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IoT Learning Platform

Scientech 6205A

A platform to build smart solutions for everyday ease

The Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring Human-to-Human or Human-to-Computer interaction. IoT has evolved from the convergence of wireless technologies, Micro-ElectroMechanical Systems (MEMS) and the Internet. More than just smart homes and connected appliances. IoT is about connecting devices over the Internet and other wireless technologies, letting them talk to us, to applications, and each other.

Scientech 6205A is a unique solution which allows user to explore Architecture, Working, and Applications of Internet of Things. Using a variety of included and optional sensors and actuators, this solution provides in-depth learning for a vast rang of applications.

Features

- In-depth practical learning on IoT
- Linux based design
- Linux Operating System porting
- Linux python programming
- Qt IDE based GUI development
- Study of Sensor and Actuator interfacing
- Local cloud & server configuration
- GUI Base IoT application development
- IoT Gateway Using WiFi and Ethernet
- Ardunio board interface
- HDMI interface for display
- USB HID and CDC interface
- 4 channel ADC for Voltage input
- Input for Resistance measurement
- Input for 4-20mA measurement
- RS485, I2C, SPI Protocol interface
- LEDs interface
- Motor driver interface
- Color TFT display
- Serial to USB converter
- Office Suit
- Camera connectivity
- Connectors for external module interface
- GSM IoT gateway (optional)
- Bluetooth interface (optional)
- Zigbee interface (optional)

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Scope of Learning

Introduction to Internet of Things

- Definition of the Internet of Things
- The Importance of the Internet of Things
- History of IoT, Machine to Machine, Web of Things
- Overview of IoTLab Hardware platforms
- The Layering concepts, IoT Communication Pattern, IoT protocols
- Understand IoT Market perspective in different segments.

Operating System used for IoT

- Linux Operating System introduction
- Working with the command line and the Shell
- Managing directories and files
- Managing user access and security
- Setting up a Linux file system
- Understanding system initialization
- Connecting a system to the network
- Installing and Configuring Linux

Shell Scripting Programming for IoT

- Introduction
- Creating Shell Scripts
- Flow control in the Shell
- Advanced Shell features

Programming Language used in IoT

- C Programming
- Python Programming
- Arduino Programming

Hardware Interfacing for IoT

- Sensors interfacing
- Actuators interfacing

Communication Protocol study for IoT

- UART and RS485 Communication
- I2C and SPI Protocol device interfacing
- MQTT Protocol
- Wi-Fi AP and Router interfacing
- GSM module interfacing (optional)

Database, Cloud and Server Configuration for IoT

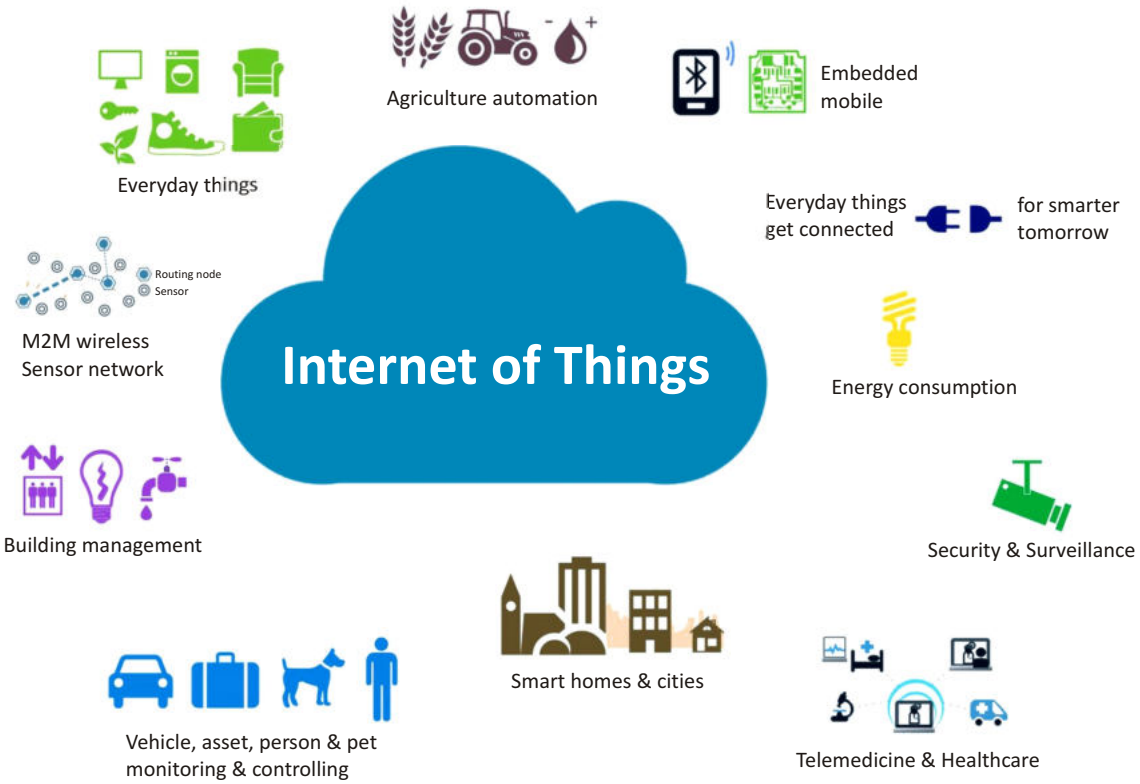
Qt based GUI and C++ Programming for IoT

Web and Application Development Tools for IoT

Case study & advanced IoT Applications with :

- Smart Agriculture Sensors
- Smart Environment Sensors
- Smart Industrial Sensors
- Smart Home Automation
- Smart Security Solutions

Applications



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Technical Specifications

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Processor	:	64bit ARMv7 Quad Core Processor 1.2GHz
Connectivity	:	802.11 b/g/n Wireless LAN Bluetooth 4.1, zigbee, USB & Ethernet
RAM	:	1GB
Memory	:	32GB (upgradable)
OS	:	Linux
Ethernet	:	10/100 BaseT Ethernet socket
Video Output	:	HDMI and Composite RCA
Audio Output	:	Audio Output 3.5mm jack
USB	:	4 nos.
Camera	:	15-pin MIPI Camera Serial Interface
LCD	:	Color TFT LCD
Motor Driver	:	Stepper and DC Motor
Analog Input	:	8 nos.
Relay Output	:	4 nos.
Buzzer Output	:	1 no.
Zigbee Frequency	:	2.4GHz
Power	:	5V, 2A

Arduino board specifications

Microcontroller	:	ATmega328
Operating Voltage	:	5V
Digital I/O Pins	:	14 (of which 6 provide PWM output)
Analog Input Pins	:	6
Flash Memory	:	32 KB including bootloader
SRAM	:	2 KB (ATmega328)
EEPROM	:	1 KB (Atmega328)
Clock Speed	:	16 MHz

Included Sensors and Actuators

DS18B20 Temperature sensor
Vibration switch module
Hall magnetic sensor module
Key switch module
Infrared emission sensor module
Laser sensor module
Small passive buzzer module
3-color full-color LED SMD modules
Photo interrupter module
2-color LED module
Active buzzer module
NTC thermistor sensor
DHT11 Temperature and humidity sensor
3-color LED module
Mercury open optical module
Photo resistor module
5V relay module
Tilt switch module
Mini magnetic reed sensor
Infrared sensor receiver module
XY-axis joystick module
Linear magnetic Hall sensors
Reed module
Flame sensor module
Magic light cup module
Soil moisture sensor
5mm red and green LED (common cathode) module
Knock sensor module
Obstacle avoidance sensor module
TCRT5000L sensor module
Automatic flashing colorful LED module
Analog Hall magnetic sensor module
Metal touch sensor module
Sensitive small microphone sensor module
Sensitive Big microphone sensor module
Finger measuring heartbeat module
Rotary encoder module

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Other optional items:

Scientech 6205G - GSM IoT Gateway

- Quad-Band 850/900/1800/1900 MHz
- GPRS multi-slot class 10/8
- GPRS mobile station class B
- Compliant to GSM phase 2/2+
- Class 4 (2 W @850/ 900 MHz)
- Class 1 (1 W @ 1800/1900MHz)
- Control via AT commands
- SIM application toolkit
- Supply voltage range : 3.2 ... 4.8V
- GPRS class 10 : max. 85.6 kbps (downlink)
- Embedded TCP/UDP protocol

Scientech 6205C - Cloud/Server

Online Cloud/Server

This is online server, in this user will get one static IP address, one domain (Website) name and one database along with email address. Annual subscription for domain name and IP address required.

Scientech 6205N - Wireless Sensor Node

Analog Inputs	:	6 nos.
Digital Outputs	:	4 nos.
I2C channel	:	1 no.
Communication	:	Zigbee 2.4 GHz
PC Interface	:	USB
Charging	:	USB and Solar Panel
Battery	:	3.7V/4400mAH
Solar Panel	:	6W

IoT Sensors for Scientech 6205N

SS150 Temperature and Humidity

SS151 Air Quality Sensor

SS152 Soil Moisture

SS153 Ambient Light Sensor

SS154 Soil/Water temperature

SS155 PIR Sensor

Scientech 6205I - Industrial Gateway Features

- Outdoor Ready to Deploy Solution
- Easily Programmable PYTHON/JAVA/C/C++
- Support HTTP, MQTT, TCP and CoAP application layer protocol
- Industrial Grade Designs
- MODBUS / PROFIBUS Input Interface
- Quad Core Processor with 1GB RAM
- Cloud Ready Gateway with Node.js Script
- Modular Software and Hardware Architecture
- Local data storage

Scientech 6205I - Industrial Gateway (optional)

Ordering Information

S.No.	Product Name	Model No.
1.	IoT learning platform	Scientech 6205A
2.	Extra Wireless Sensor Node	Scientech 6205N
3.	GSM IoT Gateway	Scientech 6205G
4.	Industrial Gateway	Scientech 6205I
5.	Online Cloud/Server	Scientech 6205C

Important Note:

- To perform actual/remote cloud application and configuration user must have Static IP based server with MySQL Database/Php/Java/Html software.
- For GSM gateway users must have own SIM Card with data balance.
- Product customization is also possible for Industrial requirement.

Subject to change V1.0.230119

Designed and Manufactured in India by -

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