IoT enabled system for Smart Environment

Scientech 6205SE

Sensors

Temperature & Humidity | Carbon dioxide | Oxygen | Atmospheric pressure | PM2.5 & PM10 | Solar Radiation | UV Index

With the rise in pollution, there is a huge demand for environmental monitoring system to protect public and the environment from toxic gases and contaminants. A smart environment uses sensor technology and Internet of Things (IoT) to remotely monitor the level of dust particles and the level of gases such as CO_2, O_2 efficiently.

Scientech 6205SE IoT enabled system for Smart Environment is specially designed to help experimenters understand how various sensors and their data can be used for real time graphical analysis on PC and mobile phones.

Scientech 6205SE has various types of sensors like CO_2 sensor, O_2 sensor, air temperature & humidity sensor, atmospheric pressure sensor, solar radiation, PM2.5, PM10 and UV Index sensor. Data can be easily stored on the local PC & cloud and is accessible anytime, anywhere.

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Features

- A friendly platform for experimenters to learn, explore and develop IoT skills.
- Provided tripod stand for node mounting.
- Arduino software compatible hardware.
- CO_2 sensor, O_2 sensor, PM2.5, PM10, solar radiation sensors and UV index.
- Air temperature & humidity sensor and atmospheric pressure sensors.
- Inbuilt voltmeter and ammeter.
- Battery operated smart sensor gateway for sensor connectivity.
- USB and zigbee connectivity for personal computer (PC) interface.
- Python, Arduino programming, embedded C and app development.
- Wi-Fi connectivity for cloud interface.
- Sensor gateway with color LCD display.
- Software to view sensor's real time graph analysis on PC and mobile.
- 10 din sockets for sensors and actuators interface.
- On board charging and protection circuit for battery.
- Signal test points and switch faults.
- User friendly, explanatory system.

Scope of Learning

- Understanding of Arduino IDE software.

Interfacing of:

- LED blink program.
- ACD and UART programs.
- Color LCD.
- Wi-Fi and zigbee module.

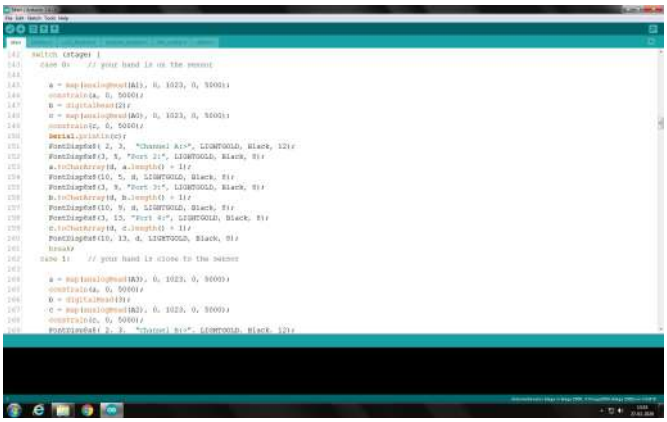
Testing and understanding of:

- CO_2 sensor.
- O_2 sensor.
- Air temperature & humidity sensor.
- Atmospheric pressure sensor.
- PM 2.5 & PM10 sensor.
- UV index sensor.
- Solar radiation sensor.

Design and develop:

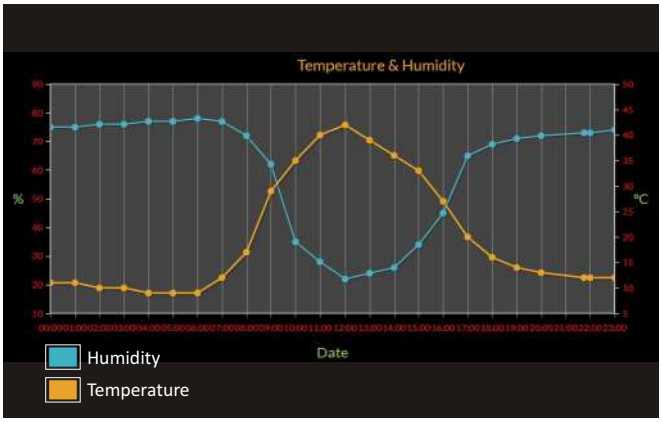
- Smart environment application programs.
- Program to configure events and alarms.
- Interfacing of wi-fi and zigbee modules.
- Interfacing of ESP8266 for online cloud interfacing.
- Implementation of python program to collect data and upload on cloud.

Software window



Sensor interfacing code

Historical data



Temperature & Humidity graph

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Technical Specifications

Microcontroller	:	ATMega2560
Sensors and actuator connector	:	10 nos.
Digital input/output pins	:	34 nos.
Analog input pins	:	16 nos.
UART	:	2 nos.
I2C	:	1 no.
Switch faults	:	30 nos.
Test points	:	30 nos.
Power Supplies	:	5V and 3.3V
Variable potentiometer	:	1 no. (10K)
Switches	:	3 nos.
Digital voltmeter and ammeter	:	0 - 25V/10A
Buzzer and LED	:	1 no. each
Color LCD	:	1.77 inch
Battery	:	3.7V/4400mAh
USB	:	2.0
Wi-Fi module	:	1 no. (2.4GHz)
Zigbee transceiver	:	2 nos. (2.4GHz/63mW)
Flash memory	:	256 KB of which 8 KB used by boot loader
SRAM	:	8 KB
EEPROM	:	4 KB
Clock speed	:	16 MHz
Node operating voltage	:	5V DC
Temperature sensor	:	0 - 100^{0}C
Humidity sensor	:	0 – 100 %RH
CO_2 sensor	:	0-2000ppm
Atmospheric pressure sensor	:	15- 115kPa
Solar radiation sensor	:	0 to 2000W/m2
O_2 sensor	:	0-25%
Dust sensor	:	PM2.5 and PM10
UV Index sensor	:	200nm-370nm
Power Supply	:	5V DC adaptor
Weight	:	3.5Kg (approximately)
Operating conditions	:	0-40^{0}C, 85% RH

Package contains — Quantity (nos.)

- Scientech 6205SSN — 1
- SS150 Air temperature and humidity sensor — 1
- SS165 CO_2 sensor — 1
- SS166 O_2 sensor — 1
- SS175 Atmospheric pressure sensor — 1
- SS156 Dust (PM2.5 & PM10) sensor — 1
- SS180 Solar radiation sensor — 1
- SS185 UV index sensor — 1
- A to B USB cable — 1
- DC adapter 5V/3A — 1
- Patch cord — 5
- 2.4 GHz antenna — 1
- USB zigbee receiver — 1
- Tripod — 1

Complete package

Subject to change Version 1.0

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