# SURVEY ON REAL TIME-RIVER WATER QUALITY MONITORING AND CONTROL SYSTEM

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# SURVEY 1

**TITLE:** Real time water quality monitoring system.

**AUTHOR:** Jyotirmaya Ijaradar,subhasish Chatterjee.

**PUBLISHED YEAR:** 3rd MARCH 2018

**SOURCE:** International-Research Journal of Engineering and Technology.

**DESCRIPTION:**

The need for effective and efficient monitoring,evaluation and control of water quality in residential area has become more demanding in this era of urbanization,pollution and population growth.The system consists of a Raspberry pi,Analog to Digital Converter,Water quality measurement sensors.It detects water temperature,dissolved oxygen,PH and electrical conductivity in real time and disseminates the information in graphical and tabular formats to relevant stakeholders through a web-based and mobile phone platforms.The experimental results show that the system has great prospect and can be used to operate in real world environment for optimum control and protection of water resources by providing key factors with relevant and timely information to facilatate quick action taking.

**ADVANTAGES OF THE PROJECT:**

- Allows Real time continuous monitoring of water quality without man power.
- Trigger alarm when discrepancies are found in quality of water.
- Using Raspberry pi3 ModelB,can do their entire job like average does.
- No External components required while measuring temperature.

**DISADVANTAGES OF THE PROJECT:**

- Only by replacing the corresponding sensors and changing the relevant software program,this can be used to monitor another water quality.
- During temperature changes,it was difficult to measure.

**LIMITATIONS OF THE PROJECT:**

- While using Thingspeak platform,it requires many fields for storing.
- Alert for authority was not present.

**INFERENCE:**

Monitoring of real time quality of Water from reserve tank of house and colony makes use of PH, turbidity and temperature sensor with Raspberry Pi and existing Cloud system for data analytics. The system can monitor water quality automatically, triggers alarms immediately to prevent any health hazards and it is low in cost and does not require people on duty. So, the system is likely to be more economical, convenient and fast. The system has good flexibility. Only by replacing the corresponding sensors and changing the relevant software programs, this system can be used to monitor other water quality parameters. The operation is simple. The system can be expanded to monitor hydrologic, air pollution, industrial and agricultural production and so on. It has widespread application and extension value.

The core element of ThingSpeak is a 'ThingSpeak Channel'. A channel stores the data that we send to ThingSpeak and comprises of elements like 8 fields for storing data of any type,3 location fields that can be used to store the latitude,longtitude and elevation,1 status field for describe the data stored in the channel.

**REFERENCE:**

Sridharan, S. (2014) Water Quality Monitoring System Using Wireless Sensor Network. International Journal of Electronic Communications Engineering Advanced Research,3,399-402 . Losilla, F., Garcia-Sanchez, A.-J., Garcia-Sanchez, F., Garcia-Haro, J. and Haas, Z.J. (2011) A Comprehensive Approach to WSN-Based ITS Application. Sensors, 10, 10220-10265. http://dx.doi.org/10.3390/s111110220. Mo Deqing, Zhao Ying, Chen Shangsong, "Automatic Measurement and Reporting System of Water Quality Based on GSM," 2012 International Conference on Intelligent System Design and Engineering Application. Nikhil Kedia, Water Quality Monitoring for Rural Areas- A Sensor Cloud Based Economical Project, in 1st International Conference on Next Generation Computing Technologies (NGCT2015) Dehradun, India, 4-5 September 2015. 978- 1-4673-6809-4/15/$31.00 ©2015 IEEE . Jayti Bhatt, Jignesh Patoliya, Iot Based Water Quality Monitoring System, IRFIC, 21 feb, 2016. [6] Michal lom, ondrej priby & miroslav svitek, Internet 4.0 as a part of smart cities, 978-1-50901116-2/16/$31.00 ©2016 IEEE.

# SURVEY2

**TITLE:** Integrating Wireless Sensor Technology To water Monitoring.

**AUTHOR:** PrasadM Pujar,Harish Kenchannavar,Raviraj Kulkarni,UmakantP.kulkarni.

**PUBLISHEDYEAR: January2020**

**SOURCE:** ResearchGate.

**DESCRIPTION:**

To develop a statistical model based on Internet of Things for water quality analysis of river KRISHNA using different water quality parameters such as PH,conductivity,dissolved oxygen,temperature,biochemical oxygen demand,total dissolved oxygen solids.The water quality data were collected from six stations of river Krishna flow in the state of Karnataka.By considering only the stretch of river Krishna.In recent years,the mineral-rich river basin is subjected to rapid industrilization.Thus polluting the river basin.The traditional manual technique that is very slow process.IOT based water quality monitoring is done by applying analysis of ANOVA were used for water quality analysis.These analyses can be used to train the IOT system so that it can take decision whenever there is abnormal change in the reading of any of the water quality parameter it will alert the user.

**ADVANTAGES OF THE PROJECT:**

- Two way ANOVA is used for water quality assessment on parameter.
- Time consumption is less.
- Temperature analysis for 3 seasons can be done effectively.
- Data can be stored in cloud for future use.
- Monitoring and alert users in a stipulated time.
- Alerting the authority on time.

**DISADVANTAGES OF THE PROJECT:**

- Temperature sensor only find the 3 seasonal changes.
- Multi parameter water quality analyzer is difficult when any parameter reading is changed.

**LIMITATIONS OF THE PROJECT:**

- There is no controlling measures or techniques.
- In cloud System,it stores large number of data.

**INFERENCE:**

The IOT sysytem was used to collect the data from identified stations for different water quality parameters to generate a data set that was used to monitor the quality of water.The collected data were successfully utilized to access the water quality of river Krishna using one way ANOVA and two way ANOVA analyze a particular parameter and predict the quality of water.If any parameter was changed then it alert the user by the web application.This system collect all the parameter value and store it in the cloud for future use to make the system intelligent by applying machine learning techniques.

**REFERENCE:**

Central pollution control board(2013)status of water quality in India 2011.Central control board,New Delhi.Central water commision ministry of water resources India(2014) report on Krishna River Basin version 2.0.Geetha S.Gouthami S(2016)IOT enabled real time water quality monitoring system.smart water 2:1.Nagar EA(2007)guidelines for water quality monitoring central pollution control board parivesh bhawan foreword.water 1-35.

# SURVEY3

**TITLE:** IOT Based Real Time River Water Quality Monitoring System.

**AUTHOR:** Mohammad Salah Uddin Chowdurya

Talha Bin Emranb

Subhasish Ghosha

Abhijit Pathaka

Mohd.Manjur Alama,Nurul Absara

Karl Anderssonc,mohammad Shahadat Hossaind.

**PUBLISHED YEAR: 2019**

**SOURCE:** ScienceDirect

**DESCRIPTION:**

Current water quality monitoring system is a manual system with a monotonous process and is very time-consuming.This one proposes a sensor-based water quality monitoring system.The components includes wiresless sensor network(WSN)include a microcontroller for processing the system,communication sysyem for inter and intra node communication and many sensore.Data collected at the apart site can be displayed in a visual format on a server PC with the help of Spark streaming analysis through spark MLIB,Deep learning neural nework models,Belief Rule Based(BRB)system and is also compared with standard values.If the acquire value is above the threshold value automated warning SMS alert will be sent to the agent.The uniqueness of the project is to obtain the water monitoring system with high frequency,mobility,and low powered.Therefore,system will immensly help Bangladeshi polpulations to become conscious against contaminated water as well as to stop polluting the water.

**ADVANTAGES OF THE PROJECT:**

- Big data analytics system.
- It is Belief Rule Based can be compared with standard values.
- SMS alert will be sent to the agent.

**DISADVANTAGE OF THE PROJECT:**

- Because of limitations in the budget this project focuses only on measuring the quality of river water parameters only.
- Additional cost is required for further improvement of the overall system.

**LIMITATIONS OF THE PROJECT:**

- Not able to extended into an efficient water management system of a local area.

- Conducting systematic experiments of the proposed technologies in diverse qualities of river water in Bangladesh.

**INFERENCE:**

If the acquired value is above the threshold value means the command will be bad,otherwise it will be good.The acquired value will be based on sensed PH temperature,turbidity and ORP values and it will be monitored continuously and displayed on the LCD board.

Therefore IOT integrated big data analytics appear to be a better solution for reliability,speed and persistence.

**REFERENCE:**

A. Rojko, “Industry 4.0 concept: Background and overview” Int. J. Interact. Mob. Technol., vol. 11, no. 5,pp. 77–90, 2017. Y. Lu, “Industry 4.0: A survey on technologies, applications andopen research issues,” J. Ind. Inf. Integr., vol. 6, pp. 1–10, 2017,doi: 10.1016/j.jii.2017.04.005. M. Crnjac, I. Veža, and N. Banduka, “From concept to the introduction of industry 4.0,” Int. J. Ind. Eng. Manag., vol. 8, no. 1,pp. 21–30, 2017. P. Doss, “Smart Water Conservation and Management System Using IOT,” vol. 7109, pp. 9–12, 2018. T. Perumal, M. N. Sulaiman, and C. Y. Leong, “Internet of Things(IoT) enabled water monitoring system,” 2015 IEEE 4th Glob.Conf. Consum. Electron. GCCE 2015, no. April, pp. 86–87, 2016,doi: 10.1109/GCCE.2015.7398710. J. H. Nord, A. Koohang, and J. Paliszkiewicz, “The Internet ofThings: Review and theoretical framework,” Expert Syst. Appl., vol.133, pp. 97–108, 2019, doi: 10.1016/j.eswa.2019.05.014.B. Farahani, F. Firouzi, V. Chang, M. Badaroglu, N. Constant, and K. Mankodiya, “Towards fog-driven IoT eHealth: Promises andchallenges of IoT in medicine and healthcare,” Futur. Gener Comput. Syst., vol. 78, pp. 659–676, 2018, doi:10.1016/j.future.2017.04.036. R. Accorsi, M. Bortolini, G. Baruffaldi, F. Pilati, and E. Ferrari,“Internet-of-things Paradigm in Food Supply Chains Control andManagement,” Procedia Manuf., vol. 11, no. June, pp. 889–895,2017, doi: 10.1016/j.promfg.2017.07.192.G. Erboz, “HOW TO DEFINE INDUSTRY 4 . 0 : The Main Pillarsof Industry 4 . 0,” no. July, 2018.B. Tjahjono, C. Esplugues, E. Ares, and G. Pelaez, “What doesIndustry 4.0 mean to Supply Chain?,” Procedia Manuf., vol. 13, no.January, pp. 1175–1182, 2017, doi: 10.1016/j.promfg.2017.09.191. M. B. Kawarkhe and S. Agrawal, “Smart Water Monitoring SystemUsing IOT at Home,” vol. 21, no. 1, pp. 14–19, 2019, doi:10.9790/0661-2101021419.

# SURVEY4

**TITLE:** Water Quality Monitoring System Based On IOT

**AUTHOR:** Vaishnavi V.Daigavane and Dr.M.A Gaikwad.

**PUBLISHED YEAR: 2017**

**SOURCE:** Research India Publications.

**DESCRIPTION:**

This paper presents the Design and Development of a low cost system for real time monitoring of the water quality in IOT(internet of things).The system consist of several sensors is used to measuring physical and chemical parameters of the water. The parameters such as temperature, PH, turbidity, flow sensor of the water can be measured. The measured values from the sensors can be processed by the core controller. The Arduino model can be used as a core controller. Finally, the sensor data can be viewed on internet using WI-FI system. By keeping the embedded devices in the environment for monitoring enables self protection (i.e., smart environment) to the environment. To implement this need to deploy the sensor devices in the environment for collecting the data and analysis. By deploying sensor devices in the environment, we can bring the environment into real life i.e. it can interact with other objects through the network. Then the collected data and analysis results will be available to the end user through the Wi-Fi.

**ADVANTAGES OF THE PROJECT:**

- By interfacing relay we can control the water supply.
- The system can monitor the water quality automatically.
- Low in cost and not require people on duty.
- The system has good flexbility.
- More economical,convinent and fast.

**DISADVANTAGES OF THE PROJECT:**

- If small mistake took place in connection,then data will not sent to the web server.
- The ESP8266 module cost effective board with extremely huge.
- Use of plastic valve tube in flow sensor may cause danger.

**LIMITATIONS OF THE PROJECT:**

- Need to increase multiple sensor for every addition of parameter.
- Collecting the data and analysis to deploy sensor devices in environment is difficult.
- Only by replacing the corresponding sensors and changing the relevant software programs, this system can be used to monitor other water quality parameters.

**INFERENCE:**

In this implementation model they used ATMEGA 328 with Wi-Fi module. Inbuilt ADC and Wi-Fi module connects the embedded device to internet. Sensors are connected to Arduino UNO board for monitoring, ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding environmental parameter will be evaluated. After sensing the data from different sensor devices, which are placed in particular area of interest.

The PCB is design at first level of construction and component and sensors mounted on it. BLYNK app is installed in the android version to see the output. When the system get started dc current given to the kit and arduino and WIFI gets on. The parameters of water is tested one but one and their result is given to the LCD display. The app went provided with hotspot gives the exact value as on LCD display shows on kit. Thus like this when the kit is located on any specific water body and WIFI is provided we can observe its real time value on our android phone anywhere at any time.

**REFERENCE:**

Nikhil Kedia, Water Quality Monitoring for Rural Areas- A Sensor Cloud Based Economical Project, in 1st International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India, 4-5 September 2015. 978-1-4673-6809-4/15/$31.00 ©2015 IEEE .Jayti Bhatt, Jignesh Patoliya, Iot Based Water Quality Monitoring System, IRFIC, 21feb,2016. Michal lom, ondrej priby & miroslav svitek, Internet 4.0 as a part of smart cities, 978-1-5090-1116-2/16/$31.00 ©2016 IEEE . Zhanwei Sun, Chi Harold Liu, Chatschik Bisdikia_, Joel W. Branch and Bo Yang, 2012 9th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks .(SECON), 978-1-4673-1905-8/12/$31.00 ©2012 IEEE .Sokratis Kartakis, Weiren Yu, Reza Akhavan, and Julie A. McCann, 2016 IEEE First International Conference on Internet-of-Things Design and Implementation, 978-1-4673-9948-7/16 © 2016IEEE Mithaila Barabde, shruti Danve, Real Time Water Quality Monitoring System, IJIRCCE, vol 3, June 2015. Akanksha Purohit, Ulhaskumar Gokhale, Real Time Water Quality Measurement System based on GSM , IOSR (IOSR-JECE) Volume 9, Issue 3, Ver. V (May - Jun. 2014) .Eoin O'Connell, Michael Healy, Sinead O'Keeffe, Thomas Newe, and Elfed Lewis, IEEE sensors journal, vol. 13, no. 7, July 2013, 1530-437x/$31.00 © 2013 IEEE .Nidal Nasser, Asmaa Ali, Lutful Karim, Samir Belhaouari, 978-1-4799- 0792-2/13/$31.00 ©2013 IEEE . Niel Andre cloete, Reza Malekian and Lakshmi Nair, Design of Smart Sensors for Real-Time Water Quality monitoring, ©2016 IEEE conference.