

Water Monitoring System Using ARDUINO

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Abstract- Water is essential for everyday life. The quality of water is depleting every day due to human activities. It is required to maintain the quality of water so that it becomes liable for drinking. The scope of this paper is about building a water quality monitoring system which enables us to measure the quality of water. Presently, internet of things (IOT) and smart sensors are being used to monitor, collect and analyses the data. The water monitoring system mentioned in this paper is economical, efficient and reliable. Smart sensors and ARDUINO Uno are used to this system. The results from the analysis of the data, measured by this system are sent to the officials or the authorities so that they can take necessary actions to improve the quality of water if it is found contaminated.

Index Terms— Internet of things, Water monitoring system, ARDUINO.

I. INTRODUCTION

Water is an essential natural resource required for the survival of living organisms on the earth. Since fresh water is a limited resource and is getting deteriorated by various human activities, water quality monitoring is required. This is done to keep a check on the water quality i.e., whether it is maintained and restored at the desired level. Water quality monitoring system helps us in measuring various parameters which is responsible for the contamination of water. The availability of good water quality is essential to prevent various water borne diseases. 783 million people do not have access to clean and safe water worldwide. WATER POLLUTION is the contamination of water bodies like lakes, rivers, oceans and groundwater [1, 2]. The water can be polluted in many ways by the pollutants which are directly or indirectly discharged into the water and no proper care is taken to remove these harmful compounds. Because of water pollution, there are deaths and diseases. As estimated 580 people in India die of water pollution related illness every day. The contaminants which are leading to water pollution include a wide variety of chemicals, pathogens and physical changes such as elevated temperature and discoloration. In our project, we collect data from various water parameters such as temperature, turbidity and the level of water.

The system evaluates the quality of water continuously and if any changes are detected it immediately informs the officials so that proper actions are taken to recover the quality of the water. The system proposed by us measures the temperature, turbidity and level of the water. The data collected from the system will be displayed on the system later; this information can be accessed by the officials on their phone/system through internet. In the system which is developed by us measures the quality of water in real time

so, that quick action could be taken. It is affordable, precise and requires less man power.

II. WAYS OF WATER MONITORING

A. Thermal pollution

Thermal pollution is caused due to the industrial effluents discharge and also the runoff water. Industrial effluents means industries uses large amount of water as coolant, in power plants and chemical industries they release the heated water into nearby water sources without cooling it appropriately.

Effects of thermal pollution: Reduces the dissolved oxygen [DO] content of the water which eventually kills the organisms that require high level of dissolved oxygen. Causes increased respiration rates and makes the aquatic animals more vulnerable to diseases. Higher temperature increases the metabolic activity of the organisms in the water causing them to consume more food. If the oxygen content reduces means it leads to conditions favorable for anaerobic bacteria which will increase in number. These digest their food by fermentation, which adds to contamination condition of water and air. So, Thermometer can be used for testing the thermal pollution.

B. Soluble nitrates and phosphates

Sediments cause clogging of water, hence destroying the feeding and spawning grounds of aquatic animals. Clouds the water and reduce the photosynthesis of aquatic plants. They carry pesticides, insecticides and harmful bacteria and disturb the aquatic food webs. Soil eroded from the land in which we find some insoluble particles that will be suspended in the water is the best example for the sediment or suspended matter. And from turbidity test we can measure the amount of impurities in the water.

C. Organic chemicals and water soluble inorganic chemicals High levels of chemicals can threaten human health and harm the aquatic life. The Chemicals are Detergents, oil

IV. LCD DISPLAY

After measuring all the parameters we need to display it, to display we are using LCD. A liquid-crystal display (LCD) is a flat panel display. Display units are the most important output devices in embedded project and electronics products. 16*2 LCD is one the most used display unit. 16*2 LCD means that there are two rows in which 16 characters can be displayed per line, and each character takes 5*7 matrix space on LCD. We can divide it in five categories power pins, control pins, contrast pin, data pins and backlight pin. Here in our project we are finally displaying the output on the LCD. And the data which is displayed can be used for the further references to maintain all these parameters in the required level. The same data can be viewed either in your mobile or system. And the collected data will go to the officials who are the in charge of that water body so that they take care or maintain the parameters to required level.

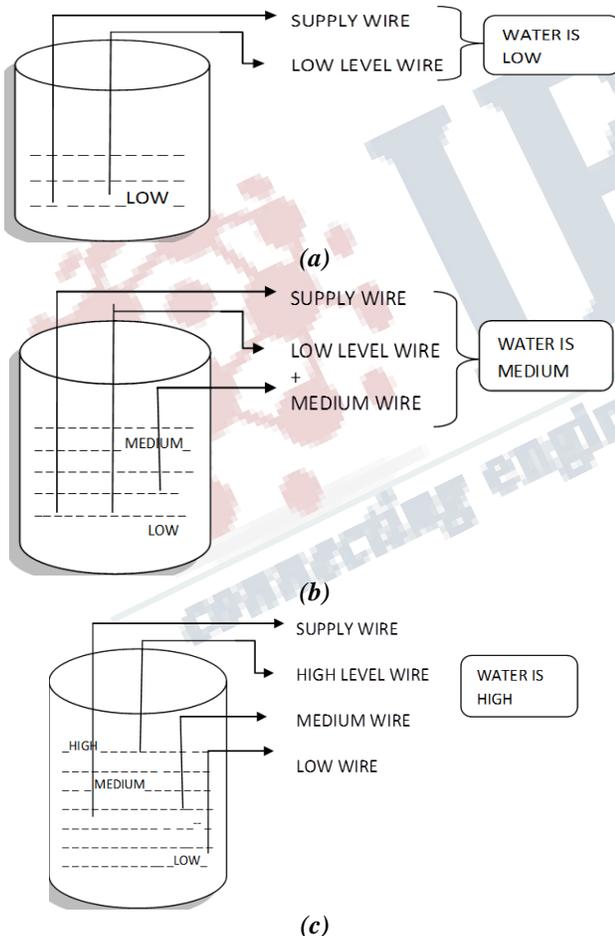


Fig. 2 Water level monitoring at: (a) Low level; (b) Medium level; (c) High level.

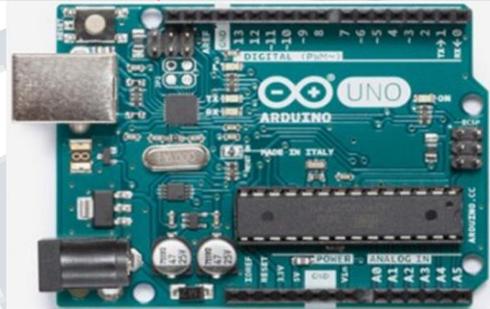
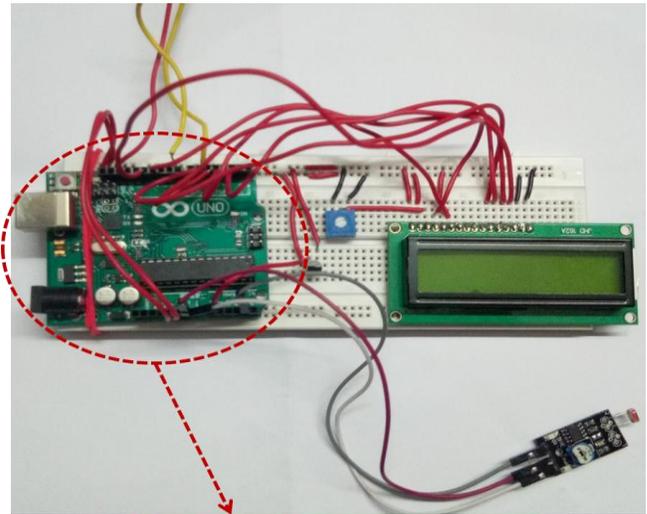


Fig. 3 Printed circuit board with LCD.

V. RESULTS

We have identified a suitable model that consists of sensors and ARDUINO microcontroller. The functionalities are as shown in the Fig. 3. In this system, we use ARDUINO Uno with temperature sensor and turbidity sensor along with the LCD display after sensing the data from the sensors placed in the area of interest, it is sent to web server.

VI. CONCLUSIONS

Monitoring turbidity, temperature and level of water is inexpensive and does not require any labor. Water monitoring system is economical, convenient and reliable. The operation is simple. Variations and improvements can be done by changing the relevant software programs and by inserting more sensors. The system can be used to monitor the quality of water in industrial and agricultural production companies. It has wide spread applications and extended value. To implement this, sensors should be placed in the environment to collect measure and analyze the data. By deploying sensors in the environment, we can bring the

**International Journal of Engineering Research in Electronics and Communication
Engineering (IJERECE)
Vol 5, Issue 6, June 2018**

environment to real life and the solutions can be drawn easily.

VII. ACKNOWLEDGMENT

The authors would like to acknowledge Dean Dr. A. Srinivas, Dayananda Sagar University, Bangalore for his valuable guidance. They would like to thank Dr. H.L Viswanath, Head, Department of Electronics and Communication Engineering for their co-operation and support.

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