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IOT Based Water Quality Testing By using Android

P.VaraLakshmi[#1], Nayeemuddin[*2]and R Sambasivanayak [*3]

[#1]*M.Tech – Scholar, Department of E.C.E, Sri ChundiRanganayakulu Engineering College, Guntur,AP, India*

[*2] *Associate Professor, Department of E.C.E, Sri ChundiRanganayakulu Engineering College, Guntur,AP, India*

[*3]*HOD,, Department of E.C.E, Sri ChundiRanganayakulu Engineering College, Guntur,AP, India*

***Abstract*— To ensure the safe supply of drinking water the quality should be monitored in real time for that purpose new approach IOT (Internet of Things) based water quality monitoring has been proposed. In this paper, we present the design of IOT based water quality monitoring system that monitor the quality of water in real time. This system consists some sensors which measure the water quality parameter such as pH, turbidity, conductivity, dissolved oxygen, temperature. The measured values from the sensors are processed by microcontroller and these processed values are transmitted remotely to the core controller that is PIC Microcontroller using IOT protocol. Finally, sensors data can view on internet browser application using cloud computing**

***Index Terms*— PIC16F877A microcontroller,16*2LCD Display, PH Sensor, LM35 Sensor, Moisture Sensor, Humidity Sensor,ESP8266 IOT Module**

I. INTRODUCTION

In this section of the paper provides a literature review of the existing water quality monitoring system that gives a short explanation of the systems that are as below Fiona Regan, Antóin and Audrey [19] designed smart water quality monitoring system. In that system they made water quality smart sensors so the sensors send data wirelessly to the device which collects data from all the nodes. This data is given to the remote server The contemporary perception of water is that of a free, renewable resource that can be used in abundance. However, this is not reality; in many parts of North America, water consumption is taxed. It is therefore reasonable to assume that it will soon become a very expensive resource everywhere. In addition to the excess cost of water, labour is becoming more and more expensive. As a result, if no effort is invested in optimizing these resources, there will be more money involved in the same process. Technology is probably a solution to reduce costs and prevent loss ofresources.

II. WORKING PRINCIPLE

In this project we are collecting some four different types of sensors like LM35 in order to collect the temperature, DH11 to collect the humidity level, conductivity in order to collect the salt content and finally PH sensor in order to collect the PH level of water. Initially we connect all the four sensors to a PIC16f877a microcontroller and we fixed the range for all sensors with respect to the universal values if any one of the sensor reaches beyond that range then it sends an information to the microcontroller regarding the water which we are collected is a bad water then the microcontroller will display the same thing in LCD and also transmits this information to the control station through IOT.

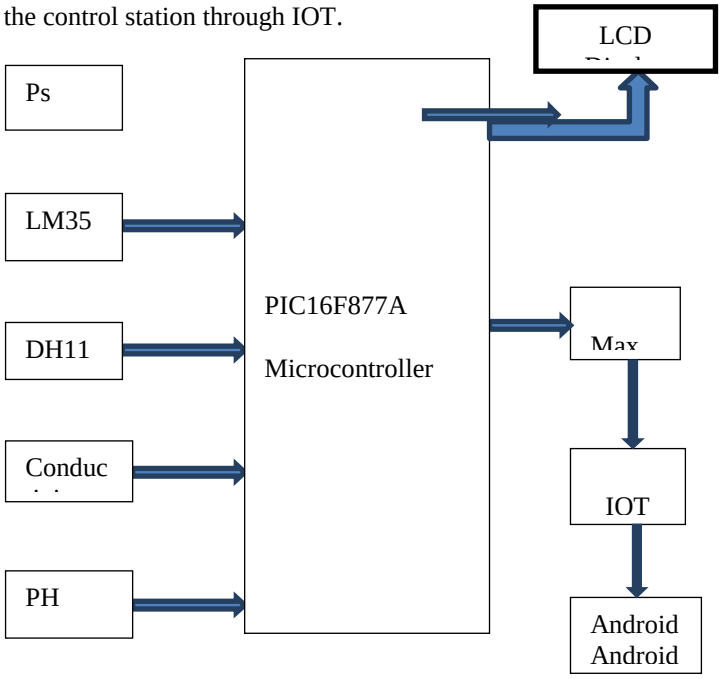


Figure: Block Diagram

A. Automatic Water Quality Monitoring system circuit design

Regulated Power Supply: Usually, we start with an unregulated power supply ranging from 9volt to 12volt DC. To make a 5volt power supply, KA8705 voltage regulator IC has been used. The KA8705 is simple to use. Simply connect the positive lead form unregulated DC power supply (anything from 9VDC to 24VDC) to the input pin,connect the negative lead to the common pin and Mathematical Methods and Optimization Techniques in Engineering ISBN: 978-960-474-339-1 93then turn on the power, a 5 volt supply from the output pin will be gotten**.**

PIC16F877A Microcontroller: A microcontroller is a computer control system on a single chip. It has many

electronic circuits built into it, which can decode written instructions and convert them to electrical signals. The microcontroller will then step through these instructions and execute them one by one. As an example of this a microcontroller we can use it to controller the lighting of a street by using the exact procedures.

Microcontrollers are now changing electronic designs. Instead of hard wiring a number of logic gates together to perform some function we now use instructions to wire the gates electronically. The list of these instructions given to the microcontroller is called a program. There are different types of microcontroller, this project focus only on the PIC16F877A Microcontroller where it's pins

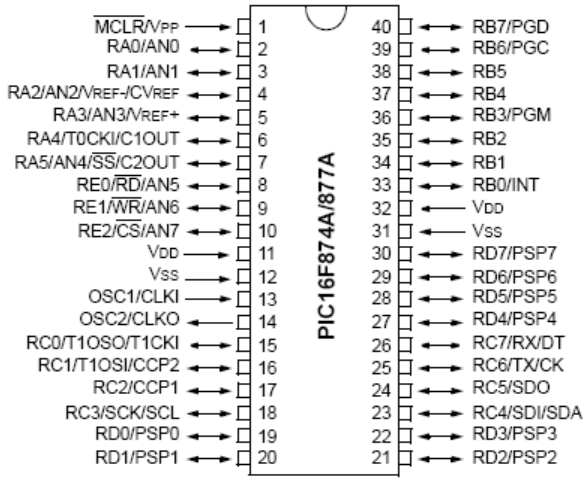


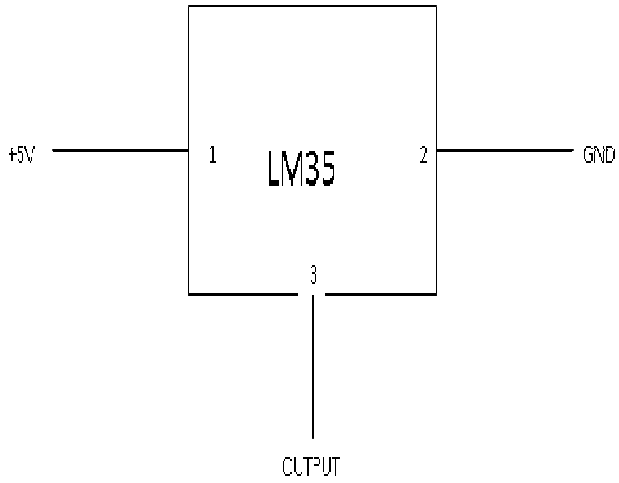
Figure: PIC16F877A PIN Diagram

- **LM-35 Sensor:**

You can measure temperature more accurately than a using a thermistor.

The sensor circuitry is sealed and not subject to oxidation, etc.

The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified.



- **pH monitoring**

pH monitoring is the current gold standard for diagnosis of gastroesophageal reflux disease (GERD). It provides direct physiologic measurement of acid in the esophagus and is the most objective method to document reflux disease, assess the severity of the disease and monitor the response of the disease to medical or surgical treatment. It can also be used in diagnosing laryngopharyngeal reflux.

Figure: PH Sensor

- **LCD**

A liquid crystal display (commonly abbreviated **LCD**) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power.

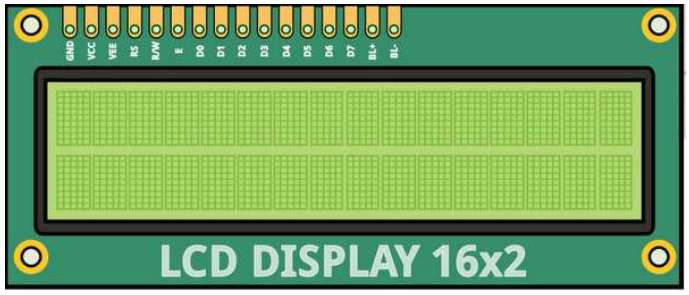
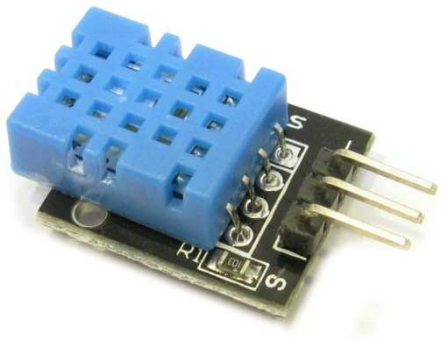


Figure: LCD Display

- **Humidity Sensor**:

Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. The presence of water vapor also influences various physical, chemical, and biological processes. Humidity measurement in industries is critical because it may affect the business cost of the product and the health and safety of the personnel. Hence, **humidity sensing** is very important, especially in the control systems for industrial processes and human comfort.



III. CONCLUSION:

The modern challenge for improving plant growth and reducing costs justifies the development of an automated irrigation system that will minimize the waste of water and reduce labour and monitoring overhead. Feedback-based approaches enable more efficient handling of resources than open-loop systems, at the expense of complexity and stability issues. Soil moistures are difficult to measure, and their target levels cannot be maintained very successfully. A design is proposed for a residential environment. It is made of reliable parts and has a relatively low cost. Its different sections have been simulated and tested, and their effectiveness in reducing water consumption and human intervention has been demonstrated. The design is also resource-efficient by itself by consuming low power. However, much more testing on the system as a whole must be conducted to measure the real water and lab oursavings.

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