.resample('D', on='Date')['FlowRate'].sum()

print(daily\_usage)

**Data Visualization:**

Data visualization can help in better understanding and presenting the collected data. You can use libraries like Matplotlib or Plotly for this purpose. Here's an example of a simple water usage plot:

**Coding:**

import matplotlib.pyplot as plt

plt.plot(daily\_usage.index, daily\_usage.values)

plt.xlabel('Date')

plt.ylabel('Water Usage (Liters)')

plt.title('Daily Water Usage')

plt.show()

**Alerts and Notifications:**

Implement alerts and notifications for anomalies such as leaks or abnormal water usage. You can use services like Twilio or Pushbullet to send alerts to users or administrators when an issue is detected. Here's a simplified example using Twilio for SMS alerts:

**Coding:**

from twilio.rest import Client

# Set up Twilio credentials

account\_sid = 'your\_account\_sid'

auth\_token = 'your\_auth\_token'

client = Client(account\_sid, auth\_token)

# Define a function to send SMS alerts

def send\_alert(message):

message = client.messages.create(

body=message,

from\_='+1234567890', # Your Twilio phone number

to='+9876543210' # Recipient's phone number

)

# Check for anomalies and send alerts

if daily\_usage.max() > 5000:

send\_alert("Abnormal water usage detected!")

**Remote Control:**

If system allows for it, can implement remote control features, like turning off/on water supply remotely. Be sure to implement proper security measures to prevent unauthorized access.

Remember to adapt the code to your specific IoT hardware, sensors, and data transmission protocols. Additionally, ensure that have taken necessary security measures to protect the data and the IoT devices.