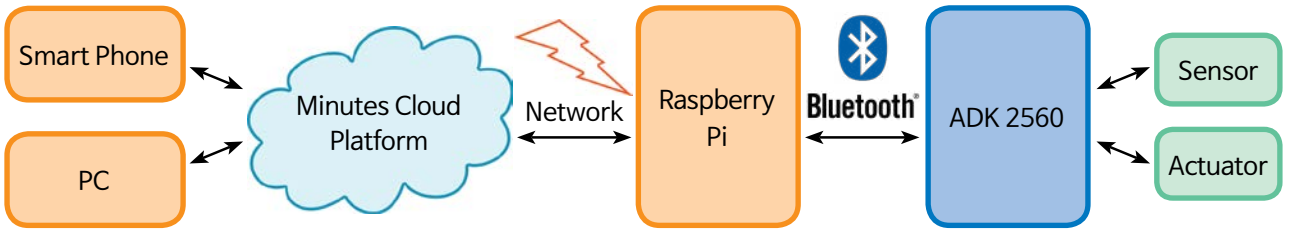
IoT(Internet of Things)
IoT SMART
F A M I L Y

IoT SMART PIONEER
IOT-011

Summary

It is possible to acquire sensor information for IoT basic technology and practice various motor and actuator control exercises, and it is possible to experience IoT service easily by using Android based cloud Interworking app.



Features

- Sensor data collection is implemented around Open Hardware Platform, so anyone can easily experience IoT service.
- Provides 10 basic sensor data bases and application examples.
- It provides module practice function using firmware and it is possible to acquire sensor information and practice actuator control to acquire IoT basic technology for each module.
- By building a gateway, it is possible to process various projects through sensor information monitoring and remote access control function.
- Provides AWS-based Cloud Service.
- Provides Android-based cloud interworking service.
- Provides an API for Cloud use.

Hardware Configuration and Specification

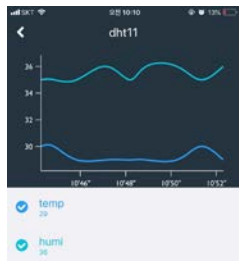
Module	Item	Specification
Gateway(Raspberry Pi 4	Processor	Broadcom BCM2711 1.5Ghz Cortex-A72 quad-core
	RAM	2GB
	Storage	MicroSD
	USB	USB 2.0 2ports, USB 3.0 2ports
	Power	USB-C socket 5V, 2A
	Audio	3.5mm A/V JACK
	Digital Video	HDMI 2 * micro HDMI
	Ethernet	10/100 BaseT
	Wireless Network	802.11n , Bluetooth 5.0
	Expansion I/O	40EA GPIO (2x20 2.54mm pitch Header)
	Size	116x56mm
HBE-ADK-2560	Micro Controller	ATmega2560 16MHz
	Flash Memory	256kByte(8KB USED BY BOOTLOADER)
	Clock Speed	16MHz
	USB Controller	ATmega8U2 16MHz
	USB Host Controller	MAX3421E USB 2.0
	GPIO Socket	2x18 Socket(1EA), 1x10 Socket(1EA), 1x8 Socket(5EA)
	Operating Voltage	7~12V
	Dimension	122 x 76(mm)
BLE Module	Processor	16MHz ARM Cortex-M0
	RF	Bluetooth LE, 2.4GHz
	Data rate	250 ~ 2000kbps
	Operating Voltage	2.2V ~ 5V
	Size	36 x 48mm
	Temperature Sensor	-
Sensor Module	PIR	Sensor : RE200B Sensing Range : 110 degree Operatiing Voltage : 3.3V I/O Interface : 1pin Digital Output
	Sound Sensor	Sensor : Microphone Feature : ambient sound detection, sound level detection Operatiing Voltage : 5V I/O Interface : 1pin Analog Output
	Gas Sensor	Sensor : MQ-5 - sensitive for LPG, natural gas, coal gas High Sensitivity : LPG, Natural gas, Town gas Low Sensitivity : Alcohol, Smoke Operating Voltage : 5V I/O Interface : 1pin Analog Output
	Color Sensor	Sensor : TCS3200D Feature : detects static color, sorting by color, color matching Operating Voltage : 5V I/O Interface : 7 pin Digital Input, 1 pin Digital Output
	Humidity / Temperature Sensor	Sensor : DHT11 Feature : temperature and humidity sensor, ambient temperature and humidity detection Operation Voltage : 5V I/O Interface : 1pin Digital Output
	Ultrasonic Sensor	Sensor : HC-SR04 Feature : 2~500cm distance measuring range, 40kHz Frequency Operating Voltage : 5V I/O Interface : 1pin Digital Input, 1pin Digital Output
	PSD Sensor	Sensor : GP2Y0A21YK0F 10~80cm distance measuring range Operation Voltage : 5V I/O Interface : 1pin Analog Output
	Light Sensor	Sensor : CdS Operation Voltage : 5V I/O Interface : 1pin Analog Output
	Flame Sensor	Sensor : ST8L Feature : sensitive to flame spectrum, fire detection, fire fighting robot, fire alarm Operating Voltage : 5V I/O Interface : 1pin Digital Output

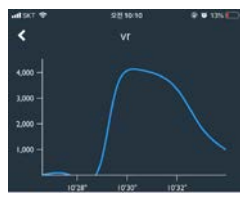
Module	Item	Specification
Sensor Module	Variable Resistor Module	Sensor : 1kΩ Variable Resistor Feature : 0 ~ 5V DC Variable Voltage out I/O Interface : 1pin Analog Output
BASE	Raspberry Pi 4 Block	Raspberry Pi 4 Connector, Power Switch, I/O Port
	ADK2560 Block	ADK2560 Connector, I/O Port
	Sensor Module Block	10 Types of Sensor Module Connector, I/O Port
	DC Motor Block	Feature : DC Geared Motor with ENCODER Motor Driver : BA6208 Gear Ratio : 120:1 Operation Voltage : 5V I/O Interface : 2 pin Digital Input(DC Motor), 2pin Digital Output(ENCODER)
	Step Motor Block	Feature : Step Motor, 32 Step, 1/16 Gear Motor Motor Driver : ULN2003 Operation Voltage : 5V I/O Interface : 4pin Digital Input
	LED Block	Feature : RED, GREEN, BLUE COLOR LED Current consumption : 20mA Lumminous Intensity : 6000~7000mcd at 20mA Viewing Angle : 30 degree I/O Interface : 3pin Digital Input
	USB Camera Block	Video Capture : Maximum 1280 x 720 Pixel : 3,000,000 Interface : USB 2.0
	PLC Interface Block	Feature : 5V / 24V Isolate Digital I/O Interface : 8 Pin 24V to 5V Digital Input, 8pin 5V to 24V Digital Output
	Switch Block	Feature : X/Y Joystick, Direct Button 4EA, Joystick Button 1EA I/O Interface : 2pin Analog Output, 5pin Digital Output
14" TFT LCD	HDMI Interface, Built in CASE	-
Keyboard / Mouse	-	-
USB Hub–3 ports or more	-	-
Jumper Cable	-	-

Software Specifications

Module	Item	Specification
Gateway	O/S	Raspbian Linux 3.xx
	Camera Program	Pi Camera Driver, Camera Streaming Server
	Server Program	Sensor Control S/W
BLE Module	F/W IDE	Arduino 1.6.x
	Communication	Bluetooth Communication S/W
	Function	Sensor Control S/W
ADK-2560 Module	F/W IDE	Arduino 1.6.x
	Communication	Bluetooth Communication S/W
	Function	Sensor Control S/W
Cloud	Minutes Cloud Platform	Powered by Amazon Web Service (AWS) cloud infrastructure Flexible cloud architecture scalable to the number of IoT devices and users Provides virtual sensors / actuators from a variety of external data sources Web user interface: Provides easy administrator screen through web interface Device management: gateway registration Sensor management: Provides the ability to manage (register / modify / delete) and test the sensor

APPS





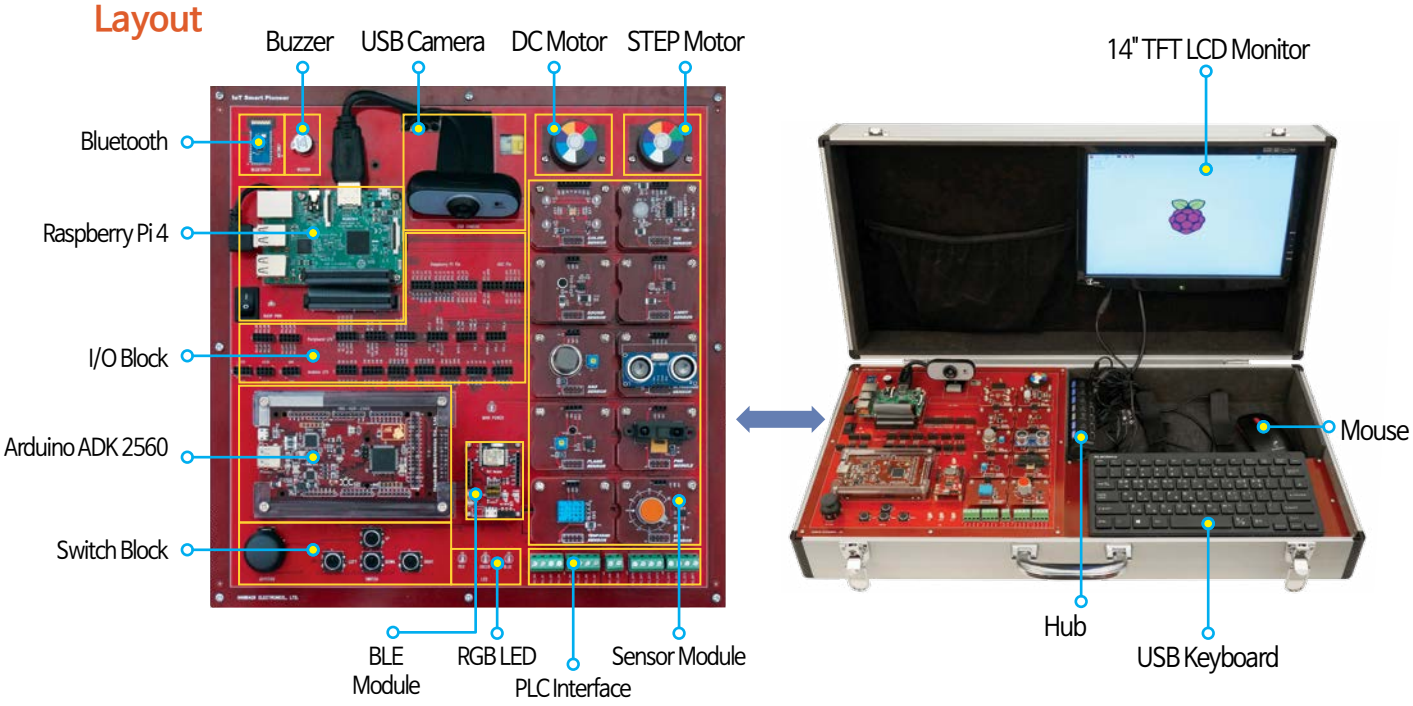
Textbook Chapter

- Overview of Internet of Things
- IoT SMART PIONEER configuration and lab environment configuration
- Practice of smart sensor control using Arduino
- Practice of smart sensor control using Raspberry Pi
- Smart sensor and cloud interworking
- Raspberry Pi

Configuration

- IoT SMART PIONEER 1set
- Power Cable
- HDMI Cable
- Micro 5P USB Cable
- Jumper Cable 15cm
- Ethernet Direct Cable
- Minutes Cloud S/W
- Book / CD

Layout



Block Diagram