Reconfigurable Water Quality Monitoring System Using FPGA in IoT Environment

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Abstract- In internet of things (IoT) environment. A sensor interface device is essential for data collection in Wireless sensor network (WSN) system for water quality monitoring (WQM) as the water pollution is a critical issue globally. This paper Present reconfigurable water quality monitoring system using FPGA in IoT Environment .The system consists of FPGA Sensors, Zigbebased communication module and personal computer (PC). The FPGA board perform as the heart of the proposed WQM system. The proposed system collects the data of water PH , Temperature , Smoke(gas) in real time basis with high speed from three different sensor nodes. Whatever data receive will going to show on server called thing speak server. For save on cloud we are using MYSQL database. Python is programming language. Xilinx software is used to compile and simulate a VHDL code.

IndexTerms- FPGA , IoT , MYSQL , Sensors- PH ,Temperature, Smoke(gas), Thingspeak server , Xilinx.

I. INTRODUCTION

Earth is called as Blue Planet and is the main planet known up to the present time having the capacity to help life. This ability of our planet to help life is just because of the nearness of water on earth. In the event that the parity of water gets aggravated in our natural framework, at that point this may prompt termination of species and animals driving life on our planet. The opportunity has for us to contemplate our condition and its ideal parity as it has been now bothered, all things considered, by our changing ways of existence and expanding offices. There are numerous elements that depict the biological framework balance, Fresh water present on earth is always diminishing and is being supplanted by contaminated water; model is expanding measure of corrosive downpours, waterway water contamination, expanding surges, ocean water contamination and terrible effect on amphibian life. New water assets are being corrupted step by step, many living animals are making due on debased water and it is prompting numerous sicknesses. Every one of these impacts are not regular but rather they are happened because of our recklessness and over utilization of offices accessible to us by the excellence of expanding innovative improvement.

Contextual investigation from most recent situation (Ganga stream venture) – Ganga is a religiously critical waterway of our nation yet it additionally underpins the presence of human progress in kingdom as it were. Just about 40 percent of the number of inhabitants in kingdom is making due on Ganga water and horticulture upheld by this water. This as well as the Ganga is pride of our nation since it is the main waterway of the planet that has 25 percent oxygen content in it's water.

FPGA equipment circuits to actualize these frameworks on the grounds that these give an adaptable and quick creating model to think about the implementation of the structure. FPGA is a ideal resolution for framework prototyping on the grounds that it prompts the low improvement cost of the observing framework. Particular devices are accessible to program the FPGA and FPGA implanted units are additionally accessible that prompt simple prototyping of the framework. FA packs comprise of FPGA gadget that is programmable and various peripherals that might be required to be interfaced with the end goal to model a frameworkVarious remote conventions are utilized for this reason, for example, ZigBee remote standard, WiFi standard, and so on.

II. RELATED WORK

(1) Mihai T. Lazarescu, et al [1] proposed (IoT) gives a indirect view, through the hyperspace Tradition, to a gigantic collection of veritable things, stretching out . Its begthe inescapable summed up ingress to the place and territory of any "object".. Remote sensor frameworks (WSN) are suitable for whole deal normal data anchoring for IoT depiction. This bills of exchange presents the helpful arrangement and execution of an aggregate WSN organize that for an extent of whole deal common watching IoT applications. The application necessities for insignificant exertion, soaring no of detector, fast association, prolonged existence, little upkeep, and lofty bore of organization are contemplate in the assurance and plan of the stage and of each one of its parts. Inexpensive achievement organize reclaim is moreover seen as starting from the conclusions.

(2) Shifeng Fang et al. [2], presents water resource organization in light of geo-informatics including distinctive advances, for instance, cloud organizations,.that joins data anchoring, data organization and sharing, illustrating, and learning organization. The system gives best results to water and flood security .i.e. SFFEIS.. In which it contains organization of information which empowers part to accept the activity as sensor and an advocate, to the information stockroom, transient and scattered examination, gauge models to envision the cool, learning organization is useful for the decision taking; or, in other words the two customers and open expect the activity of giving data and data, and other a couple of limits. This structure is a model water wealth organization IIS which facilitates geo-informatics,and cloud advantage. This organization gives the critical hugeness of an intentional regarding IISs for beneficial wealthy and condition organization.

(3) Mahdi Kasmi, FaouziiBahloul ,HaykelTkitek et. al.[4] proposed general outline IoT of an insightful home realized in light of a passage IoT and watchful center points interconnected through the ZIGG orchestrate. From tests finished ceaselessly, we exhibit that the made model is adequately gifted to Predominance distant the unmistakable apparatus of the place of residence through the requisition made in PhP. Moreover, place of residence completed is depicted by a level of learning which ensures self-governing the solace and the prosperity of occupants. Advantage of the stage cloud to record persistently the lead of the occupants. It is suitable to expand this endeavor by using statistic from the alias authoritatively organized on the direct of people to perform first behavior towards and amount. Data portrayal of the house could be also best in class by exhibiting the imperativeness usage of equipment.

(4)Qing ping Chi et al. [6], proposed another system to accumulate sensor data wisely. It was made in view out of IEEE1451 tradition by uniting with CPLD. This is amazingly for ground-breaking requirements of the quick data obtainment structure in IOT condition. The use of CPLD essentially unravels the arrangement of periphery circuit . In this new system IEEE1451.2 standard brilliant sensor interface points of interest are used with the objective that structure can assemble sensor data shrewdly.

III. PROPOSED SYSTEM

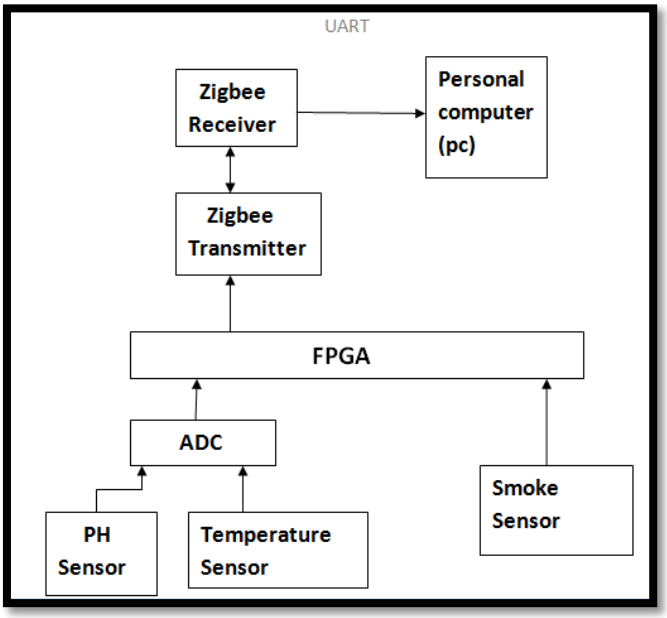

Fig.1: proposed system

The proposed water quality system is a cost-effective solution to interface to sensor network using FPGA board and ZIGBEE module is used for wireless data transmission. For calculating PH of water body, Temperature and Smoke, PH sensor, Temperature sensor and Smoke Sensor is used respectively. All these sensors are interfaced to ADC (analog to digital converter), MCP3204 a 4 channel 12 bit ADC indirectly connecting to FPGA. Whatever data receive will going to show on server called thing speak server. For save on cloud we are using MYSQL database. Python is programming language. Open software Spartan 3 is used for programming FPGA.

IV. CONCLUSION

With increasing industrialization and environmental imbalance, water quality and fresh water quantity are decreasing day by day. This paper describes a smart sensor interface to FPGA in IOT environment to monitor water quality. The system can collect data information intelligently from different sensors & send to FPGA chip for processing. ADC is used to convert analog sensor output into digital as FPGA has digital input .System simulations are results are tested on Xilinx software.

V. REFERENCES

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