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IOT BASED DISTANCE MEASURING METER

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Abstract-The conventional method of measuring distance is to use tapes.This method is time consuming , wastage of man power.This paper describes a measuring meter which is used to measure distance using ultrasonic sensor.This ultrasonic sensor is based on the measurement of time of flight of an ultrasonic pulse,which is reflected by the ground and we rather use lcd display which displays the measurement in different units by using arduino programming .Nodemcu is an open source iotplatform.It includes firmware which runs on the ESP8266 WIFI SOC and hardware ESP 12 module.

I. INTRODUCTION

Distance measurement of an object infront or by the side of a moving entity is devices may be small or large and also quite simple or complicated.Generally we are using tapes to measure distances.It becomes difficult to convert values from one unit to another unit, especially for uneducated persons.It becomes difficult for us to check the level of waters in water tanks and dams. Such distance measurementsystems are available.These use various kinds of sensors and systems.Low cost and accuracy as well as speed is important in the most of the applications.   In this paper,we describe such a measurement system which uses ultrasonic sensor,lcd,nodemcu,iotplatform.Ultrasonicd ensor are very versatile in distance measurement.This Meter is also connected to cloud,so that we can include it in automation process.By using this meter ,we can continuously moniter the levels simply

sitting in our room.we can send this information wherever we want through our mobile phone.They are also providing cheapest solutions.Ultrasonic waves are useful for both the air and under water.Ultrasonic sensors are also quite fast for most of the common applications.

II.Existing technologies

At present, tapes are being used for measuring length or distance or height of walls or objects.But the present distance meter is accurate within a few centimeters,certainly equaling a tape for larger distance, and the line is always dead staright-no bending or sagging!You have a choice of units, and there is no risk of misreading, has with the intermediate marks on the tape.

III.Proposed technology

We have seen different measurement equipmentsabove ,the main theme of our

technology is to provide accurate measurement and also in different units conversion.we rather implemented by adding iot into it so that we can get information by staying at the place we are.

We used ultrasonic sensor,nodeMCU (a wifi module),arduinoprogramming,an LCD and a blink app which we used it as iot platform.A program for arduino may be written in any programming language for a compiler that produces binary machine code for the target processor. By connecting the arduino to the nodemcu and programming it we get the units in the lcd display and by using blink app which is our IOT platform we can send it to the user for the information th--ey requireThis instrument is used for carpenters where they need a lot of daily measurements in their daily work.using of tapes may require two people and can also get precision errors,not accurate may be[3].The water level near the bridges can also be calculated using this equipment,no need to go often to check the result,as we connected to the iot we can result to our user.

Block Diagram of distance measuring meter:

Flow Chart:

DIGITAL SENSING METER

WALL

DISTANCE:

XYZ CM

MEASURED VALUES ARE MAILED TO USER.
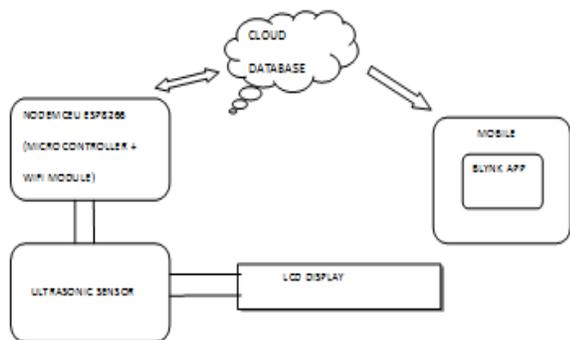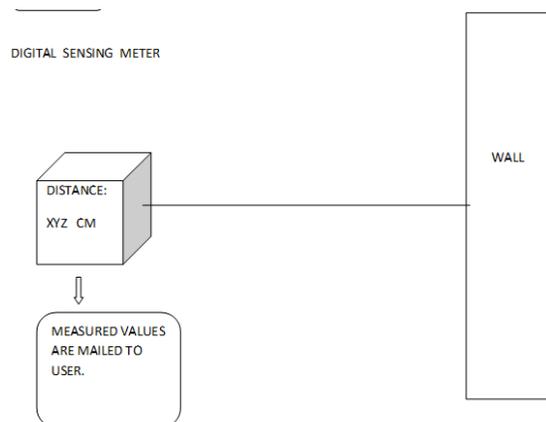
A. Ultrasonic Sensor

The distance can be calculated with the following formula;

DISTANCE $L = 1/2*T*C$

Where L is the distance

T is the time between the emission and reception.

C is the sonic speed(the value is multiplied by ½ because T is the time for go-and-return distance**.)**

A special sonic transdecure is used for the ultrasonic proximity sensors,which allows for alternate transmission and reception of sound waves.the transducer emits a number of sonic waves which are reflected by an object,back to the transducer.after emission of the sound waves,the ultrasonic sensors will switch to receive mode.the time elapsed between emitting between emitting and

receiving is proportional to the distance of the object from the sensor.

B. Nodemcu Esp8266

NodeMCU[1][2] is an open source iot platform.it includes firmware which runs on the esp8266 wifisoc from espressifsystems,and hardware which is based on the esp-12 module.The term "nodemcu" by default refers to the firmware rather than the development kits.the firmware uses the lua scripting laungauage.

Nodemcu was created shortly after the esp8266 came out.espressif systems began production of the esp8266.the esp8266 is a wifisoc integrated with a xtensa LX106 core,widely used in iot applications.The ESP8266 is a wifi module great for iot and home automation projects.This article is a getting started guide for the ESP8266 development board.it allows you to control inputs and outputs as you would do with an arduino,but it comes with wi-fi.

C. LCD and I2C Adapter:

LCDs are useful for creating standalone projects. This LCD Display utilizes an I2C interface, which means that fewer pins are necessary to use this product than would be

needed with a regular 16x2 LCD Display (just four connections, VCC, GND, SDA & SCL are required). And it is backlit. I2C address is usually decimal 39, hex 0x27. These devices can sometimes be found at decimal 63, 0x3F.

D. Push Button And Connecting Wires:

A Push Button is a type of switch work on a simple mechanism called "Push-to-make". Initially, it remains in **off state or normally open state** but when it is pressed, it allows the current to pass through it or we can say **it makes the circuit when pressed**. Normally their body is made up of plastic or metal in some types.

E. Blynk App

Blynk Server is an Open-Source Netty based Java server[], responsible for forwarding messages between Blynk mobile application and various microcontroller boards and SBCs[2] (i.e. Arduino, Raspberry Pi. etc).

F. Tracking device

A GPS tracking device navigation device normally carried by a moving vehicle or person that uses the global positioning system(GPS) .To track the devices ,moments and determine its location.The recorded location data can either be stored within the tracking unit or transmitted to an internet connected device using the cellular radio

Or satellite embedded unit.

IV. programming

In this project we need to program nodemcu.We use arduino Ide to program nodemcu.Inorder to send values to cloud we have used blynk application[2].we need to program nodemcuaccordind some predefined functions of blynk package [4].A programming for arduino may be written in any programming language of a compiler that produces binary machine code for the argetprocessor.Atmel provides a development environment for their microcontrollers,AVR studio and the news Atmel studio.The arduino project provides the arduino integrated development environment(IDE)Which is a cross-platform application written In the programming language java.it orginated from the IDE for the languages processing and wiring .it includes a code editor with features such as text cutting and pasting,searching and replacing text,automaticindenting,bracematching,and syntax highlighting,and provides simple one-click mechanisms to compile and upload programs to an arduino board.it also contains amessagearea,a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.A program written with the IDE for arduino is called a sketch.Sketches are saved on the

development computer as text files with the file extension.pdeThe arduino IDE supprts the language like c and c++ using the special rules of code structuring .The arduino IDE supplies a software library from the wiring project,which provides many common input and output procedures two basic functions,for starting the sketch and the main program loop,that are compiledand linked with a programstub main() into an executable cyclic executive program with the GNU tool chain,also included with the IDE distribution ,The arduino IDE employs the program avrdude to convert the executable code into a text file in the hexadecimal encoding that is loaded into the arduino board by a loader program I the board's firmware.

V.Working

When the push button is pressed the device gets activated and starts measuring distance from the object and displays it on the lcddisplay.By simply pressing the button again we can convert the values into another units.we connected the device to cloud by using nodemcu esp8266 through we which we can continouslymoniter the distance in our mobile phone.we can send this information to anyone through Gmail.

VI.Operation

The State of the button is read by nodemcu using its digital pin 7.whenever the button state is high the ultrasonic sensor sends triggering pulse.The micro controller presented in Nodemcu calculates the distance using the time between triggering pulse and

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recievingpulse.This calculated value is sent to Lcd through digital pins of nodemcu and lcd displays those values.

Inorder to send these values to cloud we need to have a wireless network.sincenodemcu is combination of microcontroller and wifimodule.we connect nodemcu to any personal wifi network easily by programming it as shown in coding section.For cloud storage we used a blynk server. we need to create a new project and need to add our device to that blynkaccount.All these steps are explained in previous sections.once we are connected to blynk server, we are able to see the every measured value in our mobile phone. we can store these values and can retrieve at any time.we can send these values along with the date and time they measured in csv file format to anywhere we want.This option is available in blynk application.

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*setup:This function is to program the most arduino boards contain a light

emitting diode(LED) and a load resistor connected between pin 13 and ground ,which is a convenient functions.A typical program for a beginning arduino programmer blinks n LED repeatedly.

*This program uses the functions pin mode,digital write ,and delay.Which are provided by the internal libraries included in the IDE environment .The program is usually loaded in the arduino.

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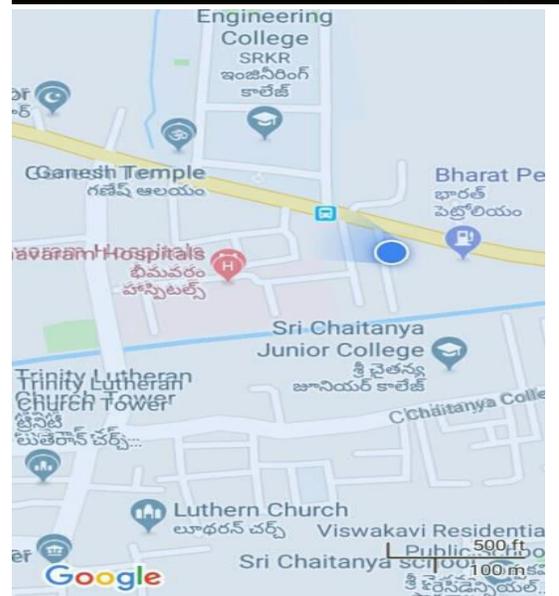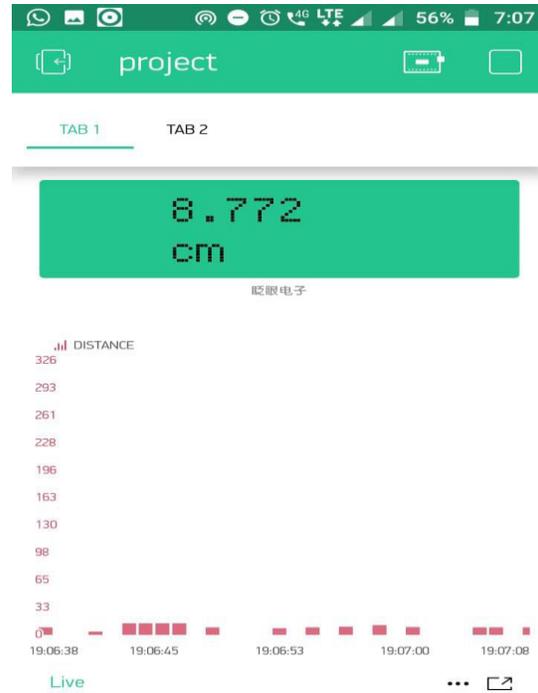
VIII. Applications

This instrument is used for carpenters where they need a lot of daily measurements in their daily work.using of tapes may require two people and can also get precision errors,not accurate may be.We can continuously moniterthe water level in the bridges and dams and water tanks continuously by simply sitting in a room.This object is placed at the back of the cars and can be used to park the cars without any damage.

IX. Future scope

Ultrasonic sensor can be replaced with lasor sensor inorder to measuring range and also accuracy.If we want very low range measurments ,we have to replace with low range laser sensors.

X. Results

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