

INTERNET OF THINGS

The phrase IOT or Internet Of Things means the objects that are used every day, which are equipped with a certain artificial intelligence, are connected to each other and the internet. The internet of things concept is used to connect various objects which are equipped with a certain level of intelligence, to the internet as well as each other to form a large network which can be controlled from the internet. Internet of things concept allows for remote operation of the connected objects or things through the internet. The devices connected in the network transmit data to be interpreted and as a result, the devices are sent instructions to be performed.

Internet of things is a concept that is helpful in many sectors like military, farming, medicine, and many more. The network of IOT is made up of devices like sensors which are the nodes of the network, these nodes connect to the internet and the data is sent to be processed. Because of the small size of the sensors, they can be used in remote places, dangerous places, and places that cannot be easily accessed by humans. There are many types of sensors that can be used for various purposes like, identifying the contents of the soil, temperature of an enclosed space, presence of things in an environment, and many such details.

Internet Of Things has proved useful in many scenarios from saving resources in an office space to carrying out important operations for the military. Internet Of Things is an amalgamation of various technologies like real-time analytics, sensors, wireless networks, embedded devices, machine learning, control systems, and automation. The concept of IOT has become synonymous with the word 'smart'. By connecting things to the internet and controlling their functions through the internet, the things gain a type of artificial intelligence that lends itself to calling the things 'smart'.

An example of this would be the concept of 'smart homes'. 'Smart homes' are homes where many household devices like light fixtures, fans, air conditioners, heaters, security systems, televisions, refrigerators, and other machinery are connected to the internet by forming an IOT network. The devices cannot be connected to the internet unless they have sensors. The sensors collect data by analysing their surroundings and transmit the data to the cloud. The cloud cleans and processes the data from the sensors and sends back trigger responses to the devices informing them of the function they have to perform.

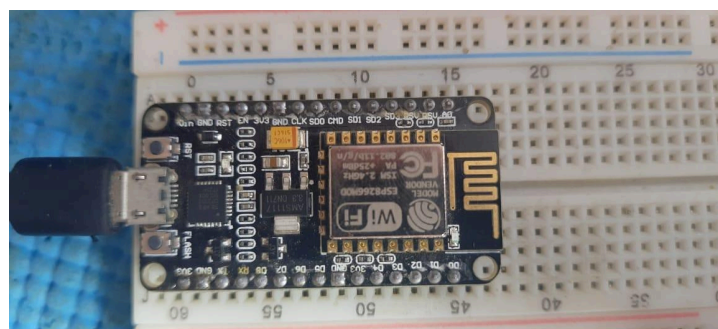


Fig.1: NodeMCU connected to the bread board

The NodeMCU(Node Micro Controller Unit) is one of the sensors widely popular in the IOT field as these sensors have a built-in Wi-Fi SoC where the SoC or System on Chip is a

subsystem which includes an antenna which is integrated into the chip or an RF(Radio Frequency) connector which can connect to external antennas, a radio physical layer, and a security MAC(Media Access Control) layer which has crypto engines. The NodeMCU sensors can be fitted into the household devices so that the devices can make up an IOT network and connect to the internet.

The sensors sense their surroundings to record data to be transmitted to the cloud, where the data is processed to find valuable information about the surroundings in the household. The sensors can be programmed to transmit at certain times rather than them always sending data, which can prove to be of no use. For example, if the fan in the house is on when there is no one in the room, the sensor in the fan can detect this and send the data to the cloud. The cloud can interpret this and send a trigger response to turn off the fan. The sensors produce analog signals which contain the information, but the devices cannot understand that, so the values need to be converted into digital signals. The bread board has a built-in function which converts the analog signals into digital signals. The ADC(Analog to Digital Convertor) values are sent to the cloud to be interpreted. The values are plotted to obtain graphs which are then interpreted by protocols like MQTT(Message Queuing Telemetry Transport).

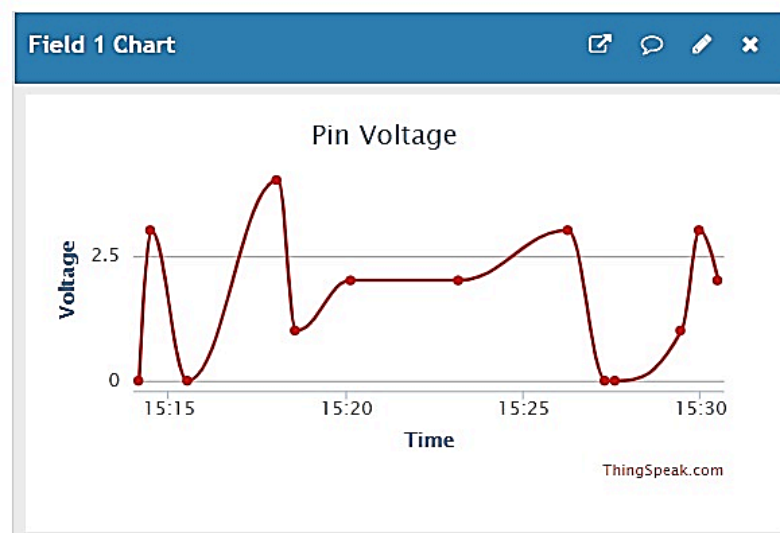


Fig.2: Graph obtained from ADC values

Fig.2 shows the graph plotted using the ADC value sent by the sensors. The protocols interpret the graph and sends trigger responses to the sensors informing the devices what to do next. ‘Smart homes’ may be expensive to install but the benefits of the devices being connected and controlled from the internet are many. The owners can turn on/off the devices remotely, energy can be saved, security systems can be programmed to alert the police if anyone tries to break-in, and these are only some of the benefits. Connecting the house to the internet may open the house to be cyber-attacked, but the IOT network can be enhanced with added security to ward off such attacks.