

INTERNET OF THINGS BASED WATER MONITORING SYSTEM

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Abstract : Water is the most essential compound found on our planet. It is vital for survival of all living beings.

Therefore its conservation and judicious use is of utmost importance. The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

Our prototype is based on the idea that monitoring the consumption of water is an important parameter for conserving water and to use it in a sustainable manner. A water flow sensor is used to measure this parameter. There are two ways for monitoring and tracking the consumption of water namely prepaid and postpaid method. In the prepaid method system, the amount of water required will be pre decided according to the need of the consumer or the quantity previously defined by the consumer. In the postpaid system a bill will be generated after the consumer has used water according to his need on monthly basis. The sensors will sense the flow of water to the main pipe entering a house which ultimately tells the usage of water at one block ideally. This information will be updated as live feed on our website.

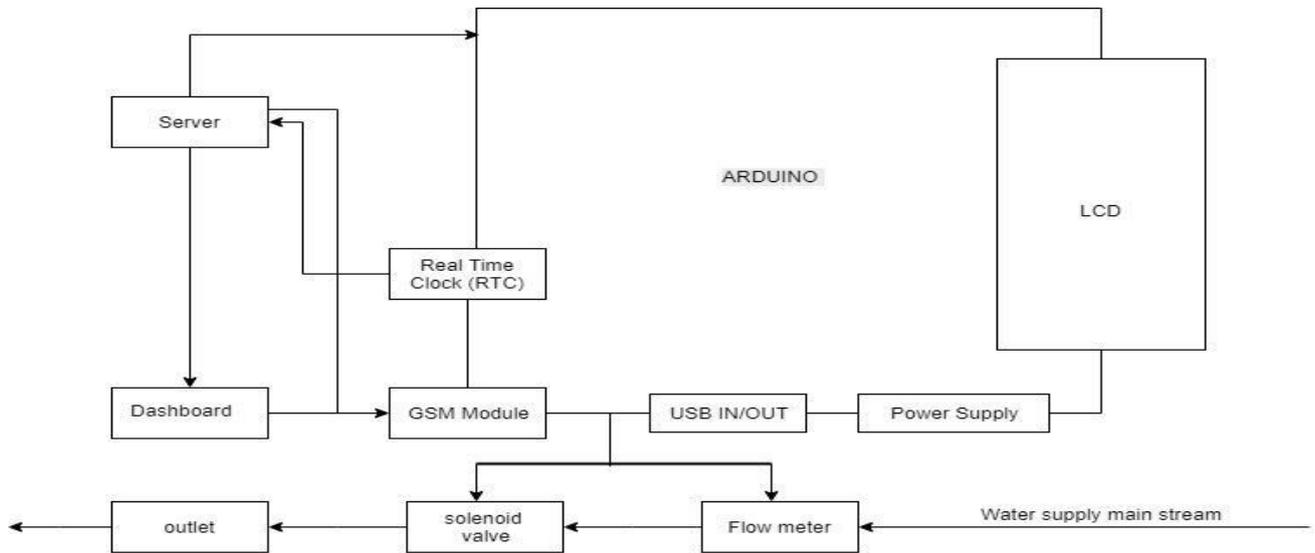
IndexTerms - IoT, Arduino, Water, Monitoring, conservation, sensor, consumption

I. INTRODUCTION

The existing system have no proper way to accurately monitor the usage of water. Some places had access to water for limited time of the day where the consumption was not monitored and the billing amount was fixed. In areas that have 24/7 access to water , an installed meter outside every block tracked the consumption of water manually. Both of the above methods had significant drawbacks such as limited time access to water and human error, fidgeting with the installed water meter in the later method . The proposed water monitoring system involves tracking the consumption of water in real time using an online dashboard . The user can select the type of billing according to which payment is to be made. With the advent of digital revolution, the prices of electronic telecommunication devices had dropped significantly giving rise to low cost computing devices such as Arduino and made GSM communication inexpensive. The proposed system involves using Arduino and various sensors for monitoring consumption of water. This automates the monitoring process and eliminates the need for human intervention in the entire process resulting in complete automation of the monitoring process.

II. PROTOTYPE IMPLEMENTATION

The IoT based water monitoring system consists of a sensor to detect the flow of water i.e the water flow sensor and it will be recorded accordingly, the flow is controlled using a solenoid valve. A solenoid valve is a electromechanical actuated valve to control flow of liquids. The meter readings would be displayed on a online dashboard. The figure below shows the detailed working of the system.



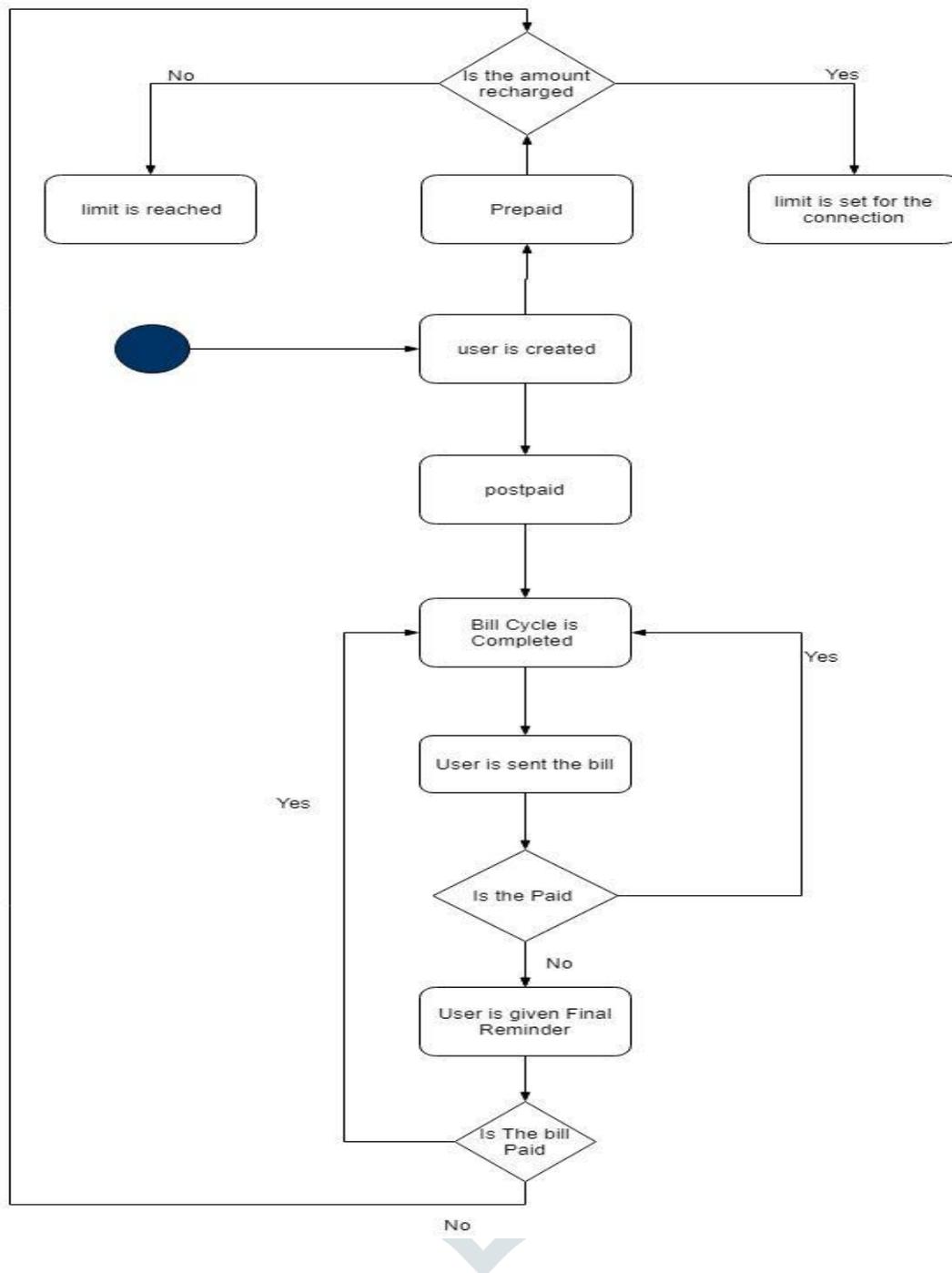
A RTC is used to keep accurate time as it is a necessity in all embedded systems although arduino itself have a timekeeper still RTCs are used as even if there is a power cut it keeps a track of time to the server as it runs on battery. In this system we have used DS3231 Real Time Clock to keep a track on time.

Eventually we are going to use 12v solenoid, motor, or light so to control this we need to use a N-channel mosfet. The N-Channel MOSFET has a N- channel region between source and drain It is a four terminal device such as gate, drain , source , body. This type of MOSFET the drain and source are heavily doped n+ region and the substrate or body is P- type. The current flows due to the negatively charged electrons.

A GSM module is used to for connection with the internet as the meter readings need to be updated on online dashboard. Quad band GPRS GSM Sim800L is used in this system.



Once the user is created the user has to select a type of connection he wants as there are two types postpaid and prepaid. In a prepaid connection the user has to pay first and then according to his payment the water will be supplied. In postpaid connection the billing would be done after the usage. The following diagram shows the exact flow of how the system would work for a user. In postpaid system if the bill is not paid a reminder is given.



III. CONCLUSION

This system makes use of IoT technology for real-time water consumption monitoring which is used for monitoring and controlling the flow of water. This IoT based proposed system is used to acquire water level details of a water source in real time from any location any device connected to internet. Water monitoring system uses the sensors to sense the water flow. The billing is proposed to types postpaid and prepaid, where user can select any of the method according to their consumption. Monthly tracking is done of water flow.

Monitoring water level from remote places becomes easy and possible when it is difficult by manually testing every time.

To make system user-friendly, a web browser application is also used. Therefore, the system will cost less, which works faster, result is also more efficient, real time and user friendly. The customers needs are fulfilled and satisfied

Concluding the proposed IOT based water level monitoring system will be helpful to collect, analyze and predict water level details, water usage and other information particular water source at particular location in real time remotely.

A. FUTURE SCOPE

- Turbidity Sensor : A turbidity sensor can be added to the system which detects the turbidity of water and look for excess turbidity that may be present in the water. This can also be monitored in real-time by the user.
 - Payment Portal : A payment portal can be added to the dashboard where the user can pay the bill amount instantly, this makes the payment process more streamlined and efficient .
- Anti - theft : The system is designed in such a way that if the flow rate at one flow sensor is different than flow rate at a different sensor , it means there is some theft which can be detected due to flow sensors.

III. ACKNOWLEDGMENT

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