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# AUTOMATION OF WATER MOTOR USING IOT

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**Abstract:** One of the major problems faced by most of the countries is the issue of water scarcity in the world and wastage during transmission has been identified as a major culprit; this is one of the motivations for this research, to deploy computing techniques increating a barrier to wastage in order to not only provide more financial gains and help the environments well as thewatercyclewhichinturnensures that we save water for our future. Many of the people have overhead tank problems at their homes so for that purpose we are implementing Water Level Monitoring Using IOT.When the water pump is started, they have no idea when it gets filled up.Water starts spilling out from the tank. We proposed a solution for this problem through the automation. The proposed system can be used for aquaculture and for the growth of some crops like paddy. Here we are using water level sensors for identifying the water level whether the water is full or empty. Whenever the water level is high or full the motor will be turned OFF where as if the water level is empty then the motor will be turned ON.The whole process will be done in an automatic way without any human interaction.

**key words:** IoT, Aurdino, Embeded C, cloud system

## 1.INTRODUCTION

### What is IOT

The Internet of things (IOT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other item embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchangedata.The IOT allows objects to be sensed or controlled remotely across existing network infrastructure,creating anopportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced humanintervention.

### 1.1 General:

We will be relying even more often on technology and less on mechanical devices. Water level monitoring system is programmed to automatically perform some defined actions i.e.,motor ON and OFF. Water is one of the important substances used in crop production or any other purposes. It must be saved to avoid water shortage in future. One such way to save water is to monitor and study its usage and accordingly its utilization should bemanaged. Monitoring water level of a

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water source, such as water tank or bore well etc., plays a key role in water management. Keeping track of water level in a water source can be used to preserve water and to study the water usage. Thus monitoring water level is an important task in agricultural or aquaculture.

**STATEMENT OF PROBLEM:**

The main aim of this system is to monitor the water level at rural areas so that they help in detecting the wastage of water and measures can be taken to avoid unnecessary overflowing of water in the areas where monitoring is a difficult task. Alarm based system is not convenient as compared to the automatic system .The water level indicator with alarm was indicate the level of water in tank. Whenever tank gets filled, we get alerts on particular levels like empty and full. When tank get filled or empty we get sound from alarm or buzzer sound. If the alarm switch is broken the sound is so irritated .It just make an alarm sound but not take an active role in switching ON and OFF of the motor. In alarm based system there is a need of human interaction.

**Related work:**

There are some factors must be considered when designing a Water level monitoring system. These factors are used in various applications. Now-a-days water level monitoring is playing a major task with low price, more efficient. This system enters into a water level by using some controlling mechanisms like ESP8266, Internet, and using some microchips. This water level monitoring is the simple, and easy to manage your overhead water tank problems.

Here we will keep two sensors, one sensor at the top of the tank and another is at bottom of the tank. Here we are using relay for controlling the motor ON and OFF conditions based on sensor high and low values. So, there will be need of human interaction for checking the tank whenever the water level is increases or decreases, because when two sensor values are low then the motor will be ON or otherwise if two sensor values are high then the motor will be OFF. The water level indicator with alarm was indicating the level of water in tank.Whenever tank gets filled, we get alerts on particular levels like empty and full. The existing system presents a low cost and flexible water level monitoring system using an embedded microprocessor and microcontroller, with IP connectivity for accessing and controlling devices and appliances remotely using Smartphone application

1. Bluetooth based Water Level Monitoring: Here Bluetooth plays a major role in alerting theanomalies.

2 x,v.sv/Remote Water Level Monitoring: In this, the system is controlled remotely.When tank get filled or emptyweget sound from alarm. Then we have to turn off the motor.

**Drawbacks of existingsystem:**

If the alarm switch is broken the sound is so irritated. It just make an alarm sound but not take an active role in switching ON and OFF of the motor. This is only used for water level indication in particular water storedcontainers.

**ProposedSystem:**

Water Level Monitoring, is used to avoid overflowing of water in tanks. This can be used to make a device on/off without any human interaction. The proposed system does not require a dedicated server PC with respect to similar systems and offers a novel communication protocol to monitor The data belongs to the actions performed by the device will be stored for future help. By using this we can also store sufficient water for aquaculture and for growth of some crops.

**Advantages of proposedsystem:**

• It will reduce wastage of water problem.

• It will also save thepower.

•In industries like chemical and in aquaculture, there is a restriction on water level.

• In such cases water level monitor can maintain level of the liquid at desiredvalue.

• Cost is low.

## 2.SYSTEM REQUIREMENTS

HardwareRequirements:

• Node MCU ESP8266Board

• Relay

• Water LevelSensor

• 12V PumpMotor

Software Requirements:

• Adriano IDE for developing code inC/C++

• EmbeddedC

**About Software Used**

Embedded C is a "set of language extensions" for the C Programming language by the C Standardscommittee to address commonality issues that exist between C extensions for different embedded systems.

The Internet of Things (IoT) is the "NETWORK" of physical objects—devices, vehicles, buildings and otheritems embedded with electronics, software, sensors, and network connectivity that enables these objects tocollect and exchange data. These are the Google definitions of the subjects. One may need embedded Cwhile working in IoT as a means to write software part. IoT involves working with embedded systems whichmay need embedded C.

Embedded C is a set of language extensions for the C programming language by the CStandards Committee to address commonality issues that exist between C extensions fordifferent embedded systems. Historically, embedded C programming requires nonstandardextensions to the C language in order to support exotic features such as fixed-point arithmetic,multiple distinct memory banks, and basic I/O operations

## 3.SYSTEMIMPLEMENTATION

**NODEMCU ESP8266Board:**

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by shanghai-based Chinese manufacturer, Expressive Systems.

The chip first came to the western makes in august 2014 with the ESP-01module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and simple TCP/IP Connection using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact

that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.

**Need of ESP8266:**

**1.Active User Community:** A group of people using a similar product can hold posted message conversations and share their experiences or solve the problems of the other users in the communities with their ownexperience.

**2.Growth of ESP8266:**ESP8266 was developed with intent to provide an economical and trouble-free way of hobbyists, students and professionals to build devices that interact with their situation using sensors andactuators.

**3.ESP8266 as a programmer:** To make ESP8266 function easy and also making it available everywhere these boards come with a USB cable for powerrequirements.

**4.Multi-platform Environment:** ESP8266 is capable of running on a number of platforms including Microsoft, and Linux

**ESP8266**

**ESP8266 FEATURES:**
• Integrated low power 32-bitMCU
• Integrated TCP/IP protocolstack

• Integrated TR switch, balun, LNA, power amplifier and matchingnetwork
• 802.11 b/g/n Wi-Fi 2.4 GHz, support WPA/WPA2
• Support STA/AP/STA+AP operation modes
• 10-bit ADC, SDIO 2.0, (H) SPI, UART, I2C, I2S, IR Remote Control, PWM, GPIO
• Deep sleep power <10uA, Power down leakage current <5uA
• Wake up and transmit packets in <2ms.
• Standby power consumption of < 1.0mW(DTIM3)
•+20 dBm output power in 802.11b mode.
• Operating temperature range -40C ~ 125C.
• FCC, CE, TELEC, Wi-Fi Alliance, and SRRC certified
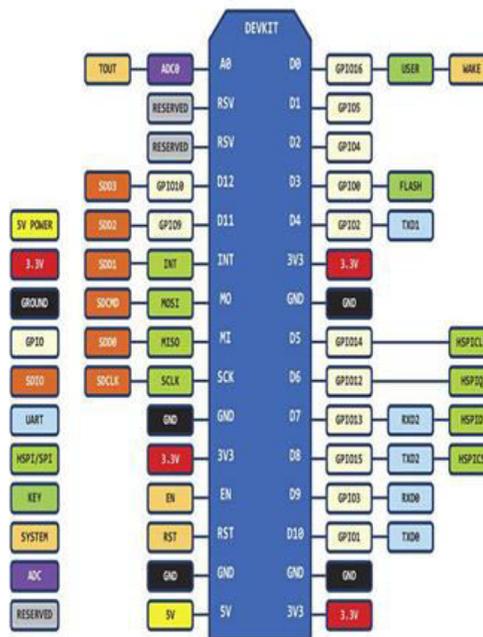
D0(GPIO16) can only be used as gpio read/write, no interrupt supported, no pwm/i2c/ow supported.

pin diagram

**Relay**

A Relay is an electrically operated switch. Many relays use an electro magnet to mechanically operate a switch, but other

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operating principles are also used such as solid state relays. Relays are used where it is necessary to control a circuit by a separate low power signal, or where several circuits must be controlled by one signal.A type of relay that can handle the high power required to directly control an electric motor or other loads is called a contractor. solid state relays control power circuits with no moving parts.Magnetic latching relays require one pulse of coil power to move their contacts in one direction, and another, redirected pulse to move them back. Repeated pulses from the same input have no effect. Magnetic latching relays are useful in applications where interrupted power should not be able to transition the contacts. Magnetic latching relays can have either single or dual coils. On a single coil device, the relay will operate in one direction when power is applied with one polarity, and will reset when the polarity is reversed. On a dual coil device, when polarized voltage is applied to the reset coil the contacts will transition. AC controlled magnetic latch relays have single coils that employ steering diodes to differentiate between operate and reset commands.



Channel Relay

## WATER LEVELSENSOR

Water level Sensor is an electrical ON/OFF Switch, which operates automatically when liquid level goes up or down with respect to specified level. Water Float Switch or Water level Controller is a handy, easy to use controller to operate the overflow of water in tanks . Float Sensor is an electrical ON/OFF Switch, which operates automatically when liquid level goes up or down with respect to specified level.Water Float Switch or Water level Controller is a handy, easy to use controller to operate the overflow of water in tanks.

Features:
• No electrical contact withwater.
• Shockproof
• Corrosion free and rustfree
• Sensor with 1.5 metercable

**Specification:**
• Cable Length: 30.5(cm) .
• Maximun Load: 50W
• Max switching voltage: 100V DC
• Sensor with 1.5 metercable
• Minimum Voltage: 250V DC
• Maximum Switching Current: 0.5 A
• Max Load Current: 1.0 A
• Max Contact Resistance: 0.4 ΩTemp Rating: -20~ 80 degr



Water level sensor

## MOTORPUMP



12V WATER PUMP

Micro dc 3-6v micro submersible pump mini water pump for fountain garden mini water circulation system diyproject dc 3v to 6v submersible pump micro mini submersible water pump 3v to 6vdc water pump for diy dc pump for hobby kitmini submersible pump motor this is a low cost, small size submersible pump motor which can be operated from a 2.5 ~ 6V power supply. It can take up to 120 liters per hour with very low current consumption of 220ma. Just connect tube pipe to the motor outlet, submerge it in water and power it. Make sure that the water level is always higher than the motor. Dry run may damage the motor due to heating and it will also producenoise.

Technicalparameters:

• Voltage :2.5-6V

• Maximum lift : 40-110cm /15.75"-43.4"

• Flow rate : 80-120L/H

• Outside diameter : 7.5mm /0.3"

• Inside diameter : 5mm /0.2"

• Diameter : Approx. 24mm / 0.95"

• Length : Approx. 45mm /1.8"

• Height : Approx. 30mm /1.2"

• Material : Engineering plastic

• Driving mode : DC design, magnetic driving

• Continuous working life for 500hours

**BreadBoard:**

Bread Board is a board for making an experimental model of an electric circuit. A breadboard is a construction base for prototyping of electronics. thesolderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuitdesign.
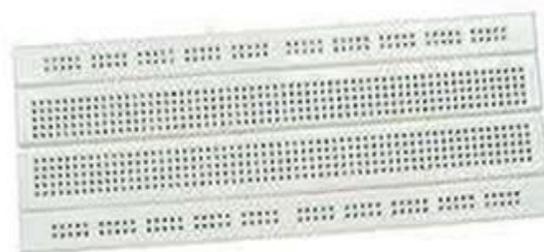


Bread Board

Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holesand then making connections throughwireswhere appropriate. The breadboard has strips of metal underneath the board and connects the holes on the top of theboard.

**Jumping Wires**

A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable – named for one manufacturer of them) is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

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**THING SPEAK CLOUD**

According to its developers, "ThingSpeak is an open source Internet of Things(IOT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of thingswith status updates".[2] ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IOT applications.ThingSpeak has integrated support from the numerical computing software MATLAB from MathWorks,[4] allowing ThingSpeak users to analyze and visualizeuploaded data using Matlab without requiring the purchase of a Matlab license from Mathworks.ThingSpeak has a close relationship with Mathworks, Inc. In fact, all of the ThingSpeak documentation is incorporated into the Mathworks' Matlab documentation site and even enabling registered Mathworks user accounts as valid login credentials on the ThingSpeak website.[5]The terms of service and privacy policyof ThingSpeak.com are between the agreeing user and Mathworks, Inc. ThingSpeak has been the subject of articles in specialized"Maker" websiteslike Instructables, Codeproject, and Channel9.
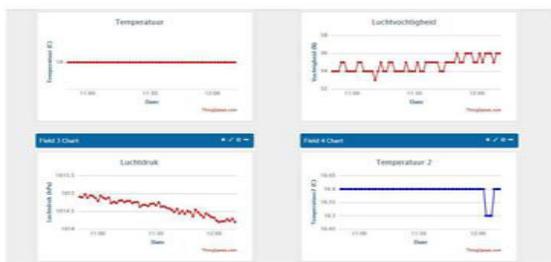


STORING THE SENSOR DATA IN THE CLOUD

**PROCEDURE**

• Connect the Power supply to the Controller.

• Initialize the Arduino, Node MCU, Sensor Board.

• Arrange the connections as per block Diagram.

• Open the Arduino IDE Software and Write the Source Code, Define the pins

• Interface the Sensor Connections According to the Pins defined in the Source code

• Load the Program into Arduino. If any error is present rectify it and Save. Again load.

• Now go to Serial Monitor and Observe the output of Sensor .

• Upload the data into Cloud through Node MCU

• Login into Android app and take the proper action by calling to others

**BLOCK DIAGRAM**
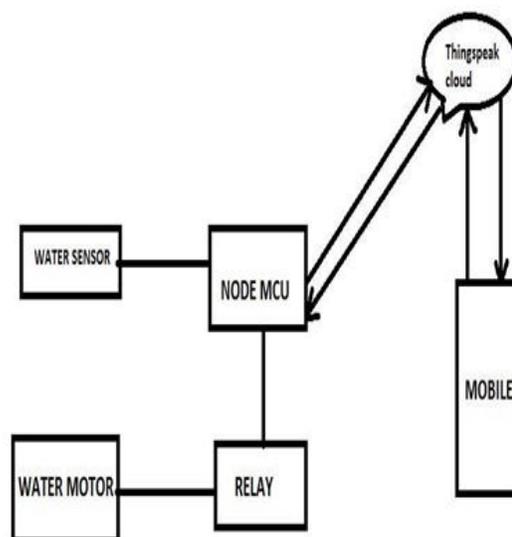
## SCREENSHOTS
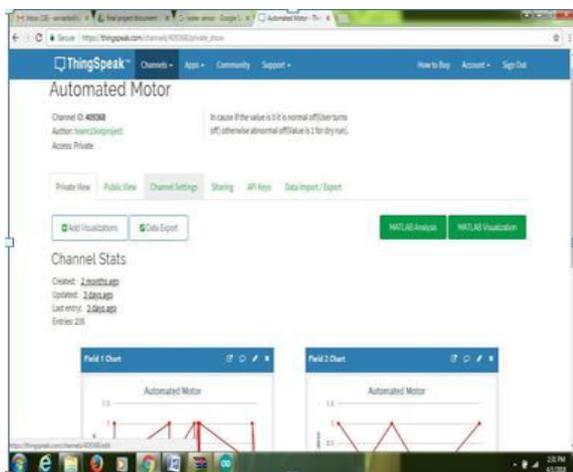




ESP8266 connections
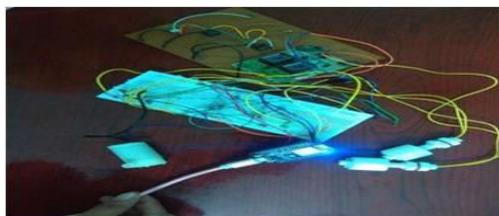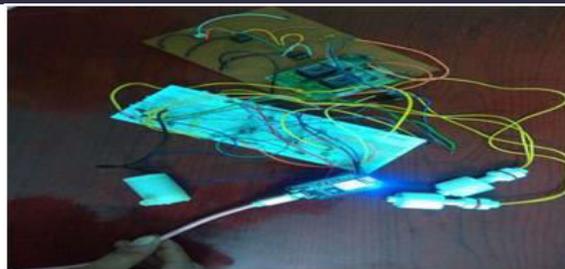


Fig.1
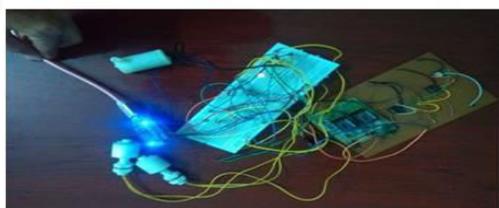


Fig.2





## 4  CONCLUSION

In the existing system many are using alarm based systems to the water tanks, so in that they are facing difficulties in that methods. In order to overcome the drawbacks we implemented the IOT concept through the sensors. By this we will get the good results and easy to use .This system is very useful when compared to the existing system. So whenever the water increases and decreases the motor will be automatically turned OFF and ON. The data will be posted to the THINGSPEAK.

## 5  FUTURE ENHANCEMENT

By using high capacity of electronic devices, we can also implement for aquaculture and irrigation purpose, in an automatic way.

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