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# Water Supply Management and Consumption Analysis

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**Abstract:**
Water shortage and water wastage issues create a serious warning to the global population. Water is the most valuable resource that must be used properly. Information regarding the usage of water can reduce the wastage of water and can help in water management. The manual meter-reading method is problematic and time consuming. Also, this method is not able to keep record of usage of water. So that we need effective, reliable and precise monitoring techniques to keep track of water consumption. The paper proposes a method to improve the efficiency of traditional billing and monitoring method. For that we are creating an app which will manage the database of customer, analyze the water consumption and provide the automatic bill. There are many systems to do the same, but this is about monitoring usage of water using data mining. It will calculate usage of water on monthly basis. The existing system has some drawbacks like improper timings of monitoring, etc. As data will be monitor and analyze using data mining every month, this will prevent wastage of water and will help to know future requirement of water.

**Keywords:** MJP (Maharashtra Jeevan Pradhikaran), Supply management, Water consumption monitoring, Data mining, Demand Analysis/management.

## I. INTRODUCTION

Water management and monitoring is necessary to reduce the wastage of water. Measuring the consumption of water is a critical need in many cities. Accurate measurements are important in water distribution plants or departments because it can either lead to making profit or loss.

In other cases, measurement taken manually by individuals or failure to take the reading can have drastic effects on the results. It is apparent that presently almost all of us make use potable drinking water supplied by government departments. Especially in the MJP department manual monitoring system is in use. Such manual system requires extra workforce for bill processing, water consumption analysis, demand management, supply management which eventually increases the overall budget for the MJP department which at the end affects the customers. This technique/method is used by government's water supply department for monitoring the water consumption by individual family in rural areas.

## II. PROPOSED SYSTEM

The objective of the project is achieved by developing mobile application along with a desktop application and hardware unit. The hardware unit consists of Step-down Transformer, Diode, Voltage regulator, Capacitor, Microcontroller, Bluetooth module HC05, Mechanical valve, Relay. The architecture of this system is as shown in Fig. (1). The mobile application will be used by the office person for consumption monitoring (reading monitoring) and controlling hardware and the desktop application will be used for office work by the officers for new registration, etc.
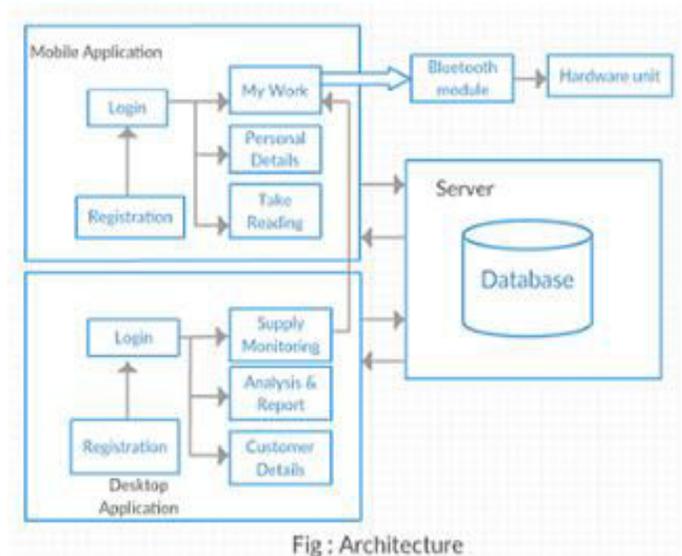


**Figure.1. Architecture**

## III. METHODOLOGIES

### A. Mobile Application

#### i. Water consumption monitoring
In this section the office person will go to the respective area and take the reading of each customer by capturing the image of the meter and the by manually entering the name of the customer and meter idalong with meter reading of that month. In this way the amount of water consumed per month will be monitored for further analysis. The water supply management system would be a real time system and it will maintain the consumption of water on monthly basis as shown in Fig. (2).
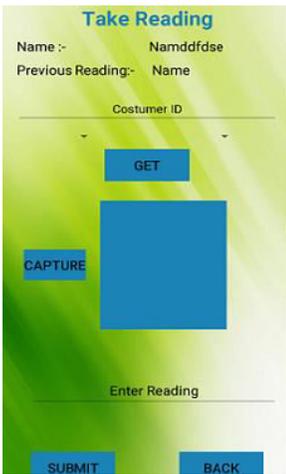
**Figure.2. Take Reading**

### ii. Supply Management

This section will contain the list of the customers whose water supply connection has to be disconnected, if the bill has not been paid till the due date. Firstly, the mobile will be paired with the Bluetoothmodule of hardware unit so that it gets the access to send command. After pairing the device with meter, the valve will be controlledto continue or discontinue the supply as per norms as shown in Fig. (3).
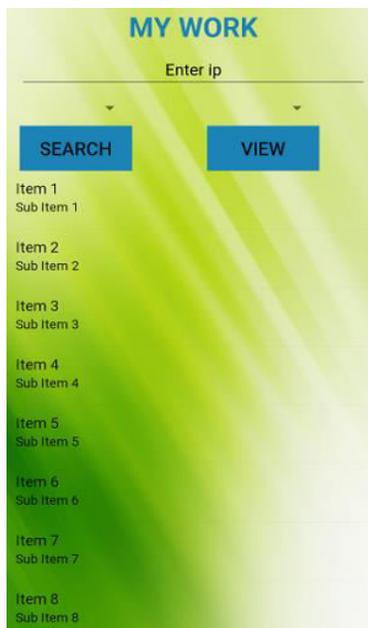


**Figure.3.My Work**

### B. Desktop application

### i. Demand Analysis / Management

The amount of water consumed by the customer is analysed and the graphical report is generated for the future demand management. This feature is named as bar graph in our desktop application.Using the concept of data mining the analysis of water supplied to the different region could be calculated. This analysis will describe the water usage within a quarter of year. As a result, the water required by the region would be calculated accurately. The bar graph will demonstrate the monthly consumption of that area for a year. Data mined will avoid the

shortage of supply of water in future for same time span and will help to be aware about the requirement of water in future as shown Fig. (4).



**Figure. 4.**

### ii. New Customer Registration

If there is any new connection in the area, then the officer would fill the details of new customer into the system. This entry will be updated in the database and the new connection of water meter will be done as shown in Fig. (5).
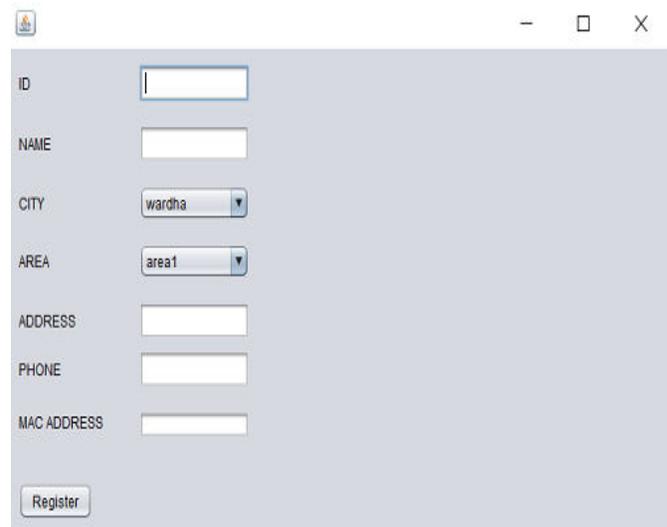


**Figure.5.**

### C. Hardware circuit

The transformer is supplied with 230volt A.C household electricity supply. Then this Potential difference in the terminal which was 230 volts is converted to 12 Volt A.C. Now with the help of connecting wires the supply of 12 Volt is send to the PCB (Printed Circuit Board) on which the diode is there to convert the A.C power supply to D.C because the microcontroller which we are using require D.C to be driven. The converted power supply is passed through 7805 Voltage Regulator for constant voltage regulation of 5 Volt. Now the constant voltage is passed through the capacitors of 1000µf &

100μf respectively for power factor correction. This filtered power supply is supplied to the MC18F4620 (AKA Micro Controller) to manage the Bluetooth module and the mechanical valve. The transistors are used to amplify the 5-volt D.C to 12-volt D.C to operate with mechanical flow control valve. The Bluetooth module following wireless communication principles is used to control the mechanical flow valvethrough microcontroller. While operating valve with mobile phone firstly pairing is done with the Bluetooth module of hardware unit and then on successful pairing the valve is operated/controlled. The flow of hardware connectivity is as shown in Fig. (6).
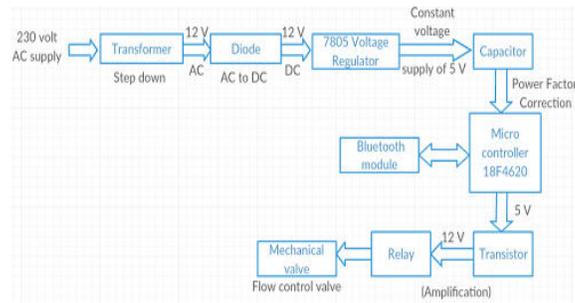

Fig : Flow Control Valve controlling architecture.

**Figure.6. Flow Control Value Controlling Architecture**

## IV. RESULT AND CONCLUSION

The proposed system to manage and monitor water usage is discussed. Fig (8) shows the monthly consumption of water in area. Data mining technique was usedfor making the prediction of water usage in area. All the manual procedure will be automated by this proposed system. Various services (Consumption validation, Customer validation, new registration etc.) will be accessed through single window. As it is a desktop application any of the officials of the department can easily access the entire customer details. Officer could fill the details of new customer into the system. Data mining will help us to know the water usage on monthly basis in a year by calculating the water consumed in the area and will let us pre-predict the future requirement of water in peak time. Also, manual hard work method of disconnection of supply of water is reduced by using the hardware assembly of flow control valve and this system will help to recover the pending bills of the M.J.P department.
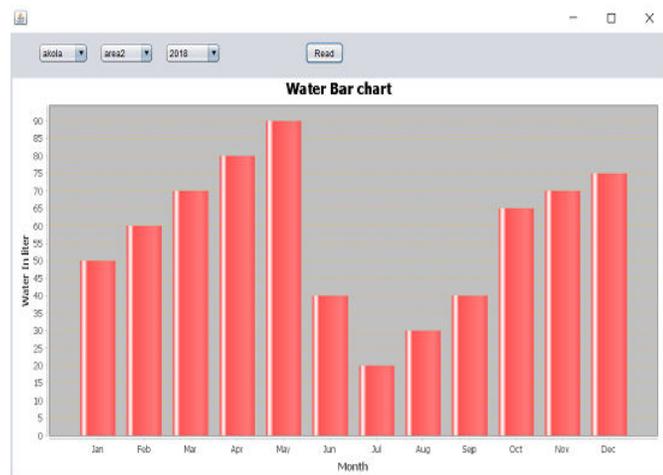


**Figure.7.**

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