

# SMART WATER METER

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**Abstract :** Availability of water resource in many region of the world is now a serious issue. This problem is silently related to inadequate use of water and integrated water mismanagement. Water is widely used for agriculture, industry, and domestic usage . The water monitoring is important constraint for the different applications of human being in day to day life. The unnecessary wastage of water can be controlled by applying small charges which is bearable by poor people.

In this project, a low cost water flow meter is proposed, which measures flow rate of water passed through the water supply pipe of particular user and bills are created according the flow rate of that particular user. This provides control on usage of water per user without affecting or increasing cost of other user.

**IndexTerms - Wi-Fi module, Valve, Sensor, Android app.**

## I. INTRODUCTION

The modern digital era is focusing on smart city applications based on Internet of Things (IoT), Wi-Fi. This work focuses on modern automation techniques based on Android system for smart water meter. Water is one of the important resource required in daily life of human being. But there is not such a proper management for the water as like electricity. For water total usage in one building is calculated and one common bill is created among all consumers. There for there is no control over individual to avoid wastage of water. This gives improper management for most valuable resource. By analysing the condition to avoid over water usage there should be control over the every user. There for every user will get serious about the usage of water to avoid extra payment. This gives full control and proper management of the water usage. There for this idea come in mind that this system should be implemented in every society to avoid extra water usage and to save water

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## II. LTERATURE SURVEY

- [1] “Electronic Water Billing System” has been implemented to take the water readings and send it wireless communication to the base station of Water Management Company. The readings are automatically stored into the database and automatically uploaded on the website. The user can pay online after getting notification through Short Message Service (SMS) from base station [11].
- [2] GSM based Water Meter” has been used to measure the consumption of water in real time. The amount paid for month or particular time period to use water can be preciously used in the remaining days of month or particular time period to avoid extra bill. The record for used water is compared with storage and loss is detected to avoid loss in water distribution system [9].
- [3] Flow meter has been used to measure the quantity of water consumed by user in terms of flow rates. The consumed water have been displayed and the bill forwarded through the Global System for Mobile (GSM) communication module to website in “Smart Water Leakage Detection and Metering Device” [5].
- [4] “Automatic water flow meter” which is designed to provide low cost water meter to measure water flow rate passed through the pipe used for water supply in house. This involves supplying water according to the customer’s requirement of water [6].
- [5] The purpose of “IOT Based Automated Water Billing System” is to present the water billing system for urban home. Android based water billing system (AWBS) measures the water flow rate through the house hold pipe and send an SMS at the end of every month. In addition to that, detail information of the water usage is shown in graph by using cloud platform called as “Thing speak” and the mobile app is also use to pay the water bill [1].
- [6] “Smart City Billing System for Homes through IOT” is used for the smart city billing system for the homes through the IOT platform. This system consists of two modules one is prepaid water billing system and second is prepaid electricity

billing system. Because of that system we can check our water and electricity consumption and according to that we can pay the bill online [2].

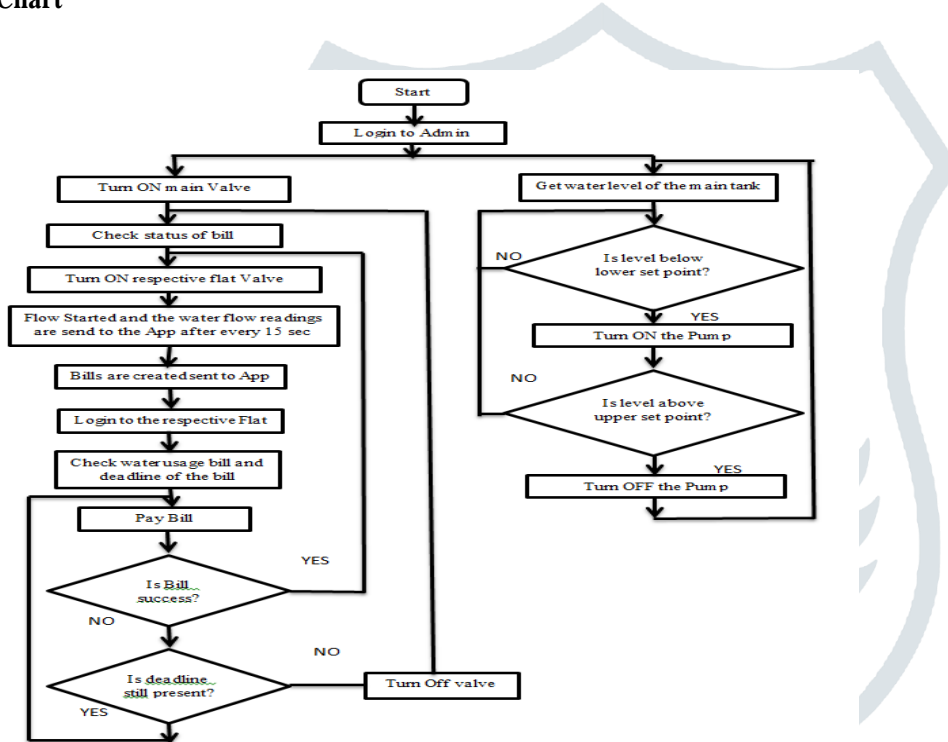
- [7] Flow sensor based water meter is very low costly and reliable. Paddle wheel flow sensor is used to measure the water flow accurately with the help of rotating paddles. Monthly water bill readings send to the municipal corporation office and calculate the monthly bill by using these readings and create the correct bill using “Implementation of GSM Based Water Meter A Step towards Automation in Billing System” [10].
- [8] In Nanded City which is one of the huge living and corporate township in Pune, India, this management is using prepared water billing system. Readings of the flow meter are forwarded through wireless communication media to the monitoring unit and bills are created according to consumption of water per user [12].
- [9] In this way by studying all above papers to improve the water billing management system “*Android based Smart Water Meter (SWM) System*” is designed.

### III. IMPLEMENTATION

A. Water bill creation according to the usage of water per flat and send to the Android App

B. The modern digital era is focusing on smart city applications based on Internet of Things (IoT), Wi-Fi. This work focuses on modern automation techniques based on Android system for smart water meter.

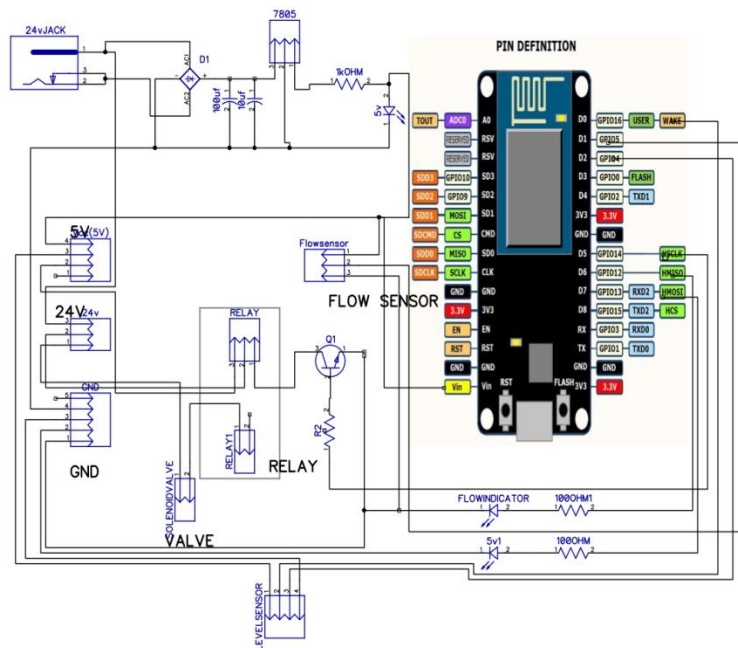
C. Flow Chart



An SWM system consists of flow sensor, solenoid valve, ultrasonic sensor and node-microcontroller. Flow sensor is used to measure the flow of water through pipe, ultrasonic sensor is used as level sensor to measure the level of the water in tank, solenoid valve is used to control the water flow from supply pipe and node-microcontroller is the main part of SWM system which calculates all the readings and directly transfer to the “Smart Water Meter Application” (SWM-App) based on android application (app)through Wi-Fi to pay bill.

In **SWM system**, normally all valves are in OFF state which are turned ON by using **SWM-App**. Water will start flowing through main tank after turning ON valve. Each supply pipe consists of a valve to control the supply of water to every user and flow sensor is used to measure the water flowing through it towards user. The valve connected to user supply pipe is controlled based on payment status by administrative person.

## D. Circuit Design



## E. Specification

### Project Specification

1. Project board- 10cm x 10cm
2. Project Enclosure- 1feet x 1 feet
3. Project supply- 230V, 1Ampere
4. Power specifications- 12V x 500ma = 6 Watt

### Hardware Specification

1. MICROCONTROLLER: PIC 18F4550 MICROCONTROLLER
2. FLOW METER YF-S201, ULTRASONIC HC-SR04, SOLENOID VALVE
3. WI-FI MODULE- NODE MCU 8266

### SOFTWARE REQUIREMENTS:

1. COMPILER- uVISION KEIL3
2. PROGRAMMING LANGUAGE- EMBEDDED C
3. BLINK APP

# RESULTS

The *Smart Water Meter (SWM-App)* gives the results of the AWB system Start *SWM -App* and clicks on the button to start the project then go to the setting and enter the Message Queuing telemetry transport (MQTT) broker Uniform Resource Locator (URL) in the top of login page. After entering the URL click ok, then clear Random Access Memory (RAM) of *SWM-App* and again start *SWM-App* and login with Admin using username and password same as 'Admin'. After login to admin then next page is opened having icons of main tank and users by clicking on the respective icon pages are opened with their information such as water usage, status of the bill .Admin has given authority to control the valves of water supply pipe according to the bill status. The status of the bill payment success or not is at the admin login page. By clicking on the ON/OFF button of respective icons main tank or users the valves are controlled. In admin and users page by clicking on graph button graphs of respective users water flow is opened.

Results of the user's login page are as shown. User's login pages in *SWM-App* are flat101 and flat102 respectively. Users can check their bill by using the login identification (ID) and password. Different user ID and password are given by the supplier to different users. User ID and password for user1 and user 2 are 'flat101' and 'flat102' respectively. By login into the user1 and user2 page in *SWM-App* deadline of the bill, water usage of the user, bill amount and graph of the water usage information is available; also the payment option is given.

Bill of the user is generated by clicking on generate bill button and payment process of the bill is done by using pay bill button in the *SWM-App*. Payment of bill is through by using Pay Pal, debit card or credit card. Graphical representation of the water usage of user1 and user2 is as shown on icon.

## IV. ACKNOWLEDGMENT

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