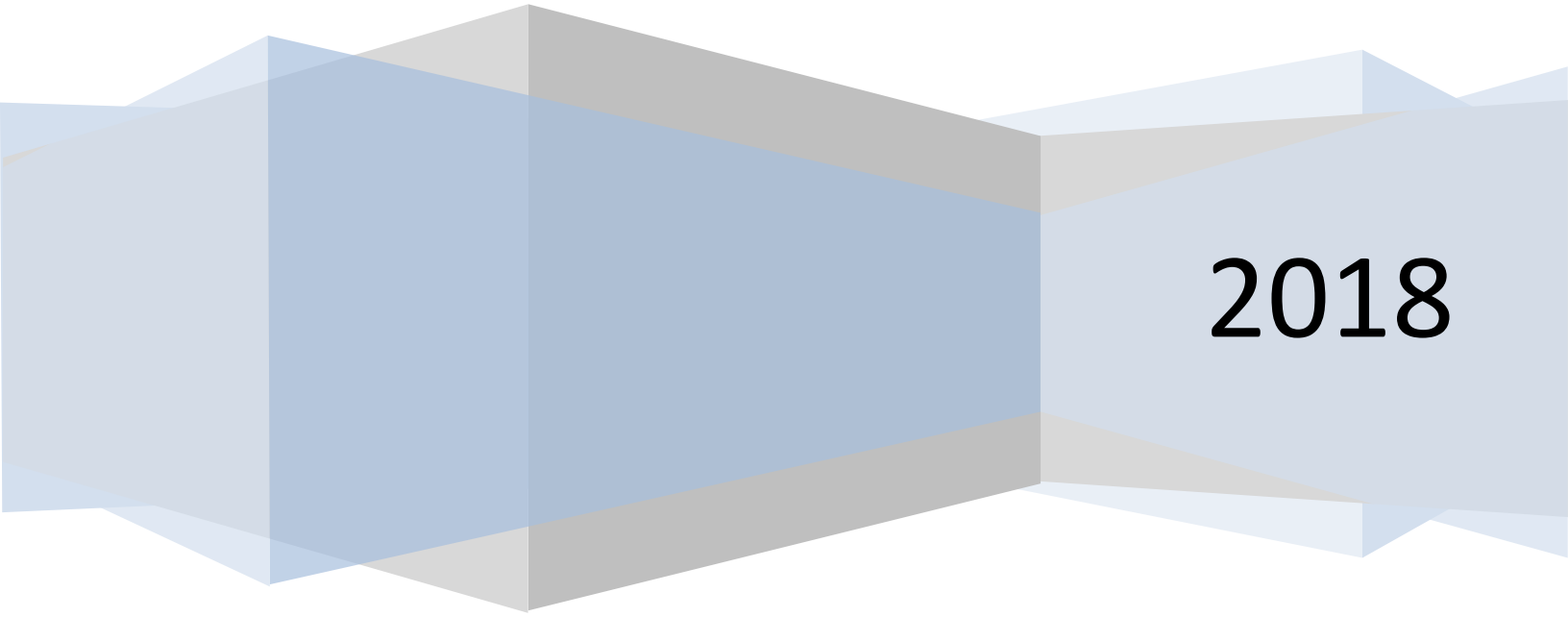
AGROSENSE

Smart Ways to Grow Plants

Report on its benefit and future enhancement



2018

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Agrosense is the device which is capable of collecting data from its environment and stores it into the online database and as well use to control device through internet. This device runs on the concept of Internet of Things (Iot) which is very hot topic right now and considers one of the top 10 elements for 4^{th} Industrial Revolution. Agrosense is the one step towards the achieving or becoming part of that industrial revolution.

Internet of Things is the concept where sensor and devices are connected through internet and every task are done in internet. Here device communicate through internet and human have access to that information like what is happening there, what is the condition and so on.

Agrosense uses different sensor to collect data like DHT sensor and moisture sensor .the data collected are moisture, temperature, soil humidity and heat index. All these data are collected in the online database. These data can be used for research and information. Researcher can use it to study condition of environment and soil of particular location and information collected from device can be use to create graph and to analyze at what condition we can increase productivity.

It can be use to control device through internet using Android application. Android application is use to view real time data and as well as previous data Store in the database

As young generation don’t want use muscle power to do agriculture and the people from city want to have garden but don’t have time to take care this device can help them. For agriculture this device can be use mainly in green house and very beneficial for green house with aquaponicis or hydroponics. It helps to control

multiple green houses through android application. And in city people can water plants through internet from anywhere as well can check condition of garden.

DEVICE INTRODUCTION:

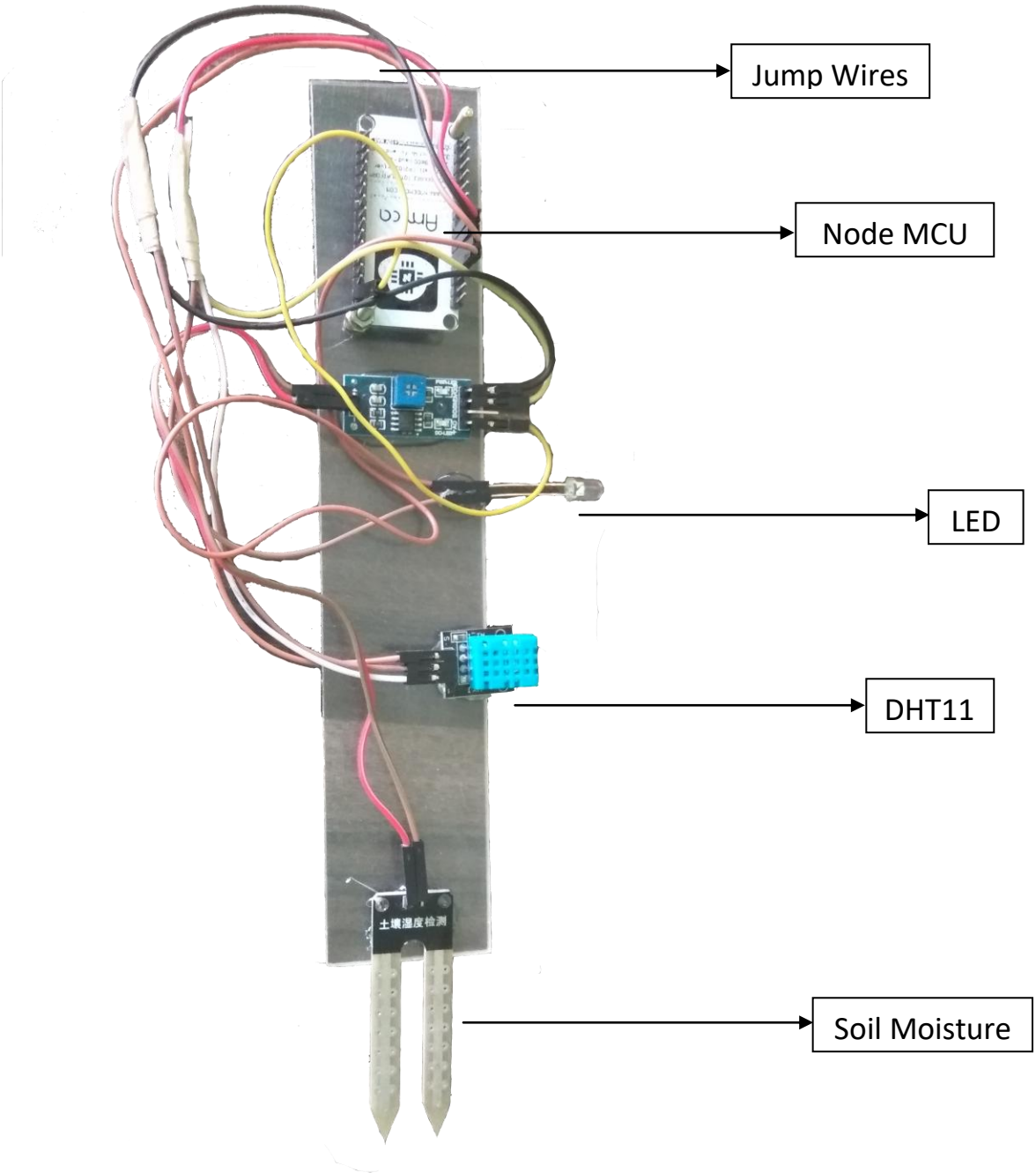
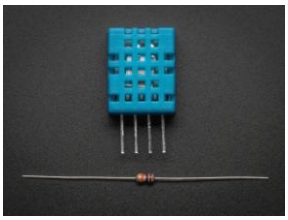


Fig:-AGROSENSE

DHT11:



The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings can be up to 2 seconds old. Compared to the DHT22, this sensor is less precise, less accurate and works in a smaller range of temperature/humidity, but it's smaller and less expensive.

NodeMCU:

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware rather than the dev kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson, and spiffs.

SOIL MOISTURE SENSOR:

A typical Soil Moisture Sensor consists of two components. A two legged Lead, that goes into the soil or anywhere else where water content has to be measured. This has two header pins which connect to an Amplifier/ A-D circuit which is in turn connected to the Arduino. The Amplifier has a Vin, Gnd, Analog and Digital Data Pins. This means that you can get the values in both Analog and Digital forms.

Most soil moisture sensors are designed to **estimate soil volumetric water content based on the dielectric constant (soil bulk permittivity) of the soil.** The dielectric constant can be thought of as the soil's ability to transmit electricity. The dielectric constant of soil increases as the water content of the soil increases. This response is due to the fact that the dielectric constant of water is much larger than the other soil components, including air. Thus, **measurement of the dielectric constant gives a predictable estimation of water content.**

LED:

A **light-emitting diode** (**LED**) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LEDs are typically small (less than 1 mm^2) and integrated optical components may be used to shape the radiation pattern.

JUMP 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.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

Present use of device:

-Collect Data from green house or garden in urban areas

-Control up to 5v of device.

-Check Real time data

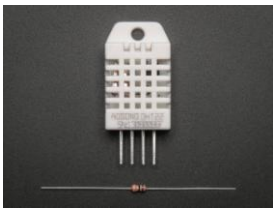
Future use of device after enhancement:

-Control up to 12v of device

-Collect more precise and more accurate data

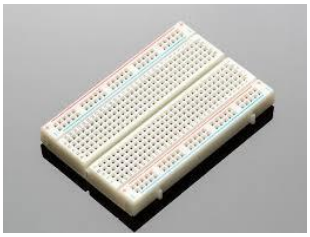
- Works in a bigger range of temperature/humidity,

DHT22:



The DHT22 is a basic, low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). Its fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings can be up to 2 seconds old. Simply connect the first pin on the left to 3-5V power, the second pin to your data input pin and the right most pin to ground. Although it uses a single-wire to send data it is not Dallas One Wire compatible! If you want multiple sensors, each one must have its own data pin. Compared to the DHT11, this sensor is more precise, more accurate and works in a bigger range of temperature/humidity, but its larger and more expensive with a 4.7K - 10K resistor, which you will want to use as a pull-up from the data pin to VCC.

BreadBoard:

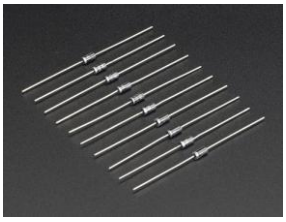


A **breadboard** is a construction base for prototyping of electronics. Originally it was literally a bread board, a polished piece of wood used for slicing bread. In the 1970s the **solderless breadboard** (a.k.a. **plugboard**, a terminal array board) became available and nowadays the term "breadboard" is commonly used to refer to these.

Because the solderless breadboard does not require soldering, it is reusable. This makes it easy to use for creating temporary prototypes and experimenting with circuit design. For this reason, solderless breadboards are also extremely popular with students and in technological education.

Older breadboard types did not have this property. A stripboard (Veroboard) and similar prototyping printed circuit boards, which are used to build semi-permanent soldered prototypes or one-offs, cannot easily be reused. A variety of electronic systems may be prototyped by using breadboards, from small analog and digital circuits to complete central processing units (CPUs).

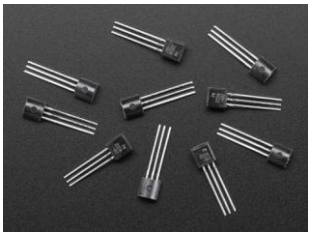
TRANSISTORS:



Transistors are powerful little electronic switches, and we really like these NPN transistors whenever we need to control medium-power electronics such as small motors, solenoids, or IR LEDs. We find them so handy, they come in a pack of 10!

Each transistor is a general purpose amplifier, model PN2222 (same pinout as the 2N3904) and has a standard **EBC** pinout. They can switch up to 40V at peak currents of 1A (not continuously, just peak!), with a DC gain of about 100. They're basically your garden-variety NPN, and do the job with class!

DIODES:



These are good for reverse polarity protection (put it between your DC power jack and circuitry to avoid a negative-voltage that would zap your delicate electronics), kickback protection (place across your solenoids, relays & DC motors to safely discharge the spikes generated by the coils), general rectification, and more!.These diodes can safely pass 1A average current continuously, can protect against up to 50V reverse voltage and have about 0.7V drop for typical usage

LIQUID PUMPS:

Move fluid safely from here to there with this very nice little pump. Unlike most liquid pumps, this is a peristaltic type - the pump squishes the silicone tubing that contains the liquid instead of impelling it directly. The upshot? The pump never touches the fluid which makes this an excellent choice for any food/drink/sterile based pumping such as for making drink-bots or gardening robots.The pump is basically a geared down DC motor, so it has a lot of torque. Inside the pump is a 'clover' pattern of rollers. As the motor turns, the clover presses on the tube to press the fluid though. The pump does not need to be primed and in fact can self-prime itself with water a half meter with ease. You can PWM the motor to speed up or slow down the flow rate and if you connect the motor the other way it will move fluid the other direction. Works great with either a power transistor (basic on/off) or a motor driver chip such as the L293D.

Technical Details

- Uses approx 4mm outer diameter, 2mm inner silicone tubing, the pump tube size has changed on us, so please measure the tubing that comes with your pump to verify!
- Working Temperature: 0℃ - 40 ℃
- Motor voltage: 12VDC
- Motor current: 200-300mA
- Flow rate: up to 100 mL/min
- Weight: 200 grams
- Dimensions: 27mm diameter motor, 72mm total length
- Mounting holes: 2.7mm diameter, 50mm center-to-center distance

RELAY SWITCH:

A Relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate the switch and provide electrical isolation between two circuits. In this project there is no real need to isolate one circuit from the other, but we will use an Arduino UNO to control the relay. We will develop a simple circuit to demonstrate and distinguish between the NO (Normally open) and NC (Normally closed) terminals of the relay. We will then use the information gained in this tutorial to make a much more exciting circuit. But we have to start somewhere. So let's get on with it.

REQUIRED DEVICE FOR ENHANCEMENT, RESEARCH AND DEVELOPMENT:

-Relay switch

-led

-jump wire

-Liquid Pumps

-diodes

-Transistor

-DHT 22

-Bread board

-NodeMCU

-Soil Moisture Sensors