IOT_PHASE 3

IOT WATER CONSUMPTION MONITORING SYSTEM:

Water management is a big problem in many apartments,

especially in cities like Mumbai, Bangalore, Chennai and Delhi. Indian cities are facing severe water crisis and this situation reaches its peak during summers.

But still there are wastage of a good amount of water every day. Many apartment authorities have not still taken necessary steps to manage the water scarcity issues in their building. In apartments, there is no system to know the quantity of water consumed by each flat.

They often divide total water bill equally a fixed amount for each flat. Water metering is the process of measuring water use through water meter and is one of the best ways to keep an account on the amount of water used in an apartment society. It provides an incentive for water conservation along with volumetric pricing. It helps the detection of water leaks in the distribution network which further provides a basis for the reduction of non-revenue water.

The water supply can be ended if the residents are not present in their home. This system enables residence or owners to pay for the water they use rather than paying a fixed amount.

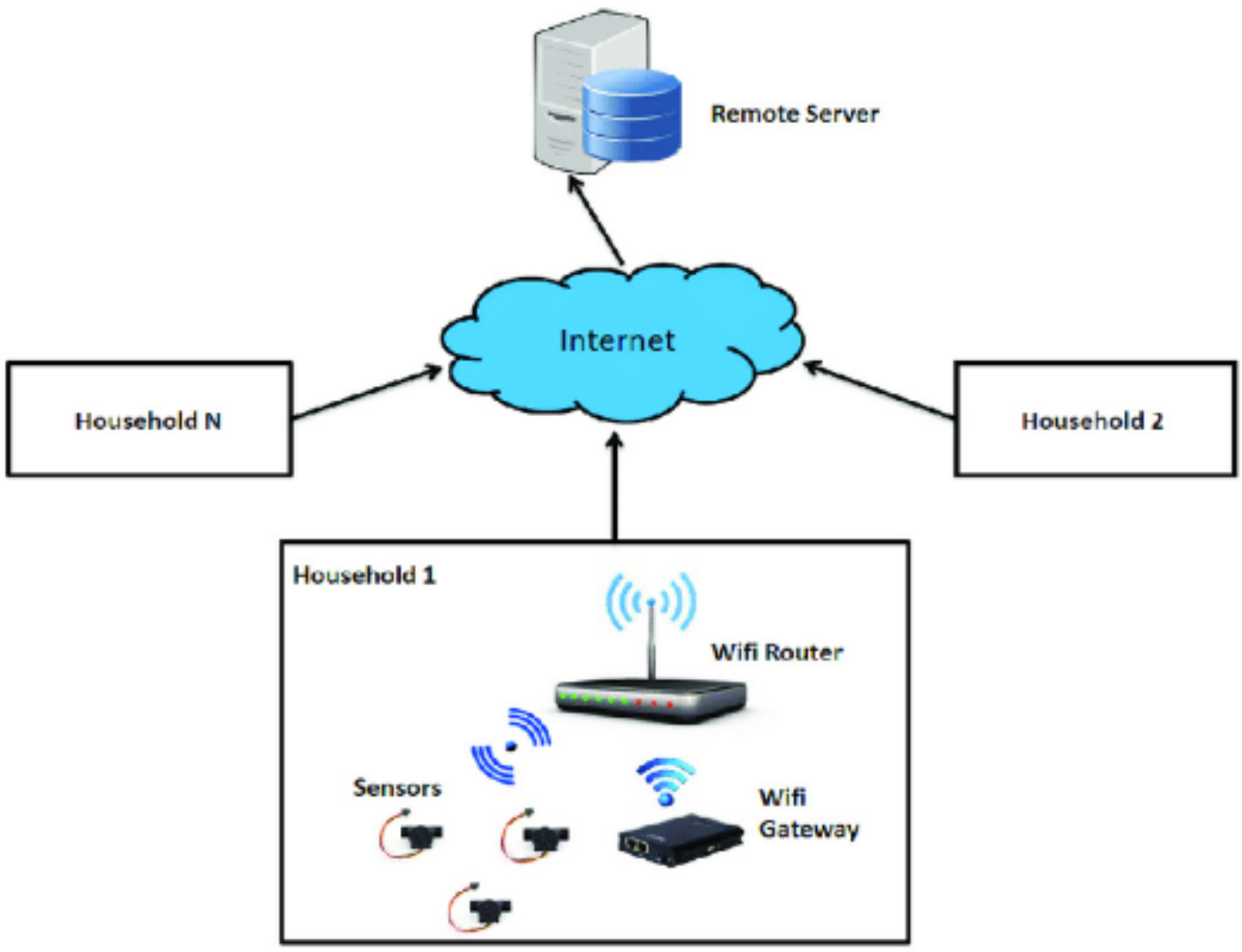
The water consumption monitoring system contains an

electronically controlled valve and micro controller with embedded hardware.

The sensor provides a series of pulses which is proportional to the water flow through the valve. By measuring the number of pulses, we can estimate the volume of the water flowing through the valve. This information is displayed in LCD module and the number of liters consume each day is sent to the owner via GSM module. The primary function of the system is to monitor and manage domestic water consumption. The water consumption is monitored directly from the pulse output of a conventional water meter via a fully electronic probe.

This ensures high accuracy, reliability, and long life.

Keywords: water flow sensor, GSM module, LCD



Scientific digram of water consumption monitoring system.

IOT SENSOR WATER CONSUMPTION MONITORING MEASURES IN PUBLIC PLACE :

Water pollution ensues when lethal materials move into water sources like ponds, rivers, lakes, seas and oceans, gets dissolved and suspends in water or gets deposited on the bed.

Pollution will degrade the quality and purity of water.

Destruction of biodiversity: Pollution of water reduces aquatic ecosystems and initiates

unrestrained increase of phytoplankton in water resources. Food chain contamination:
Fishing carried out in polluted water resources and utilization of waste water for agriculture and livestock husbandry may lead to addition of toxins or contaminants into foods that are injurious to the health after consumption.

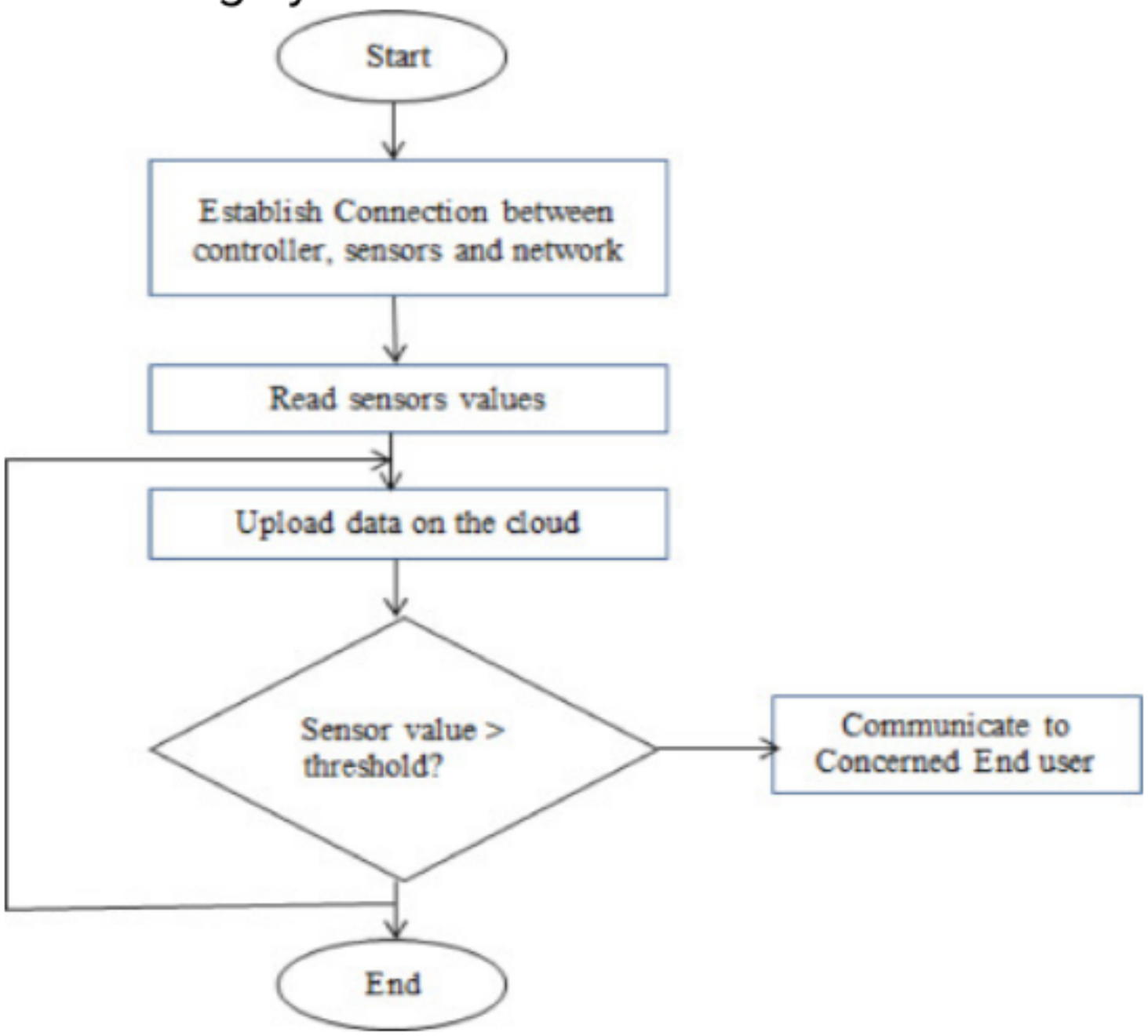
Scarcity of drinkable water: If pollution of water increases or quality of drinking water is not maintained, then there will be no clean water for drinking or public health or sanitization, in rural as well as urban areas.

Disease: According to WHO (World Health Organization) information, roughly 2 billion people across the world do not have any option for pure water resources, but they have to drink water polluted by excrement, which exposes them to many ailments.

Infant mortality: As per WHO, diarrhoeal diseases associated with lacking of hygiene results in death of nearly 1000 children per day across the world.

Fig. 1. Taxonomy digram of water consumption

monitoring system.



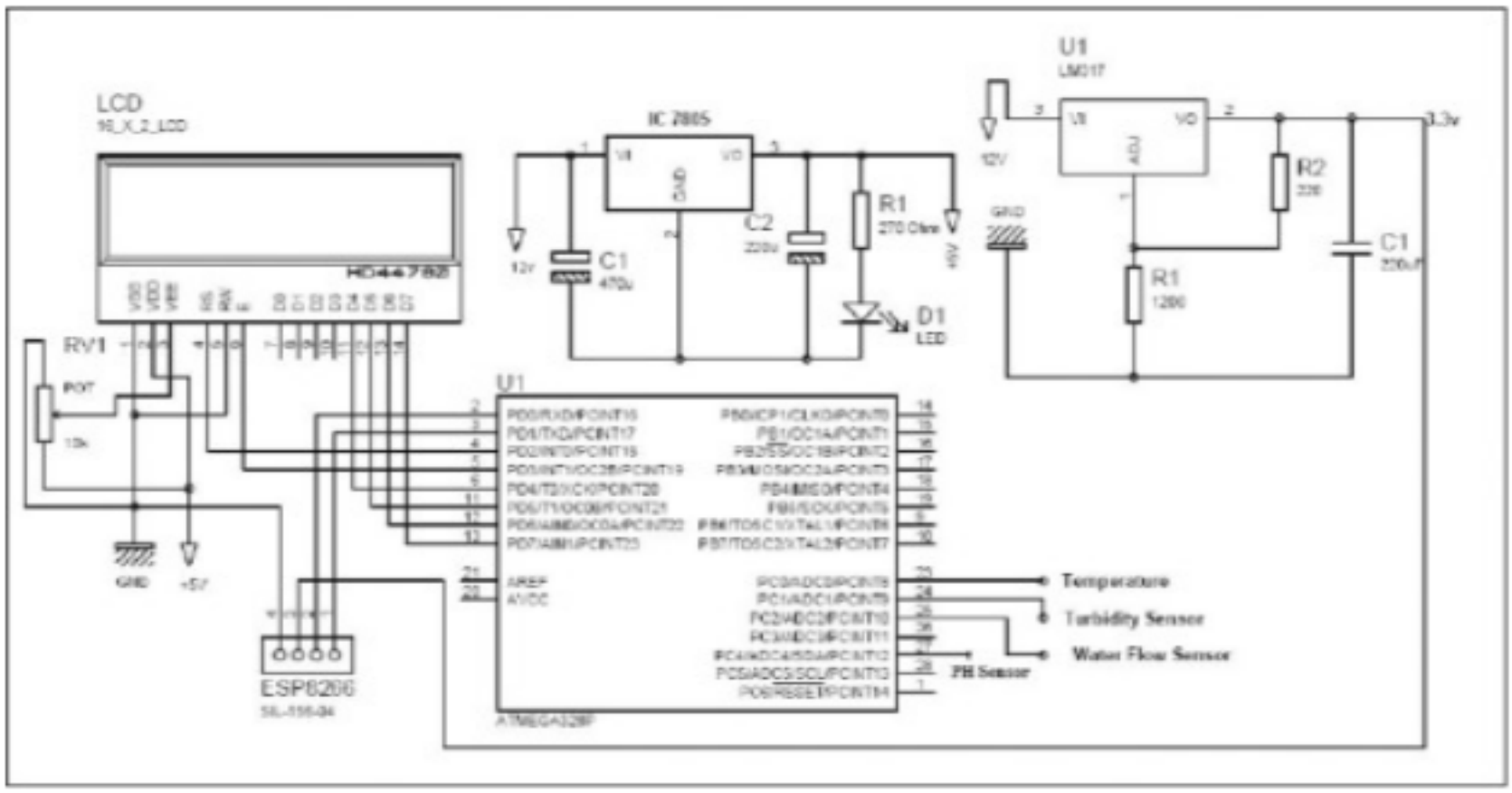
SCHEMATIC ANALAYSIS:

The schematic digram of the proposed work is as shown:

The work consists of two parts, the first one is hardware & second one is software. The hardware part has sensors which help to measure the real time values, another one is arduino ATMEGA328 converts the analog values to digital and LCD shows the displays output from sensors,

Wi-Fi module gives the connection between hardware and software.

ATMEGA328 has inbuilt ADC and Wi-Fi modules.



Sample	Parameter	Measured Value
Water Sample 1	pH	7.5
	Turbidity	4 NTU
	Conductivity	450 µS/cm
	Carbon Dioxide	1.20 mg/L
	Humidity	42%
	Temperature	20° C
Water Sample 2	pH	9.3
	Turbidity	5.6 NTU
	Conductivity	600 µS/cm
	Carbon Dioxide	1.820 mg/L
	Humidity	60.44%

	Temperature	29.4° C
Water Sample 3	pH	9.72
	Turbidity	5.33 NTU
	Conductivity	709 µS/cm
	Carbon Dioxide	1.89 mg/L
	Humidity	64.67%
	Temperature	26.4° C

From the analysis, water sample 1 is drinkable and other two samples are not drinkable.

Develop a Python script on the IoT sensors to send real-time water consumption data to the data-sharing platform:

```
# Sample sensor data from various IoT devices
sensor_data = [
{type': 'temperature', 'value': 20},
{type': 'temperature', 'value': 22},
{type': 'humidity', 'value': 55},
{type': 'temperature', 'value': 24},
{type': 'humidity', 'value': 60},
{type': 'temperature', 'value': 25},
{type': 'humidity', 'value': 50},
]
# Group sensor data by type
grouped_data = {}
for data in sensor_data:
sensor_type = data['type']
if sensor_type not in grouped_data:
grouped_data[sensor_type] = []
grouped_data[sensor_type].append(data['value'])
# Calculate average values for each sensor type and store them in a list
average_values = []
for sensor_type, values in grouped_data.items():
average_value = sum(values) / len(values)
average_values.append({'type': sensor_type, 'average_value': average_value})
# Sort the list of average values
```

```
average_values.sort(key=lambda x: x['average_value'])
# Print the sorted list of average sensor values
print(average_values)
```

Output:

```
[{'type': 'temperature', 'average_value': 22.75}, {'type': 'humidity', 'average_value': 55.0}]
```