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Iot Based Water Distribution System For Quarters

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Abstract—

TheIOTbasedWaterDistributionSystemisbasedonArduinoNano.Inthissystem, wecanreducethewastage of water and increase the human liability to keep him alert from the problems e.g., pipe leakage, water overuse etc. The proposed system consists of a water flow sensor for water flow monitoring. Also, we are using a solenoid valve for controlling the water flow in the pipeline. Hence, this system is used for the required distribution of water to any building also detection of any leakage problem so that, no loss of water occurs. These are connected to Arduino Nano. These devices are inexpensive, definitive, highly efficient, and extensible.

Keywords— IoT; Water Management; Arduino Nano; Water flow meter; solenoid.

I. INTRODUCTION

To safeguard India' specuniary success, it is pivotal that enough resources area vailable to meet the necessity of all sectors in futureyears.Thecountry'scurrentresourceiswitnessingrapidpopulationgrowth,sectorsandweknowthatwaterisrudimentary, water management and distribution between sectors is becoming important. Furthermore, water shortage in India is expected to getworsenastheoverallpopulationisincreasingdaybydayanditisexpectedtohavea1.6billionpopulationbytheyear2050.

Negatively,poorwaterplanning,waterscarcity,inadequateimplementationhascreatedasituationthatisdifficulttomanage.The scarcity of water is already evident in remote and urban areas of India, and its distribution and preservation had to be practiced as soon as possible. The current water distribution and management system involve human practice to control the system and unfettered access is given to the consumers without monitoring it. Thus the IOT enabled system has been brought into play to reduce the human practice, save water through leakage and equal distribution among theend-users.

II. IDENTIFIED PROBLEM

Now a day's people living in flats face a lot of water problem issues. Its basically the amount of water being distributed aroundeachflat,sowehavecomeupwithaplantoautomate,suchthatwecanhavecontrolovertheamountofwaterperflatas well as controlling each section with a secured connection to turn on and off thetap.Also,insummerlimitedamountofwaterisbeingprovidedtocreateanunequaldistributionofwater.

We,therefore,decided that there was a problem and that an efficient solution wasneeded.

III. PURPOSE ANDSCOPE

1. To stop wastage ofwater.
2. To distribute equal amount of water to each flat in abuilding.
3. Easy to repair a tap or fix a brokentap.
4. Gives the amount of water consumed in aday.
5. To control the tap throughIOT.

IV. METHOD

The sensors used in the projected system are water flow sensor, solenoid, relay, Arduino nano, Wi-Fi-module, and switch. The system works with an Arduino as a microcontroller. Water flow sensors are used in the system to detect leakage as well as theamountofwatertoeachflatthatarepredetermined.Thesystemisdesignedinsuchawaythatitcollectsdata fromthewater pipes, of any diameter also whose water flow rate can bemonitored.Whenever the allocated value reaches the system generates alert that automatic switch is used to turn on and off the motor, which is embedded in mobile application. Below figure shows the flow diagram.

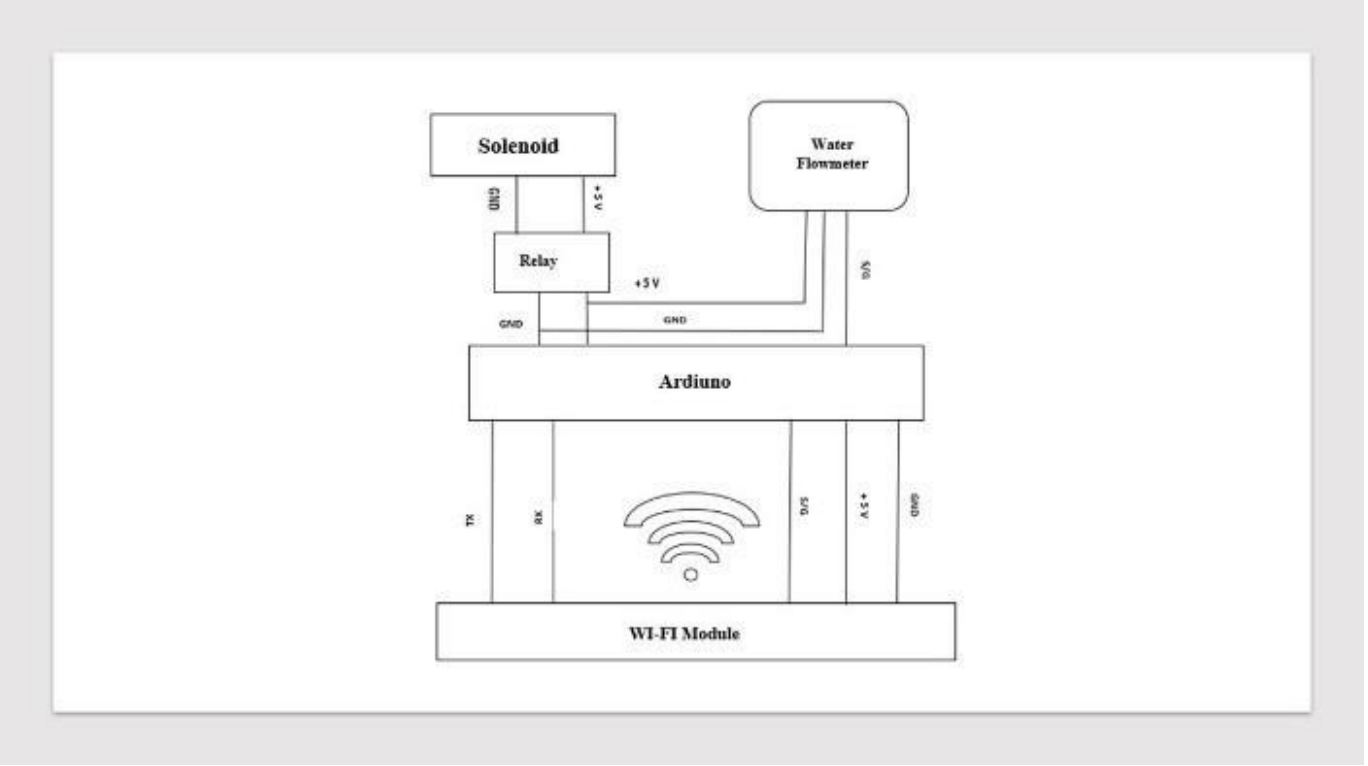

Fig. 1 BLOCK DIAGRAM

At first a value is assigned in mobile through a server which is connected to Wi-Fi and Arduino nano. When the waterflows through the water flow sensor the reading is given to nano.

Then the condition is checked. When the condition fails. The water isstoppedbythewaterflowsensor.iftheconditionistruethewaterflows.Inthecaseofemergencylikeiftapbreaksorleakage occurtheusercanturnthetapofbythecommandorbyswitch.Thereadingofwaterflowhasbeenmonitoredin realtime.Also, through this method we can have distribution of water in every block with some limit. The distribution of water limit could be given by the user's demand. By the website we can see the exact storage and available in realtime.Thetotalwaterconvertedtovolumefordistributionpurpose.Thenallocatethewaterasperrequirementperflat.Flowmeter ateachflatwillmeasurethewaterflowprovidedineachflataswellasleakagewillbedetectedifitsubsists.AfterautomaticallocationArduinowillshutdownthewatersupply.Thewaterutilizationdetailswillbeupdated timetotime inrealtimeandnotificationwillgotoaregisteredmobilenumberthatToday'swatersupplyisoversothatuser willalsobecome alert while spending water. All this detail will be uploaded on a webserver.Through this we can provide billing per water usage and get to know the storage purpose. If any flat user wants to use more water, he/she have to login through the mobile application. Put the complete information like Username, wing no, flat number and required amount of water. Depending upon the quantity of water requested, the data will be verified against the available storageandonlysomepercentoftheavailableamountofwatercanbereleasedforthedemandeduser.Finalbilling willbedone by considering extra usage of water ondemand.

V. FUTURESCOPE

1. To use AI and ML to make it moreefficient.
2. To increase the processing speed and make it more UIfriendly.
3. Trying to make it more costeffective.
4. To make this system more secure from malware attacks andthreat.

VI. RESULTS

Thesystemisdesignedinsuchawaythatitcollectsdatafromthewaterpipes,ofanydiameter,whosewaterflowtheratecan bemonitored.Whenever thereisacontinuousabnormalusageofwaterthroughawaterpipeorthelimitgetscrossed,thesystem generates alert that would be sent to the concerned authorities and it is detected by placing water flow sensors at the pipe, the differencebetweentheflowratesistheleakagedetectionofthesamepipeandifthelimitgetscrossedthewaterflowisstopped.
Anautomaticswitchisusedtoactivateanddeactivatethewaterflow,whichisintegratedintothemobileapp.

III. HARDWARE CONNECTION

In the hardware connection we have build the prototype model by using the components and methods as discussed above. In fig 2 you can see the hardware wire connections. Which we were able to do by the use of Jumping wires and breadboard. in fig 3 we have used a pink bucket as the main tank which is representing the main tank of the building and the pipe as the pipeline of the building also assuming that this connection will be going to a flat as the entry point hence keeping our system at the entry point of the flat and green bucket which we are assuming it as the end user to a flat.

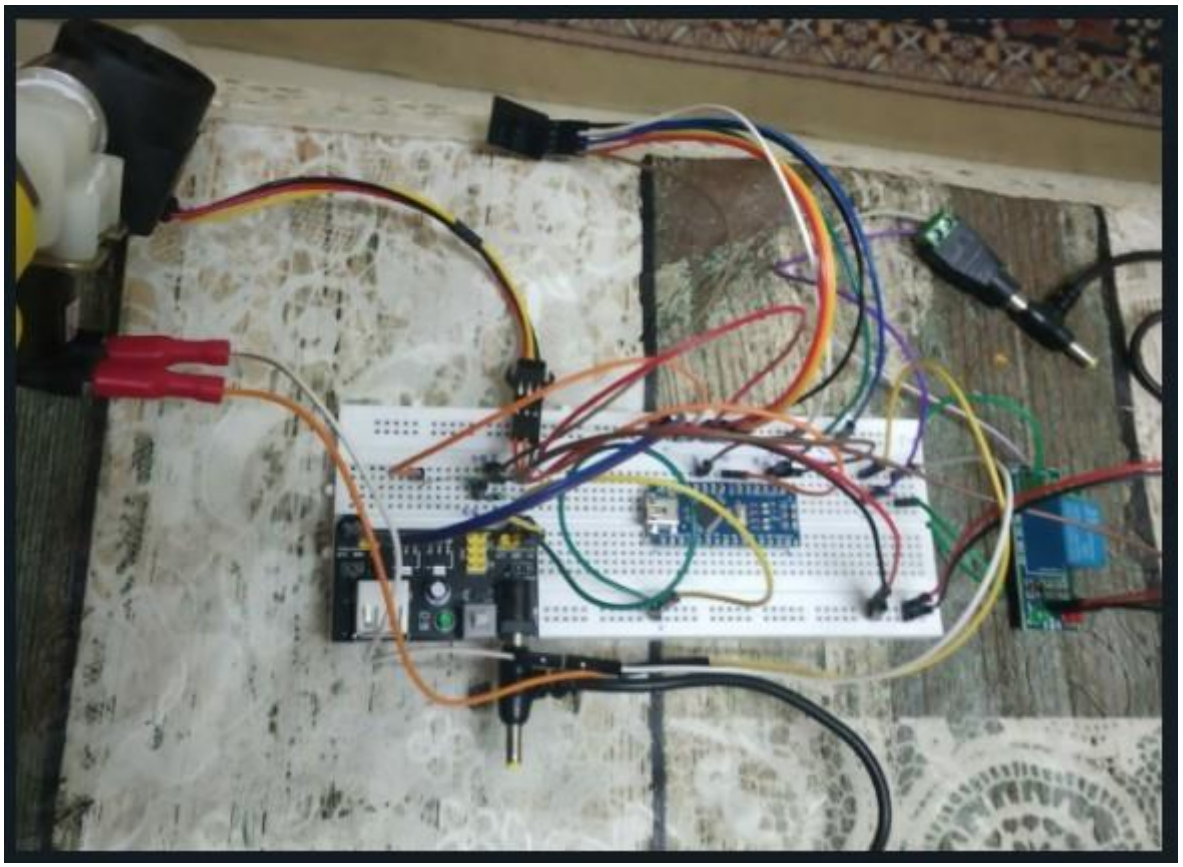

Fig. 2 PROTOTYPE USING THE ABOVE-MENTIONED SYSTEM AND COMPONENT

fig. 3 pink bucket as the main tank and the pipe as the pipeline and green bucket as the end user to a flat

IV. SOFTWARE

This is the code that we have used to check the reading and to monitor the water flow.

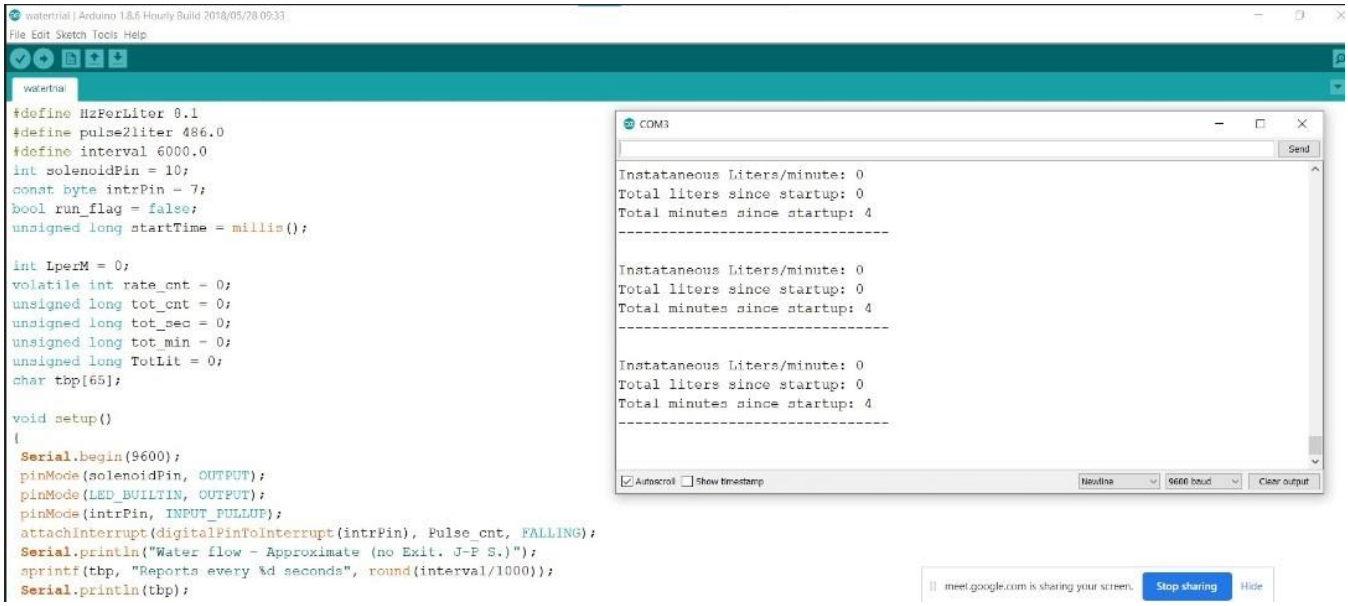

Fig. 4 WATER FLOW CODE

V. CONCLUSION

The IOT based water distribution system is mainly used for proper and equal sharing of water resources. In our day to day life, we all know water resource is mainly needed. This system is designed for the conservation of the water resource for future generations as well as to full fill their demands for the water resource. Our system is designed with different sensors and devices. The flow sensor detects the quantity of water consumption and leak detection. The solenoid valve will get closed when the given limit is consumed by the user or continuous flow of water occur more than the usual time limit. Hence, the water will not be supplied till it the procedure is done. By using this method user will get to know or gets alert from the usage of water and outflow of water too. With the help of this system, the usage and conservation will be done by every user. As we know, residential

buildings, hostels, apartments, hotel rooms, etc., generally, water needs are higher. Our system is therefore very useful for conserving water resources and providing an appropriate and effective solution to the current housing water problem.

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