Raspberry PI Based Water Quality Monitoring and Flood Alerting System Using Iot

Samreen Jahan, E.Amareshwar, S.V.S Prasad, Arulananth T S

Abstract: --- Presently multi day's water contamination is one of the greatest feelings of trepidation for the green globalization. To keep the water contamination, first we need to assess the water parameters like pH, humidity, temperature and Mems sensor as the varieties in the estimations of these parameters point towards the nearness of toxins. In this paper we outline and build up an ease framework for constant checking of the water quality in IoT. At present, water parameters are recognized by concoction test or research facility test, where the testing hardware's are stationary and tests are given to testing supplies. In this way the momentum water quality observing framework is a manual framework with repetitive process and is extremely tedious. With the end goal to expand the recurrence, the testing types of gear can be put in the water assets and recognition of contamination can be made remotely. This paper proposes a Sensor-Based Water Quality Monitoring System which is utilized for estimating physical and substance parameters of the water. The parameters, for example, Temperature, pH, Mems sensor and Humidity of the water can be estimated. The deliberate qualities from the sensors can be prepared by the center controller. The Raspberry Pi model can be utilized as a center controller. At long last, the sensor information can be seen on web utilizing API. The uniqueness of our proposed paper is to get the water observing framework with high recurrence, high versatility, and low controlled.

Keywords: Raspberry Pi processor, Temperature sensor, pH sensor, Mems sensor, Humidity sensor, IoT (Internet of Things).

I. INTRODUCTION

The contamination in water is expanding step by step, and numerous specialists and researchers are endeavoring to take care of the issue by checking and keeping up the nature of water. This paper centers predominantly around the quality checking of water. The point of the paper is to test the water quality with the goal that it intent be continuous to protect manlike life from the dirtied water. Investigating the status and assessment whether the water is good for the survivings creatures and plants is primary target. There are various types of the accessible water attribute estimating gadget available, extending from modest to costly ones and house to mechanical applications.

Gadgets are exorbitant and difficult to comprehend for the buyer and may be reasonable yet can't satisfy the requirements of value checking insufficient and quick ways. Also, these water analyzers measure pH; however none of them gauges pH, humidity, Mems sensor and additionally the temperature ofwater. Some other water quality analyzers measure pH of water. On off chance that every one of the parameters are accessible in the gadget, at that point that gadget isn't moderate for average folks. Since it isn't accessible available, this venture incorporates every one of the three required parameters for checking the nature of water in reasonable expense. This paper will check the estimation of pH, Humidity, Mems sensor and Temperature of the water and decides if the water is reasonable for the ordinary utilize.

This paper is viewed as valuable for the advancement of water quality estimating gadgets for estimation and examination of water utilized for surviving things, for instance, individuals, creatures and also aquatic fishes and plants. We expend H2O each day, so it is crucial for us. In this way, water ought to be curbed continuously. Since water directly affects life on earth; it has turned out to be urgent to check whether the water is in great condition to utilize. For decidingquantity of substantial in water requires untold diligent work and is tedious. It has turned out to be vital with the developing innovation a speedy and effective technique decides the nature of water. This paper centers on checking the Mems sensor, pH esteem, Humidity and Temperature, which can be confirmed every day. It incorporates the depiction of the required sensors and its particulars.

It is conceivable to sort the gadget consolidate.This paper centers onpresent necessity for improvement of cleansing in water. There are numerous different components which found in water, yet these three variables like pH, Mems sensor, Humidity and Temperature are pivotal to decide quality. In general, this paper adds to deciding the nature of water in a helpful and easy to understand technique for estimating the pH, Humidity and Temperature

II. EXISTING METHOD

In [Kulkarni Amruta and Turkane Satish, 2016], made Solar Powered Water Quality Monitoring structure using remote Sensor Network. In this structure the WSN advancement controlled using sun arranged board. The system involves center and base station in which the center

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accumulates that get from the unmistakable remote sensor. The center point is related with the base station through the Zigbee advancement that powered by the daylight based board. This system is ease yet if the sun situated board can't be charged because of the some condition affect then the structure will stop working. From, all above indicate method we come to understand that every one of a kind structure include some obstacle anyway it can't meet the purpose of continuous, insignificant exertion predictable checking of water quality parameters. Thusly, to overcome this restriction, that leads us to be made and plan the new system that wills insignificant exertion, progressing and simple to utilize.

Humidity, pH and Temperature &ware are naturally identified under the control of single microcontroller throughout the day. The single chip gets the information and then procedures and examinations them, if the water quality is unusual, the information will be sent to checking focus and caution people in general at the equivalent time. It is helpful for administration to take comparing estimates opportune and have the capacity to identify constant circumstances of water quality remotely.

III. PROPOSED METHOD

The proposed technique is utilized to defeat the disadvantages present in existing strategy. Here we are utilizing Raspberry pi as center controller and different sensors to screen the water Quality. The square outline of our framework is appeared in Figure 1. Raspbian os keep running on the Raspberry pi to oversee different sorts of hardware's including sensors et cetera. We are associating diverse sensors Raspberry pi to screen the states of water. The Raspberry pi will get to the information from various sensors and after those procedures the information. The sensor information can be seen on the cloud utilizing Mobile App.

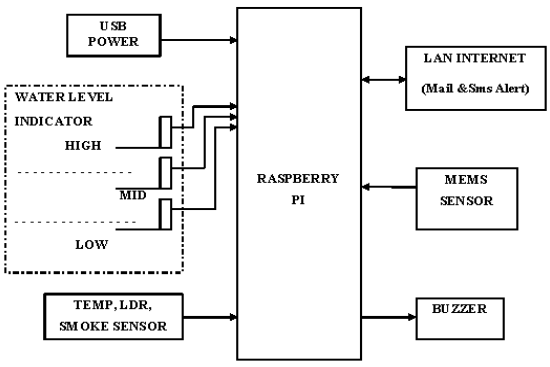

Fig: Block Diagram

IV. HARDWARE SYSTEM

Raspberry Pi Processor: It is a Minicomputer, Usually with a Linux OS to run numerous projects. Raspberry pi has the worked in Ethernet port, through which you can associate with the arrange. Raspberry pi is appeared in Figure 2.But to begins with Pi you needn't bother with plunge into the stacking dialect and a little information of gadgets and is part is sufficient.

Ph Sensor: pH sensor (SKU: SEN0161) is a sensor which identifies pH estimation of water. This sensor is appeared in Figure 3. The pH scale is a logarithmic scale whose range is from 0-14 with an unbiased point being 7. Qualities over 7 show a fundamental or basic arrangement and qualities beneath 7 would demonstrate an acidic arrangement. The typical scope of pH is 6 to 8.5

Humidity Sensor: Humidity is the proportion of various particles in the water. We utilized Humidity Sensor (SEN0189) for estimating the Humidity which is appeared in Figure 5. Humidity is estimated in Nephelometric Humidity Units (NTU).

Amid the time of low stream, numerous waterways are unmistakable green shading, and humidity is low, typically under 10 NTU. Amid rainstorm, surges, water streams quickly and blends with diverse particles, which makes the humidity of water high. High Humidity has impact in the lakes, streams and lakes. As a result of the humidity lakes and lakes are filled quicker with the strong particles and causes oceanic life in risk for natural surroundings. These sorts of particles give the place which could be appropriate for the toxins, for the most part metals and microorganisms. This is the motivation behind why humidity estimations can be utilized as a marker of conceivable contamination in a water body.

Temperature Sensor: This is appeared in Figure 5. When the exact estimation is required; we ought to dependably think about the temperature. The expansion in temperature of water expands the ionization rate.Ph is temperature subordinate, when temperature goes up,rate of ionization increments andother way around. Temperature assumes a fundamental job when estimating water quality. Temperature is key component for deciding significantly other application for water quality investigation. We utilized DS18B20 to quantify the temperature water its range is - 55 to 125°C . This fixed computerized temperature test lets you accurately measure temperatures in wet conditions with a basic 1-Wire interface. The DS18B20 gives 9 to 12-bit (configurable) temperature readings over a 1-Wire interface, with the goal that just a single wire (and ground) should be associated from a focal chip. The stick out for this sensor is as per the following: RED=Vcc BLACK=GND WHITE=SIG.

Mems Sensor:"Broke up solids" alludes to any minerals, salts, metals disintegrated in water. Add up to disintegrated solids (Mems sensor) contain in natural salts (principally calcium, magnesium, potassium, sodium, bicarbonate, chlorides, and sulfate) and some little measures of natural issue that are broken down in water. Mems sensor (Total Dissolved Solid) sensor unit which is perfect with IoT Device, fitting and play, simple to utilize. We can assemble a Mems sensor identifier effortlessly to gauge the Mems sensor estimation of fluid this sensor bolsters 3.3 ~ 5.5V wide voltage info, and 0 ~ 2.3V simple voltage yield, which makes it perfect with 5V or 3.3V control framework or board. The excitation source is AC flag, which can viably keep the test from polarization and delay the life of the test,

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in the interim, increment the solidness of the yield flag and this Mems sensor Measurement Range is 0 ~ 1000ppm. The Mems sensor test is waterproof; it tends to be drenched in water for long time estimation. This sensor can be utilized in water quality application, for example, residential water, hydroponics. With this sensor, you can undoubtedly DIY a Mems sensor identifier to mirror the tidiness of water to secure your wellbeing.

Internet of Things (IoT)

Worldwide system of "shrewd gadget" that can detect and interrelate with their condition utilizing the web for their correspondence and connection with clients and different frameworks. The principle originations behind each IoT innovation and execution are "Gadget is coordinated with virtual universe of Internet and connects with it by following, detecting and checking object and their condition"

V. RESULTS

In our proposed framework four sensors are associated (Temperature, pH, Mems sensor and Humidity) are associated with the Raspberry Pi as appeared in Figure 1. These four sensor proportions of Temperature, pH, Mems sensor and Humidity parameters of the water when they dunked in water. At that point Raspberry Pi will get to the information from these sensors and process the information, at long last sends the information to Thing Speak API utilizing system. Demonstrates the readings of the considerable number of sensors estimating Temperature, pH, Mems sensor and Humidity levels of Water from various assets.

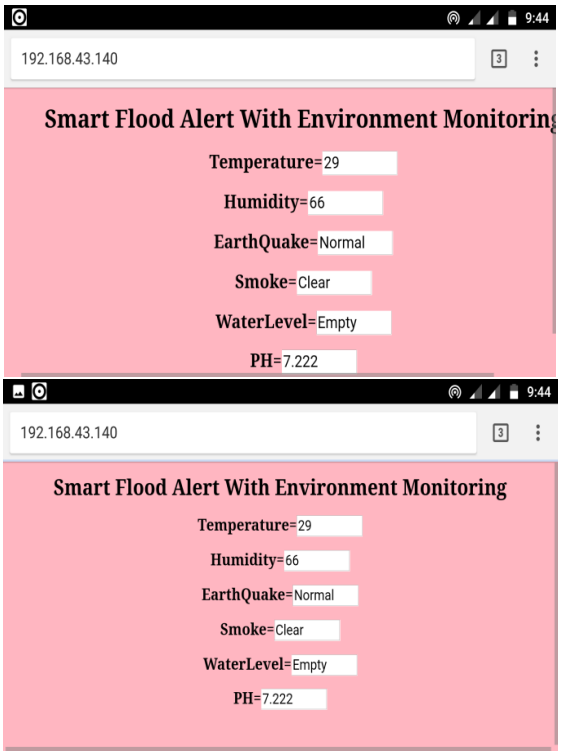
a. Estimation of Water Temperature utilizing Temperature sensor: Indicates how sensor estimating the water temperature in the range from - 50°C to 125°C. Fundamentally water temperature is grouped into chilly, typical and hot dependent on its temperature. On the off chance that the temperature is in the range from - 55°C to 20°C is considered as chilly water, from 21°C to 39°C is considered as should be expected water and from 40°C to 125°C is treated as high temp water.

b. Estimation of pH estimation of water utilizing pH sensor: Indicates how sensor estimating pH estimation of the water that extents somewhere in the range of 0 and 14. In view of the pH esteem, water is named acidic, ordinary and fundamental. In the event that the esteem is underneath 7 it is considered as acidic, over 7 as fundamental and 7 as typical or great water. In acidic, it is again named low acidic (3 to 6) and high acidic (0 to 2). Similarly fundamental water is additionally arranged into two sorts. They are low fundamental (8 to 10) and high essential (11 to 14).

c. Estimation of Mems Sensor estimation of water utilizing Mems Sensor "Broken down solids" alludes to any minerals, salts, metals disintegrated in water. Add up to break down solids (Mems Sensor) contain in natural salts (principally calcium, magnesium, potassium, sodium, bicarbonate, chlorides, and sulfate) and some little measures of natural issue that are broken up in water. As indicated by WHO (world Health Organization) Mems sensor ranges from 0 to over 1200. The Mems sensor is estimated in ppm. Mems sensor go less than 300ppm territory is Excellent for drinking water, 300-400 ppm is great, 600-900 ppm is reasonable, 900-1200 is poor or more 1200 is unsuitable. Furthermore, figure 10 demonstrates the estimation of Mems sensor run.

d. Estimation of Humidity of Water utilizing Humidity sensor: The humidity of water is its clearness. In the event that any mud, opening or sand particles and so forth are blended with the water, its quality shifts. As indicated by the water quality standards, typical water ranges from 0 NTU (Nephelometric Humidity Units) to 5 NTU and furthermore most extreme of up to 5 NTU is passable. On the off chance that the water goes more than 6 NTU up to 3000 NTU it is delegated turbid or mud blended water. Figure 11 demonstrates the estimation of Humidity of water.

TEST CASES OF MODEL



VI. CONCLUSION

Our venture "IoT Based Low Cost System for Monitoring of Water Quality in Real Time" concentrated on dissecting the water quality with superior, ongoing and exact. In our proposed framework we have estimated Mems sensor, Temperature, Humidity and pH estimations of water with the assistance of Raspberry Pi and different Sensors. In future, the parameters like conductivity, hardness, chloride, smelling salts, press, fluoride and so on likewise considering water quality estimation and these qualities are utilized to check the immaculateness of the water for some reasons, for example, drinking water and day by day necessities.

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