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Smart Water Flow Sensor & Detector

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ABSTRACT: The Project aims at designing smart system for controlling and monitoring of water wastage and discharge. The System is designed using Arduino which allows the water to discharge from the pipe in a controlled manner. At the transmitter end, the quantity of water to be discharged and the time to complete this task shall be given as the input to the system through keypad and is displayed on the LCD screen which are connected to Arduino. Water wastage is a global problem. It requires continuous monitoring to prevent the wastage of water. One of the reasons for this to happen is the unawareness of public and administration. Various types of water monitoring system are available but the controlling has to be done manually in it. This project is concerned with the efficient management of the water.

KEYWORDS: Arduino, Water Flow Sensor, 16*2 LCD Display, Potentiometer, Arduino Software.

I. INTRODUCTION

In this project, we will interface YFS201 Hall Effect Water Flow Sensor with Arduino for measuring flow rate and volume of water or any other liquid. This is a very wonderful project that can be used in industry or at home or at water flow measurement application in water tap, tunnel, river, etc. Water Flow Sensor for Flow Rate & Volume Measurement using Arduino code along with the circuit diagram is explained below. This project can be used to measure liquid flowing through a pipe or container or to create a control system based on the water flow rate or quantity. For example, you could use this while gardening to measure the amount of water used to water your plants, to prevent wastage. Water is one of the most precious and irreplaceable natural resources available on earth. The prime elements responsible for life on earth. Water circulates through the land just as it does through the human body, transporting, and dissolving, replenishing Nutrient sand organic matter.

II. RELATED WORK

This section will serve the purpose of providing insight as to what other similar projects have been made and how they differ from the one in this report. What follows is a summary of those systems.

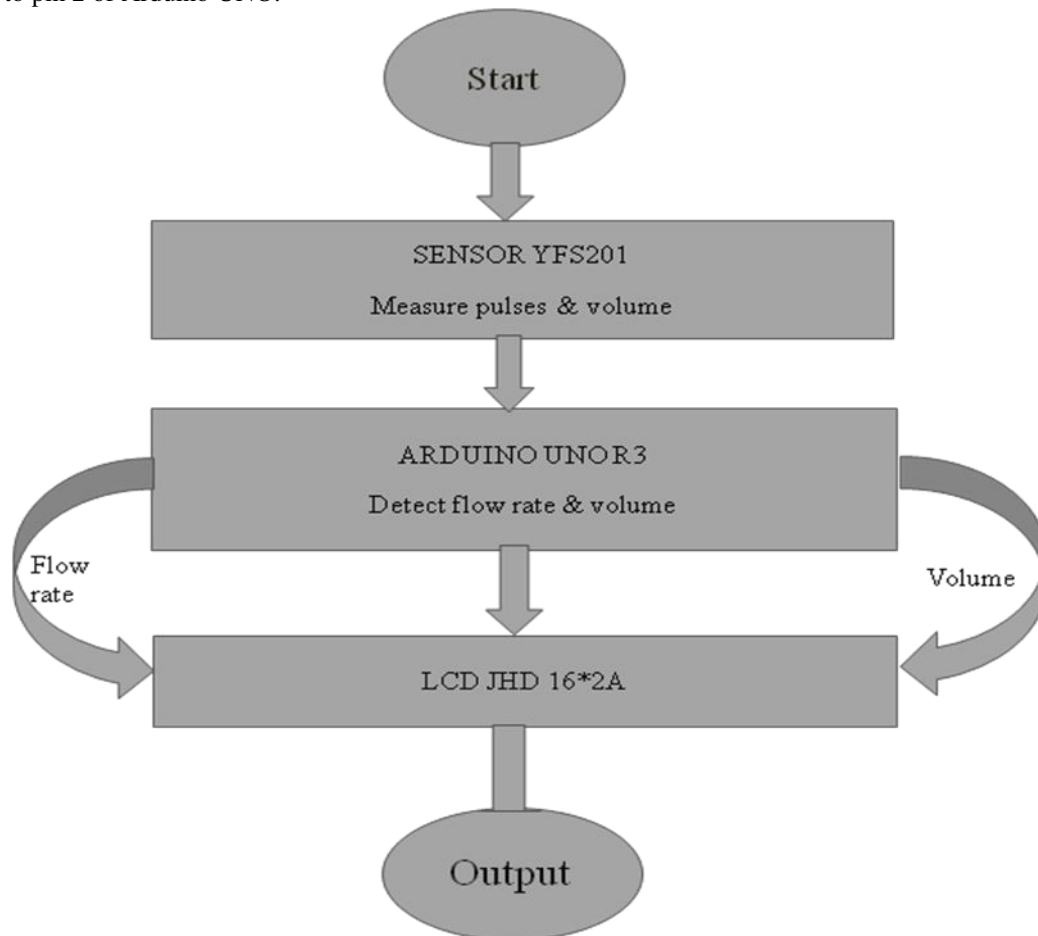
Rasin,Z;Hamzah,H.;Aras,M.S.M resolves the problem of the manual analytical method Adopted in water flow detection with bad real-time character, this paper introduces a remote Water flow measuring and monitoring system. It has used wireless sensor network based on the ZigBee to realize the water quality parameter remote probing and the real-time monitoring Smart water flow control and monitoring system 2017-2018.

ZulhaniRasinandMohd Rizal Abdullah in this paper, the application which is particularly Used for wireless networks, specifically a water equitable distribution and monitoring system is Been used. A possible communication system for the water equitable distribution and monitoring the quality, and describe our channel measurement approach is proposed.

A water monitoring sensor network implemented in northern Australia is described in the article by Le Dinh et al.It describes sensor nodes that amongst other things measure water flow similarly to the sensor node described in this report. It is aimed more towards monitoring the system when it is deployed. The report is extremely informative in regards to deploying a sensor network or a node in a practical sense such as how a lot of GPRS modules tend to malfunction after an extended period of time connected to the network.

III. METHODOLOGY

The process is divided into two parts transmitter and receiver section. At the transmitter end, the quantity of water to be discharged and the time to complete this task shall be given as the input to the system is displayed on the LCD screen which are connected to Arduino. The data is given to Arduino software to transmit the data wiredly connected to the Arduino. The water flow circuit diagram is shown below flow sensor and LCD (16*2) with Arduino. Note that the pot is connected in between 5V and GND and pot's pin 2 is connected with the V0 pin of the LCD. I used a breadboard, and once the connection was done. We are using the header file of the LCD, which eases our interfacing the LCD with Arduino, and the pins 12,11,5,4,3,9 are allotted for data transfer between LCD and Arduino. The sensor's output pin is connected to pin 2 of Arduino UNO.



In the void setup, we tell the MCU that the pin 2 of the Arduino UNO is used as INPUT by giving command pin Mode(pin, OUTPUT). By using attach Interrupt command, whenever there is a rise in the signal at pin 2, the flow function is called. This increases the count in the variable flow frequency by 1. The current time and cloop Time are used for the code to run in every 1 second.If the output valve of the pipe is opened. The water flows through the sensor, which in turn rotates the wheel inside the sensor. In this condition, we can observe pulses, which are generated from the sensor. These pulses will act as an interrupt signal to the Arduino UNO. For every interrupt signal(rising edge), the count of the flow frequency variable will be increased by one. The current time and cloop Time variable ensure that for every one second the value of the flow frequency is taken for calculation of flow rate and volume. After the calculation is finished, the flow frequency variable is set to zero and the whole procedure is started from the beginning.

1.1 What is Hall-Effect Sensor?

A Hall Effect Sensor is a transducer that varies its output voltage in response to a magnetic field. Hall Effect sensor are used for proximity switching, positioning, speed detection, and current sensing applications. In its simplest form, the sensor operates as an analog transducer, directly returning a voltage. With a known magnetic field, its distance from the Hall plane can be determined. Using groups of sensor, the relative position of the magnetic field, its distance from the Hall plate can be determined. Using groups of sensor, the relative position of the magnet can be deduced. Electricity

carried through a conductor will produce a magnetic field that varies with current, and a Hall sensor can be used to measure the current without interrupting the circuit.

IV. EXPERIMENTAL RESULTS

With the help of this project, we can reduce and control the wastage that occurs while using water and any other liquid. This project has successfully overcome the problem that's why we use it in most companies and home appliances.

V. FUTURE SCOPE

With the help of proposed system, we measured water flow speed without contact of water. And the main purpose of the system which useful in household water distribution purposes is to detect the running water flow condition and stationary water flow condition.

Detection of the flow induced vibrations of water is very easy because of use of piezoelectric plate i.e. Vibration sensor. Our future works is to detect vibration signal with the help of stethoscope. When we try to detect flow induced vibrations using stethoscope various major changes are occurred. That's why we decided to use stethoscope for detection of vibration signal of water flow.

VI. CONCLUSION

Flow sensors are devices used for measuring the flow rate or quantity of a moving liquid or gas. New materials have been introduced into flow sensors to improve their performance. Among them, CNTs were introduced into flow sensors by Ghosh et al. Designed a smart system capable of controlling the water automatically. This project is of low cost and the efficiency of the project is more compared to the previous methods. Using this project, automatic controlling and monitoring the flow of water is done. Thus, required amount of water is discharged. Same methodology can be implemented in case of any fluids in the industries. The disadvantage of the previous systems, that required manpower was eliminated. This real time project represents a solution for easy and automated management of water which helps in preventing wastage of water.

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