A Navel Approach for Monitoring water wastage with motion detection system using temperature and moisture sensor

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ABSTRACT

Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that nurtured the development of civilization. In my project, the temperature of environment can be calculated using Thermistor series which has precision integrated circuit temperature sensors from which output voltage is generated which are linearly proportional to the Celsius temperature. Thus, the temperature of the surroundings can be calculated easily. This calculated information is an end to the PIC microcontroller.

The moisture content of the soil is calculated using Electronic bricks. It is the convenient way to connect sensors, servos and other components. It contains three phases, they are push button switch, relay, and a light sensor. By this way, the moisture of the soil can be calculated easily and it is transferred to the microcontroller.

The temperature of the environment and moisture content of the soil is compared each other and finally, the optimum level of water to be transferred to the agricultural field is calculated. Then calculated optimum water content is transferred to the android application where we can control the setup using two categories, they are, automatic and manual.

If the setup is automatic, the DC motor will work in automatic mechanism for the flow of water in the agricultural field.

Keyword: Water Wastage, Temperature Sensor, Moisture Sensor Float Meter, Mobile Android Application.

1. INTRODUCTION

The main aim of the project is a flexible system to manage the demand on water for getting the best usage of the available water. Human beings have always developed technology to support their needs ever since the beginning of mankind. The basic purpose of innovation in technology, to self-monitor the water by Android phone.

Severe shortages in all field research requirements, and the need to twin it with agricultural extension to apply research results and deliver them to the farmers. We design a system which can be helpful to monitor and control all irrigation system which reduces manpower usage. Manpower is becoming a big issue in the field of agriculture.

It's becoming difficult to appoint men to work in every sector and without knowledge people just waste water. To overcome these problems implement different sensor to get reports according to the agriculture land and act according to that.

Simultaneously we attach water unit to sense water level and to calculate to flow rate to calculate water flow.

In proposed system, we use microcontroller to sense the water level to give message via GSM by Android phone. If water level, soil moisture, temperature and water usage are getting by phone easily.

We have check moisture level by the home itself, and there is no wastage of water.

OBJECTIVE

Agriculture, also called farming is the cultivation of animals, plants, fungi, and other life forms for food, fiber, biofuel and other products used to sustain life. Agriculture is the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that nurtured the development of civilization.

The random usage of water in the three main sectors: agriculture, industrial, and domestic, is still continuing, in addition to the lack of internal coordination and absence of agreement among the main users which calls for developing a vision for water policy.

SYSTEM ANALYSIS

Existing system

Most of the hotels do not monitor individual guest water usage, resulting in millions of gallons of potable water wasted every year by hotel guests. This paper presents HydroSense, a novel low-cost, accurate, small size, low power, wireless device for monitoring water use from hotel room showers. HydroSense is targeted for the hotel industry to reduce costs by promoting water conservation among hotel guests. HydroSense fits most new and existing hotel shower fixtures and wirelessly transmits hotel guest water usage data simplifying infrastructure requirements. In this paper, the design of HydroSense is presented along with a preliminary market analysis, estimates on the water and energy savings resulting from installation, and projections for return-noninvestment by a hotel. Additional applications of HydroSense for conserving water and improving water usage outside of the hospitality industry are presented.

- The flow meter is used to calculate water flow.
- Flow meters are used in hotel guest rooms.
- Calculates water consumption at rooms
- The calculated data are transmitted through Wi-Fi to the main system.

Disadvantages:
- Not implemented in a required field. Since Agriculture, homes are the most required field but those fields are not concentrated.
- Made it for private sectors.

LITERATURE SURVEY

Water Efficiency in the Commercial and Institutional Sector

The CI sector consists of a large number of subsectors that vary greatly in how they function and in how they use water. While some water utilities have water efficiency and conservation initiatives targeting the CI sector, as a whole, it has received less attention than the residential sector, largely due to a lack of data on water use within CI subsectors. This section presents CI sector definitions, classifies CI subsectors, highlights key end uses of water in CI subsectors and discusses water-efficient practices and technologies.

Measure Your Hotel's Water Consumption, Then Start Saving.

Description

This paper highlights the global phenomenon of the crisis in the quality and quantity of water supplies and how tourism generally and hotels specifically may have contributed to the situation. The major internal and external barriers for Small Medium Enterprises adopting Environmental Management Systems, including water, are listed.

The paper proposes a water management framework for hotels and other types of accommodation that leverage on the concept of innovation. Taking into account the various levels of knowledge and technological capabilities in water management, the framework is developed based on the commonly known 3R approach in environmental management, with the addition of another R (Reaching).

It is proposed that hotels can innovate and enhance their water management approaches under these 4Rs: Innovative Reducing, Innovative Reusing, Innovative Reaching and Innovative Recycling. The framework offers examples and strategies about how hotels of different sizes, with differing financial, technical, knowledge and Managerial capacities could address the challenge of implementing water management and obtain a commercial benefit.

A detailed case study is provided by a gray and black water recycling system in a Malaysian resort. Other examples of a range of water management methods are also discussed.

Nation's water costs rushing higher.

Description

Academics, global leaders, and practitioners have debated, for decades, over the best management models (public, private, decentralized) of water utilities for increasing water access. Proponents of privatized water utilities argue profit motive incentivizes efficiency leading cost saving, infrastructure improvements, and increase usage. Proponents of publicly owned water utilities argue that efficiency is improved due to accountable to a constituency. Proponents of decentralized utilities argue locally owned water utilities maximize resource efficiency and eliminate waste because of accountability and local knowledge.

This thesis investigated whether these debates over the best management model for increasing accessibility oversimplify a complex global development issue. Statistical analysis did not 3 identify a satisfactory relationship between management models and water coverage. Additionally, case studies showed nuanced factors external to management models significantly impacted a utility's water coverage.

Water-Using Equipment: Domestic, in *Encyclopedia of Energy*.

Abstract

Water management is an important aspect of energy engineering. This entry addresses water-using equipment used primarily for household purposes, including faucets, showers, toilets, urinals, dishwashers, and clothes washers, and focuses on how this equipment can be optimized to save both water and energy. Technology retrofits and operation and maintenance changes are the main water and energy conservation methods discussed. Auditing to determine current consumption rates is also described for each technology.

US Drought

The United States is parched, with more than half of the land area in the lower 48 states experiencing moderate to extreme drought, according to a report released today (July 5).Just under 56 percent of the contiguous United States is in drought conditions, the most extensive area in the 12-year history of the U.S. Drought Monitor. The previous drought records occurred on Aug. 26, 2003, when 54.79 percent of the lower 48 were in a drought and on Sept 10, 2002, when drought extended across 54.63 percent of this area.

When including the entire nation, the monitor found 46.84 percent of the land area meets criteria for various stages of drought, up from 42.8 percent last week. Previous records: 45.87 percent in drought on Aug. 26, 2003, and 45.64 percent on Sept. 10, 2002.

"The recent heat and dryness are catching up with us on a national scale," Michael Hayes, director of the National Drought Mitigation Center at the University of Nebraska-Lincoln, said in a statement. "Now, we have a larger section of the country in these lesser categories of drought than we've previously experienced" in the past 12 years.

The monitor uses a ranking system that goes from D0 (abnormal dryness) to D1 (moderate drought), D2 (severe drought), D3 extreme drought and D4 (exceptional drought).At the lower end of the scale, moderate drought involves some damage to crops and pastures, and low water levels in streams, reservoirs or wells.

Areas in exceptional drought would experience widespread crop and pasture losses and water shortages that lead to water emergencies. Currently, 8.64 percent of the country would meet criteria for either extreme or exceptional drought.

"During 2002 and 2003, there were several very significant droughts taking place that had a much greater areal coverage of the more severe and extreme drought categories, "Hayes said. "Right now we are seeing pockets of more severe drought, but it is spread out over different parts of the country.

2.3 PROPOSED SYSTEM

The main theme of this project is a flexible system to manage the demand on water for getting the best usage of the available water. Human beings have always developed technology to support their needs ever since the beginning of mankind. The basic purpose of innovation in technology, to self-monitor the water by Android phone.

Severe shortages in all field research requirements, and the need to twin it with agricultural extension to apply research results and deliver them to the farmers. We design a system which can be helpful to monitor and control all irrigation system which reduces manpower usage. Manpower is becoming a big issue in the field of agriculture.

PIC microcontroller is widely used for experimental and modern applications Because of its low price, wide range of applications, high quality and ease of availability. Then the main quality is should be heated which is produced by electronics items. It is ideal for machine control applications, measurement devices, and study purpose and so on. It is also called as "Computer on a Chip". PIC was developed as a Peripheral controller. PIC Microcontrollers are designed with a separate 14 bit program memory bus to carry instructions.

In my project, the temperature of environment can be calculated using thermistor series which has precision integrated circuit temperature sensors from which output voltage is generated which are linearly proportional to the Celsius temperature. Thus, the temperature of the surroundings can be calculated easily. This calculated information is an end to the PIC microcontroller.

The moisture content of the soil is calculated using Electronic bricks. It contains three phases, they are push button switch, relay, and a light sensor. By this way, the moisture of the soil can be calculated easily and it is transferred to the microcontroller.

The temperature of the environment and moisture content of the soil is compared each other and finally, the optimum level of water to be transferred to the agricultural field is calculated. Then calculated optimum water content is transferred to the android application where we can control the setup using two categories, they are, automatic and manual.

If the setup is automatic, the DC motor will work in automatic mechanism for the flow of water in the agricultural field.

In certain circumstances like rain, flood, and other natural disasters, the water content to flow to the agricultural land wanted to be minimized. So in this situation, we can use another category called a manual.

The vital advantage of the project is as follows. People are not required to migrate to the agricultural field to operate the DC motor. People can operate from anyone at any time with more ease.

SYSTEM DESIGN
BLOCK DIAGRAM

It contains a temperature sensor, moisture content sensor, PIC microcontroller, LED display and DC motor.
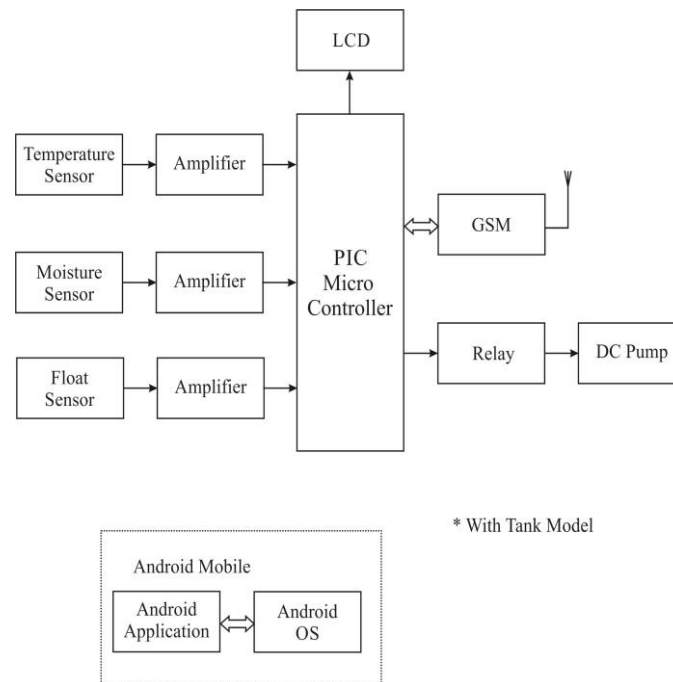
Overall diagrams
Hardware and Software Specification
Hardware Requirement:
- Microcontroller
- Temperature sensor
- Soil moisture sensor
- GSM
- Flow sensor
- DC Motor
- Relay

Software requirement:
- Microsoft Visual studio
- Eclipse

- CCS Compiler
- SQL

Languages:
- Embedded C
- ASP.Net
- Java for Android app.

PROGRAMMING SOFTWARE
CCS SOFTWARE

A compiler is a computer program (or set of programs) that transforms source code written in a programming language (the *source language*) into another computer language (the *target language*, often having a binary form known as *object code*). Most common reason for wanting to transform source code is to create an executable program.

This integrated C development environment gives developers the capability to quickly produce very efficient code from an easily maintainable high-level language. The compiler includes built-in functions to access the PIC microcontroller hardware such as READ_ADC to read a value from the A/D converter. Discrete I/O is handled by describing the port characteristics in a PROGRAM. Functions such as INPUT and OUTPUT_HIGH will properly maintain the tri-state registers. Variables including structures may be directly mapped to memory such as I/O ports to best represent the hardware structure in C.

SOFTWARE PROGRAMMING LANGUAGE
EMBEDDED C

Looking around, we find ourselves to be surrounded by various types of embedded systems. Be it a digital camera or a mobile phone or a washing machine, all of them has some kind of processor functioning inside it. Associated with each processor is the embedded software. If hardware forms the body of an embedded system, embedded processor acts as the brain, and embedded software forms its soul. It is the embedded software which primarily governs the functioning of embedded systems.

During infancy years of microprocessor-based systems, programs were developed using assemblers and fused into the EPROM's. There used to be no mechanism to find what the program was doing. LEDs, switches, etc. were used to check the correct execution of the program. Some 'very fortunate' developers had In-circuit Simulators (ICEs), but they were too costly and were not quite reliable as well.

MODULES
Modules List

- ➢ **Temperature sensor**
- ➢ **Moisture sensor**
- ➢ **Microcontroller**
- ➢ **LCD display**
- ➢ **Power supply**
- ➢ **Float sensor**
- ➢ **Relay**
- ➢ **DC pump**

MODULES DESCRIPTION
TEMPERATURE SENSOR

Temperature is one of the most commonly measured variables. Temperature sensing can be done either through direct contact with the heating source or remotely, without direct contact with the source using radiated energy instead. There are a wide variety of temperature sensors on the market today, including Thermocouples, Resistance Temperature Detectors (RTDs), Thermistors, Infrared, and Semiconductor Sensors.

In my project, the temperature of environment can be calculated using LM35 series which has precision integrated circuit temperature sensors from which output voltage is generated which are linearly proportional to the Celsius temperature. Thus, the temperature of the surroundings can be calculated easily. This calculated information is an end to the PIC microcontroller.

Thermistor

A **Thermistor** is a type of resistor used to measure temperature changes, relying on the change in its resistance with changing temperature. The thermistor is a combination of the words thermal and resistor.

Thermistors can be classified into two types depending on the sign of *k*. If *k* is positive, the resistance increases with increasing temperature, and the device is called a positive temperature coefficient (**PTC**) thermistor.

If *k* is negative, the resistance decreases with increasing temperature, and the device is called a negative temperature coefficient (**NTC**) thermistor. Resistors that are not thermistors are designed to have the smallest possible *k*, so that their resistance remains almost constant over a wide temperature range.

Symbol:

Basic centigrade temperature sensor

Circuit Description:

In this circuit, the thermistor is used to measure the temperature. Thermister is nothing but temperature sensitive resistor. There is two type of thermister available such as positive temperature coefficient and negative temperature co- efficient. Here we are using negative temperature coefficient in which the resistance value is decreased when the temperature is increased.

Here the thermister is connected with resistor bridge network. The bridge terminals are connected to inverting and non-inverting input terminals of the comparator. The comparator is constructed by LM 324 operational amplifier.

The LM 324 consist of four independent, high gains, internally frequency compensated operational amplifier which was designed specifically to operate from a single power supply over a wide voltage range.

The first stage is a comparator in which the variable voltage due to thermister is given to inverting input terminal and the reference voltage is given to non-inverting input terminal.

Initially, the reference voltage is set to room temperature level so the output of the comparator is zero. When the temperature is increased above the room temperature level, the thermister resistance is decreased so variable voltage is given to comparator. Now the comparator delivered the error voltage at the output. Then the error voltage is given to next stage of the preamplifier. Here the input error voltage is amplified then the amplified voltage is given to next stage of the gain amplifier.

In this amplifier, the variable resistor is connected as a feedback resistor. The feedback resistor is adjusted to get desired gain. Then the AC components in the output are filtered with the help of capacitors. Then output voltage is given to final stage of DC voltage follower through this the output voltage is given to ADC or another circuit.

MOISTURE SENSOR

An electronic brick is an electronic module which can be assembled like Lego bricks simply by plugging in and pulling out. Compared to traditional universal boards and circuit modules assembled with various electronic components, electronic brick has standardized interfaces, plug, and play, simplifying the construction of prototype circuit on one's own.

There are many types of electronic bricks, and we provide more than twenty types with different functions including buttons, sensors, Bluetooth modules, etc, whose functions cover from sensor to motor drive, from Ethernet to wireless communication via Bluetooth, and so on. We will continue to add more types to meet the various needs of different projects. Electronic brick of soil moisture sensor is mainly used to detect the moisture content in the soil. The control board can get the moisture value or threshold in the soil via analog or digital pins.

Schematic Diagram:
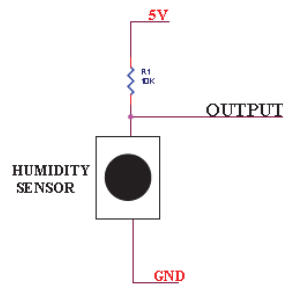
Schematic diagram

Circuit description:

In this circuit, the two conductors are used to measure the moister. Moister is nothing but water particles in the sand.

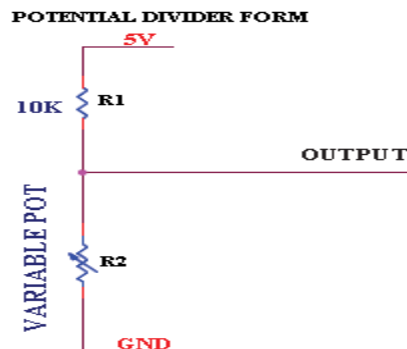**Potential divider form:**

Fig: 5.2.3 Potential divider

If the R1 and R2 value is equal means the output is half of the Vcc supply. In this circuit output is a variable one. So the output is depending upon the R2 resistance value.

Resistance value will be varied depending upon the Temperature level. Temperature varied means the resistance value also varied. If moister value increased means output also decreased. The moister value and output is an inversely proportional one. Then the final voltage is given to ADC for convert the analog signal to digital signal. Then the corresponding digital signal is taken to process in the microcontroller.

The ADC value will increase if the temperature increased. We can measure the moister only with the help of any controller or processor.

MICROCONTROLLER

The microcontroller is the heart of the power saving unit, which gets the data from sensor and driver the control circuit. It is an integrated chip that is often part of an embedded system. The microcontroller includes a CPU RAM, ROM, I/O ports and timers like a standard computer but they are designed to execute only a single specific task to control a single system they are much smaller and simplified so that they can include all the functions required on a single chip. Other than the normal Microcontrollers PIC Family supports more features.

A microcontroller is a complete microprocessor system built on a single IC. Microcontrollers were developed to meet a need for microprocessors to be put into low-cost products. Building a complete microprocessor system on a single chip substantially reduces the cost of building simple products, which use the microprocessor's power to implement their function because the microprocessor is a natural way to implement many products.

This means the idea of using a microprocessor for low-cost products comes up often. But the typical 8-bit microprocessor based system, such as one using a Z80 and 8085 is expensive. Both 8085 and Z80 system need some additional circuits to make a microprocessor system. Each part carries costs of money. Even though a product design may require only very simple system, the parts needed to make this system as a low-cost product.

To solve this problem microprocessor system is implemented with a single chip microcontroller. This could be called microcomputer, as all the major parts are in the IC. Most frequently they are called microcontroller because they are used they are used to perform control functions.

The microcontroller contains a full implementation of a standard MICROPROCESSOR, ROM, RAM, I/0, CLOCK, TIMERS, and also SERIAL PORTS. The microcontroller also called "system on a chip" or "single chip microprocessor system" or "computer on a chip".

A microcontroller is a Computer-On-A-Chip, or, if you prefer, a single-chip computer. Micro suggests that the device is small, and controller tells you that the device' might be used to control objects, processes, or events. Another term to describe a microcontroller is embedded controller, because the microcontroller and its support circuits are often built into, or embedded in, the devices they control.

Today microcontrollers are very commonly used in wide variety of intelligent products. For example, most personal computers keyboard and implemented with a microcontroller. It replaces Scanning, Debounce, Matrix Decoding, and Serial transmission circuits. Many low-cost products, such as Toys, Electric Drills, Microwave Ovens, VCR and a host of other consumer and industrial products are based on microcontrollers.

EVOLUTION OF MICROCONTROROLLER

Markets for microcontrollers can run into millions of units per application. At these volumes of the microcontrollers is a commodity item and must be optimized so that cost is at a minimum. .Semiconductor manufacturers have produced a mind-numbing array of designs that would seem to meet almost any need. Some of the chips listed in this section are no longer regular production, most are current, and a few are best termed as "smoke ware": the dreams of an aggressive marketing department.

ADVANTAGES OF MICROCONTROLLERS

If a system is developed with a microprocessor, the designer has to go for external memory such as RAM, ROM or EPROM and peripherals and hence the size of the PCB will be large enough to hold all the required peripherals. But, the microcontroller has got all these peripheral facilities on a single chip so the development of a similar system with a microcontroller reduces PCB size and cost of the design.

One of the major differences between a microcontroller and a microprocessor is that a controller often deals with bits, not bytes as in the real world application, for example, switch contacts can only be open or close, indicators should be lit or dark and motors can be either turned on or off and so forth.

PIC MICROCONTROLLER

- PIC microcontroller is widely used for experimental and modern applications because of its low price, a wide range of applications, high quality and ease of availability. It is ideal for machine control applications, measurement devices, and study purpose and so on.
- It is also called as "Computer on a Chip".
- PIC was developed as a Peripheral controller.
- PIC Microcontrollers are designed with a separate 14 bit program memory bus to carry instructions.
- A Separate 8bit data memory bus to carry data.
- This Design is commonly called hardware architecture, and So PIC Microcontroller is based on Hardware architecture.
- Every instruction is coded as a single 14 bit word and fetched simultaneously with the corresponding data variable for that instruction.
- The Harvard architecture speeds up the Process by its design.
- The instruction set for the PIC Microcontroller consists of 35 instructions.
- Each occupying a single 14 bit program memory word and a two stage Pipelining.

The sensor gives input to the microcontroller and the output of the microcontroller will drive the Relay to activate. The output of the microcontroller is driven by the sensors itself. A relay is needed to drive the DC pump since the uses the on/off switching. In this project, a relay of 12V is used.

The value of the relay is not important since it is only used to drive the Pump. The connection of the valve and the relay is isolated in the relay itself. For this project, the temperature of 26°C is the value indicated to turn on and off the valve. If the temperature is higher than 26°C, the valve will turn on and vice versa. At first, the microcontroller will scan the environment temperature.

The LED will display running light indicating that the program is running. Once the microcontroller detected that the temperature is higher than 26°C, all of the LED at Port D and the indicate the value will turn on. Thus, the valve is turn on. As long as the microcontroller does not detect the temperature is higher than 26°C. The LED Display GSM there is power supply supplied to the board.

LCD display

LCD is used for display the moisture content and temperature in digital.   We use
X 16 LCD modules to display the setting data and to view change in setting data.

Following data are displayed in the LCD
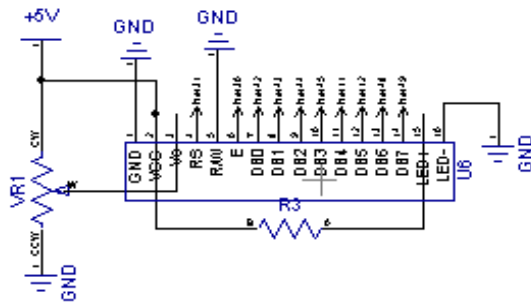
Which are compatible with HD44580. Their interfacing with various microcontrollers, various interfaces (8-bit/4-bit), programming, special stuff and tricks you can do with these simple looking LCD which can give a new look to your application.

The most commonly used LCD found on the market today are 1 Line, 2 Line or 4 Line LCD which have only 1 controller and support at most of 80 characters, whereas LCD supporting more than 80 characters make use of 2 HD44780 controllers. Most LCD with 1 controller has 14 Pins and LCD with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

POWER SUPPLIES

In my project using the power supply for the all of the circuit unit, that will be used for convert the power to chip or circuit. In general, the transformer produces high voltage of power that is equally supplied through the power supply. There is temperature and moisture sensors are required low like 5V is self, then PIC microcontroller is also consumed 5V. Then dc pump and GSM is consumed more power like 12V that also controlled by the power supply. The operation of power supply circuits built using filters, rectifiers, and then voltage regulators. Starting with an ac voltage, a steady dc voltage is obtained by rectifying the ac voltage, then filtering to a dc level, and finally, regulating to obtain a desired fixed dc voltage. The regulation is usually obtained from an IC voltage regulator unit, which takes a dc voltage and provides a somewhat lower dc voltage, which remains the same even if the input dc voltage varies, or the output load connected to the dc voltage changes.

A block diagram containing the parts of a typical power supply and the voltage at various points in the unit. The ac voltage, typically 120 V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage.

This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit can use this dc input to provide a dc voltage that not only has much less ripple voltage but also remains the same dc value even if the input dc voltage varies some or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of a number of popular voltage regulators IC unit.

IC VOLTAGE REGULATORS

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. Although the internal construction of the IC is somewhat different from that described for discrete voltage regulator circuits, the external operation is much the same. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustable set voltage.

A power supply can be built using a transformer connected to the ac supply line to step the ac voltage to desired amplitude, then rectifying that ac voltage, filtering with a capacitor and RC filter, if desired, and finally regulating the dc voltage using an IC regulator. The regulators can be selected for operation with load currents from hundreds of miles amperes to tens of amperes, corresponding to power ratings from mile watts to tens of watts.

5.6 FLOAT SENSOR
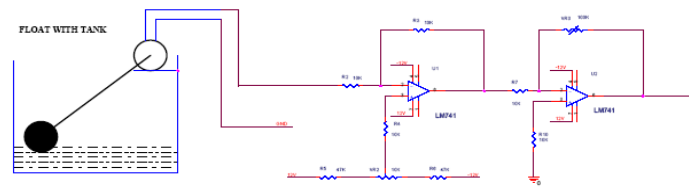
Float process circuit

The float is the one type of transducer which is used to measure the water level in the tank.

CIRCUIT DESCRIPTION

The float changes the resistance value depending on the water level. This change is resistance is converted into a corresponding voltage signal which is given to inverting input terminal of the comparator. The reference voltage is given to non-inverting input terminal.

The comparator is constructed by the operational amplifier LM 741. The comparator compares with reference water level and delivered the error voltage at the output terminal. Then the error voltage is given to next stage of the gain amplifier which is constructed by another operational amplifier LM 741.

In the gain amplifier, the variable resistor is connected in the feedback path, by adjusting the resistor we can get the desired gain. Then the final voltage is given to ADC for convert the analog signal to digital signal. Then the corresponding digital signal is given to microcontroller in order to find the water level in the tank.

RELAY:

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example, a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timers IC is 200mA so these devices can supply relay coils directly without amplification.

Relay Chip

Relays are usually SPDT or DPDT but they can have many more sets of switch contacts, for example, relays with 4 sets of changeover contacts are readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay. The animated picture shows a working relay with its coil and switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. There is one set of contacts (SPDT) in the foreground and another behind them, making the relay DPDT.
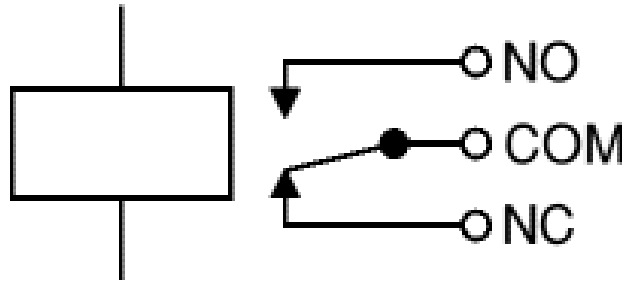
Fig: 5.7.2 circuit of relay

The relay's switch connections are usually labeled COM, NC and NO:

- **COM** = Common, always connect to this, it is the moving part of the switch.
- **NC** = Normally Closed, COM is connected to this when the relay coil is **off**.
- **NO** = Normally Open, COM is connected to this when the relay coil is **on**.

Circuit description:

This circuit is designed to control the load. The load may be the motor or any other load. The load is turned ON and OFF through relay. The relay ON and OFF is controlled by the pair of switching transistors (BC 547). The relay is connected to the Q2 transistor collector terminal. A Relay is nothing but electromagnetic switching device which consists of three pins. They are Common, Normally close (NC) and normally open (NO).

The relay common pin is connected to supply voltage. The normally open (NO) pin connected to load. When the high pulse signal is given to base of the Q1 transistors, the transistor is conducting and shorts the collector and emitter terminal and zero signals are given to base of the Q2 transistor. So the relay is turned OFF state.

When a low pulse is given to base of transistor Q1 transistor, the transistor is turned OFF. Now, 12v is given to base of the Q2 transistor so the transistor is conducting and the relay is turned ON. Hence the common terminal and NO terminal of the relay are shorted. Now load gets the supply voltage through the relay.

DC PUMP

A pump is a device used to move gases, liquids or slurries. A pump moves liquids or gases from lower pressure to higher pressure and overcomes this difference in pressure by adding energy to the system such as a water system. A gas pump is generally called a compressor, except in very low pressure-rise applications, such as in heating, ventilating, and air-conditioning, where the operative equipment consists of fans or blowers.

Pumps work by using mechanical forces to push the material, either by physically lifting or by the force of compression. Hand-operated, reciprocating, positive displacement, water pump. A positive displacement pump causes a liquid or gas to move by trapping a fixed amount of fluid or gas and then forcing displacing that trapped volume into the discharge pipe.

They are relatively inexpensive, and are used extensively for pumping water out of bunds, or pumping low volumes of reactants out of storage drums. Continuous energy addition Conversion of added energy to increase in kinetic energy increase in velocity.

Conversion of the Kinetic head to Pressure Head. Meet all heads like Kinetic, Potential, and Pressure Periodic energy addition. Added energy forces displacement of fluid in an enclosed volume.

Fluid displacement results in a direct increase in pressure. One sort of pump once common worldwide was a hand-powered water pump over a water well where people could work it to extract water before most houses had individual water supplies. Hand operated pumps are considered the most sustainable low-cost option for safe water supply in resource settings, A hand pump opens access to deeper groundwater that is often not polluted and also improves the safety of a well by protecting the water source from contaminated buckets.

This means that communities are often stuck without spares and cannot use their hand pump anymore and have to go back to traditional and sometimes distant, polluted resources. This is unfortunate, as water projects often have put a lot of resources to provide that community with a hand pump.

CONCLUSION

In my project, the temperature of environment can be calculated using LM35 series which has precision integrated circuit temperature sensors from which output voltage is generated which are linearly proportional to the Celsius temperature. Thus, the temperature of the surroundings can be calculated easily. This calculated information is an end to the PIC microcontroller.

The moisture content of the soil is calculated using Electronic bricks. It is the convenient way to connect sensors, servos and other components. It contains three phases, they are push button switch, relay, and a light sensor. By this way, the moisture of the soil can be calculated easily and it is transferred to the microcontroller.

The temperature of the environment and moisture content of the soil is compared each other and finally, the optimum level of water to be transferred to the agricultural field is calculated. Then calculated optimum water content is transferred to the android application where we can control the setup using two categories, they are, automatic and manual.

If the setup is automatic, the DC motor will work in automatic mechanism for the flow of water in the agricultural field.

In certain circumstances like rain, flood, and other natural disasters, the water content to flow to the agricultural land wanted to be minimized. So in this situation, we can use another category called a manual.

The vital advantage of the project is as follows. People are not required to migrate to the agricultural field to operate the DC motor. People can operate from anyone at any time with more ease.

REFERENCES

[1] Parry, W. How Bad Is the US Drought? LiveScience.com 2012.

[2] Water Sense, E., Water Efficiency in the Commercial and Institutional Sector: Considerations for a Water Sense Program. 2009.

[3] Reichardt, K. Measure Your Hotel's Water Consumption, Then Start Saving. Green Lodging News, 2007.

[4] McCoy, K. USA TODAY analysis: Nation's water costs rushing higher. USA TODAY, 2012.

[5] Harpaz, B. 6 trends changing the hotel industry. Travel Tips on NBCNEWS.com, 2011.

[6] Amy, S. and S. Kate McMordie, Water-Using Equipment: Domestic, in *Encyclopedia of Energy Engineering and Technology*. 2008, Taylor & Francis. p. 1596-1606.

[7]http://www.hotelnewsnow.com/Article/10372/Does-Hawaii-need-morehotel-rooms accessed on March 9, 2015

[8] http://www.neo.ne.gov/statshtml/204.htm accessed on March 9, 2015

[9]http://www.usatoday.com/story/money/business/2014/06/01/statesrunning-out-of-water/9506821/ accessed on March 9, 2015

[10]http://industry.visitcalifornia.com/media/uploads/files/editor/VisitCalifornia_201409(1)(1).pdf accessed on March 9, 2015

[11] https://www.ahla.com/content.aspx?id=36332 accessed on March 9, 2015