

WI-FI BASED DATA LOGGER SYSTEM

NAVEEN T

UG Scholar, Dept. of ECE,
SCIENT Institute of Technology,
Hyderabad, Telangana, India.

MOHD ZAHEER PASHA

UG Scholar, Dept. of ECE,
SCIENT Institute of Technology,
Hyderabad, Telangana, India.

A JHANSI RANI

Assistant Professor, Dept. of ECE,
SCIENT Institute of Technology,
Hyderabad, Telangana, India.

Abstract— Data loggers can record a wide variety of energy and environmental measurements including temperature, relative humidity, light, pressure, water level, Rainfall, AC/DC current and voltage. During configuration the data logger is physically connected to the PC and search for an existing wireless network so that it can be placed anywhere within the range of the network .Our developed system measures different physical parameters and retain them for a period of time using data logger shield which is connected to PC through wireless with the aid of Wi-Fi shield.

Index Terms:- Data logger, Wi-Fi, PC, AC, DC.

1. INTRODUCTION

In earlier days there is lack of device where we can use a single system in real time to monitor and store the different physical or environmental parameters like temperature, pressure, etc. Hence we developed a system using Data logger to monitor and store the parameters. Data logger is an electronic device that records various data over time. The data logger is generally portable, battery powered, and internal memory for data storage and equipped with a microprocessor and sensors. Some data loggers interface with a personal computer and utilize software to activate the data logger and view and analyze the collected data. One of the primary benefits of using data loggers is the ability to automatically collect data on a continuous basis. Data loggers are typically deployed and left unattended to measure and record information for the duration of the monitoring period. This allows for a comprehensive, accurate idea of the environmental conditions being monitored, such as air temperature and relative humidity. We developed a Wi-Fi based wireless data logger through which we measured and monitored a parameters temperature, pressure, altitude etc for a period of time. During configuration phase, the data logger will search for a wireless network while it is physically connected to the PC. Once wireless network is available then be can be

placed anywhere within range of the network. The data logger is connected to a PC via a USB interface. The data logger software is used to select logging parameters and activate the logger. Wi-Fi system 802.11b, Arduino UNO with ATmega328 and data logger is used to develop a system. The simulated result is obtained by using NI-Lab VIEW software and Arduino IDE software. The Lab View is the graphical programming language through which the different virtual instrumentation(VI) can be built for different sensors and the output of the sensors will be stored in the data logger shield which has SD card within it later it is wirelessly connected to the PC by creating the TCP sessions.

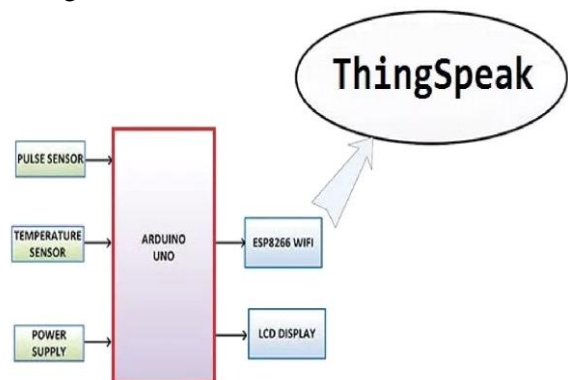


Figure 1: Block Diagram of Wi-Fi based data logger system.

The above figure shows the block diagram for the whole system where different sensors like temperature, fire, proximity, light intensity are connected to the ATmega328 microcontroller. The data logger shield is connected to ATmega328 wirelessly to the PC which creates putty session and hence all the required parameters are read successfully.

2. HARDWARE COMPONENTS

Arduino Uno:

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc .The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable .It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

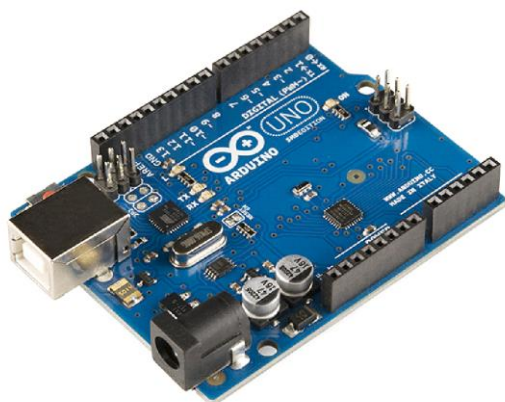


Figure 2: Arduino Uno Board

Contents:

1	Background
2	Technical specifications
3	Pins
3.1	General pin functions
3.2	Special pin functions
4	Communication
4.1	Automatic (software) reset

Table: Specifications of Aurdino Uno

LDR Sensor: A Light Dependent Resistor (LDR) or a photo resistor is a device whose resistivity is a function

of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells .They are made up of semiconductor materials having high resistance. There are many different symbols used to indicate a LDR, one of the most commonly used Symbol is shown in the figure below. The arrow indicates light falling on it.

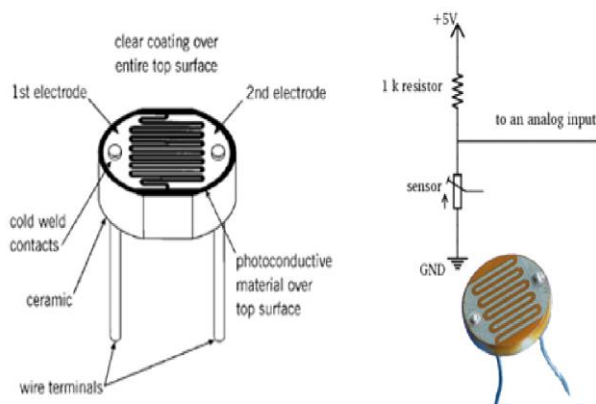


Figure 3: LDR Sensor

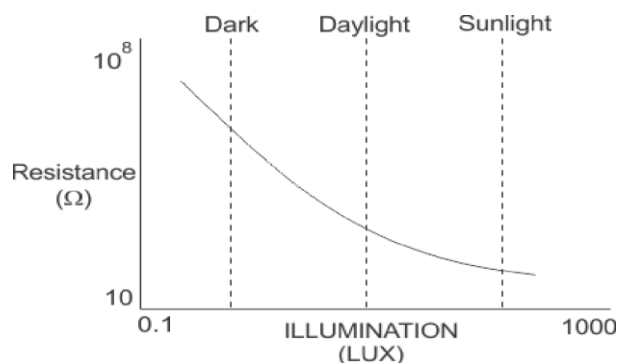


Figure 4: Plot between Illumination and Resistance

Fire Sensor: Infrared (IR) or wideband infrared flame detectors monitor the infrared spectral band for specific patterns given off by hot gases. These are sensed using a specialized fire-fighting thermal imaging camera (TIC), a type of thermo graphic camera. False alarms can be caused by other hot surfaces and background thermal radiation in the area. Water on the detector's lens will greatly reduce the accuracy of the detector, as will exposure to direct sunlight. A special frequency range is 4.3 to 4.4 μm . This is a resonance frequency of CO₂.The hot CO₂ emits much energy at its resonance frequency of 4.3 μm . This causes a peak in the total radiation emission and can be well detected. Moreover, the "cold" CO₂ in the air is taking care that the sunlight and other IR radiation is filtered. This makes the sensor in this

3. Now click on 'API keys' tab and note the **Write and Read API key**, here we are only using Write key. You need to copy and paste this key in the code (see below).
4. Now users need to upload the program to ESP8266 using Arduino IDE.
5. After uploading, open "PRIVATE VIEW" icon in ThingSpeak website and observe the monitored temperature value on graph as shown below.



Figure 8: IoT Temperature Data Logger Using ESP8266 and LM35 – ThingSpeak Graph

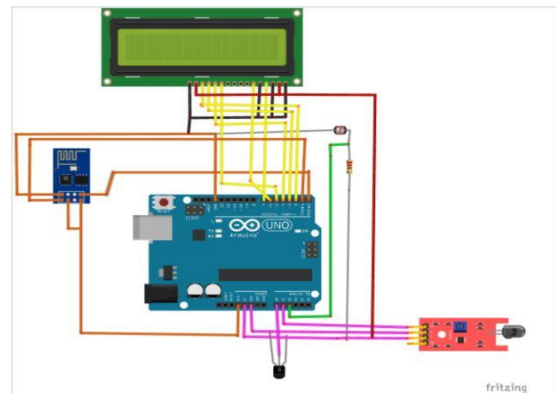
Keywords:

Here are some keywords that are used in the API. Understanding of these terms will make the API documentation easier to understand.

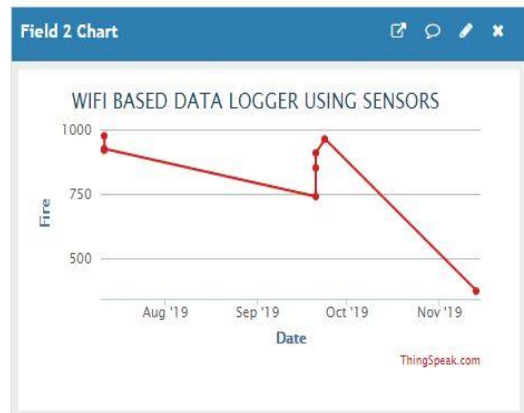
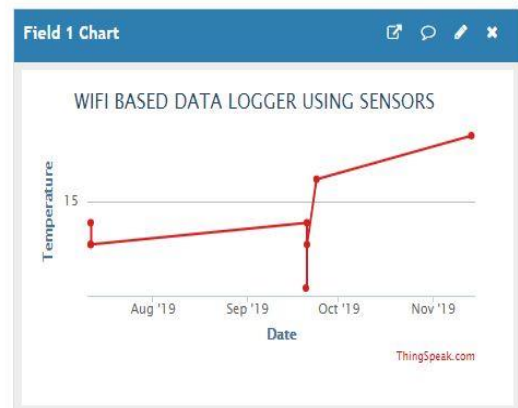
- **Channel** – Channel can be said as a stream of data. It identified by a numerical channel ID using which data can be inserted or retrieved using ThingSpeak APIs.
- **Field** – Each channel is having 8 fields which can hold any type of data. For eg. you may store temperature, humidity, RFID data (alphanumeric) in each channels.
- **Status** – It is short status message to augment the data stored in a channel
- **Location** – In addition to above 8 fields we can store GPS location or coordinates. For e.g. We can store the location of the place from where the data is coming. It is having latitude, longitude and elevation.
- **Write API Key** – A 16 digit API key code that allows an application to write data to a channel. You should not share this API key publicly, because anyone having this key can write data to your channel.

- **Read API Key** – A 16 digit API key code that allows an application to read the data stored in a channel. You should not share this API key publicly, because anyone having this key can read data from your channel.

BLOCK DIAGRAM:



4. RESULTS



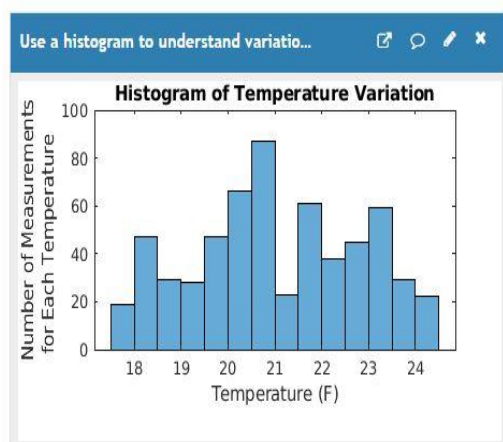
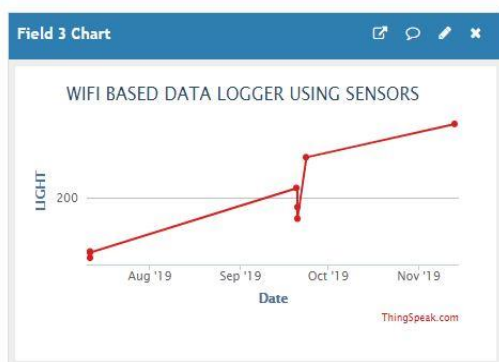


Figure 10: Information in the Thingspeak

5. CONCLUSION

In this project we present a new and precise temperature, pressure, humidity etc measurement system, by using wireless communication module, realizing wireless transmission is simpler but also low cost, high reliability, easy maintenance and less interference in transmission etc. By the help of this system we can log the different physical parameters and store the data for several days. This system is very effective where continuous monitoring of different parameters should be carried out. From this project we can even calculate the energy consumption that is by connecting the voltage and current sensor so that we can calculate the power and energy consumption.

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