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IOT-110
Edge IoT Teaching Platform

IOT-110 is a platform that integrates the training of edge computing, AI., and IoT. Its system consists of sensor modules, edge computing modules, and AI computing accelerators. The course provided is structured coherently and clearly, and the concepts of sensors, networks, and applications can be introduced progressively and thoroughly. With this system, users shall be able to deploy various smart applications of IOT and edge computing.

Each of the 16 sensor modules is embedded in a separate aluminum housing with a built-in hook and powered by a rechargeable lithium battery, so the sensor modules can be deployed in many different locations as well as on the training stand. The name of each sensor is printed on the housing.

● Features

1. An open-source integrated development environment: users can start programming using an easy-to-use language.
2. Graphical programming language development tools: users can generate writing programs by dragging and dropping (ideal for beginner programmer)
3. A flexible structure: convenient to set up and deploy required experimental environments easily.
4. All data collected from sensors are stored in database. Data can also be uploaded to cloud servers, such as ThingSpeak, Amazon Web Services, and Microsoft Azure.
5. It is compatible with the MQTT communication protocol, and data is obtained through publication and subscription.

● Specifications

1. MQTT Broker (IOT-12001)
   (1) Broadcom BCM2711, quad-core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
   (2) 4GB LPDDR4 SDRAM
   (3) 2.4GHz and 5.0GHz IEEE 802.11b/g/n/ac wireless LAN
   (4) 2x USB 3.0 ports, 2x USB 2.0 Ports
   (5) 2x Micro HDMI ports supporting up to 4K 60Hz video resolution
   (6) Support MQTT protocol
   (7) Include Camera

2. Wired Sensor Modules
   (1) The 16 modules IOT-14001 to IOT-14016 all include Communication Node Boards (Wi-Fi) with Intelligent control LED 3pcs, and Battery in the package.

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(2) Each of the following 16 sensors is placed in a module for experiment and recharging.

a. IOT-14001: Gas Sensor x 1
b. IOT-14002: Hall Sensor x 1
c. IOT-14003: Photo Interrupter Sensor x 1
d. IOT-14004: Ultrasonic Distance Sensor x 1
e. IOT-14005: Digital Pressure Sensor x 1
f. IOT-14007: Electromagnetic Buzzer Sensor x 1
g. IOT-14008: IR Distance Sensor x 1
h. IOT-14009: Loudness Sensor x 1
i. IOT-14010: Digital Light Sensor x 1
j. IOT-14011: Motion Sensor x 1
k. IOT-14012: IMU 9DOF Sensor x 1
l. IOT-14013: Relay Sensor x 1
m. IOT-14014: UV Sensor x 1
n. IOT-14015: Temperature and Humidity Sensor x 1
**Each of the above 14 sensors includes OLED Display 0.96" dot matrix
o. IOT-14006: Dust Sensor x 1
p. IOT-14016: CO_2 Sensor x 1

IOT-14001
Gas Sensor

IOT-14002
Hall Sensor

IOT-14003
Photo Interrupter Sensor

IOT-14004
Ultrasonic Distance Sensor

IOT-14005
Digital Pressure Sensor

IOT-14006
Dust Sensor

IOT-14007
Electromagnetic Buzzer Sensor

IOT-14008
IR Distance Sensor

IOT-14009
Loudness Sensor

IOT-14010
Digital Light Sensor

IOT-14011
Motion Sensor

IOT-14012
IMU 9DOF Sensor

IOT-14013
Relay Sensor

IOT-14014
UV Sensor

IOT-14015
Temperature and Humidity Sensor

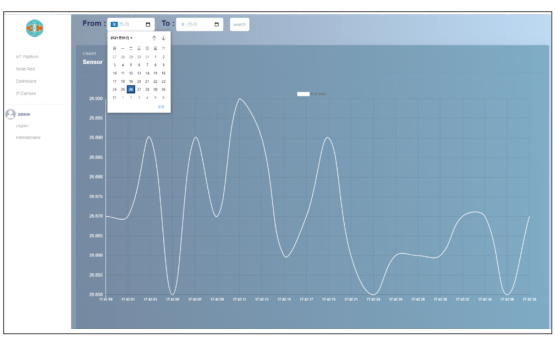
IOT-14016
CO_2 Sensor

3. Edge Computing Node (IOT-14017)
(1) Edge Computing Node (Raspberry Pi 4)
(2) Intel NCS2
(3) Include Cooling Fan
(4) USB Webcam

4. LCD Panel (IOT-14092)
(1) 13.3inch HDMI LCD
(2) Type : Capacitive

5. DC Load (IOT-14018)
(1) DC Fan
(2) USB Bulb
(3) Yeelight LED Bulb

6. Web Server Set (IOT-12002)
(1) It can display real-time information of sensors.
(2) The historical query function allows users to access historical data easily.
(3) The account management function allows users to manage web servers safely.
(4) Storage : 2TB
(5) Dongle : x 1



● Experiment List of IoT

■ Perception Layer

1. Microcontroller Development
(1) GPIO Control LED Blink Experiment
(2) UART Communication Experiment
(3) ADC Converter Experiment
(4) External Interrupt Experiment
(5) I^2C Communication Experiment

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2. Sensing Layer
   (1) Gas Measurement Experiment
   (2) Hall(Magnetic) Detection Experiment
   (3) Photoelectric Switch Experiment
   (4) Ultrasonic Distance Experiment
   (5) Barometric Pressure Measurement Experiment
   (6) Dust Measurement Experiment
   (7) Buzzer Control Experiment
   (8) IR Experiment
   (9) Noise Measurement Experiment
   (10) Illuminance Measurement Experiment
   (11) Motion Sensing Experiment
   (12) 9 DoF Measurement Experiment
   (13) Relay Control Experiment
   (14) Ultraviolet Measurement Experiment
   (15) Temperature and Humidity Measurement Experiment
   (16) Carbon Dioxide Measurement Experiment

■ Network Layer

3. Wi-Fi Communication
   (1) Wi-Fi AT Command Experiment
   (2) Wi-Fi Web Server Experiment
   (3) Wi-Fi Request Experiment
4. MQTT Communication
   (1) MQTT Broker Experiment
   (2) MQTT Protocol Introduction Experiment
   (3) Sensor Data Transmission Experiment
   (4) Actuator Control Experiment
   (5) MQTT Programming Experiment

■ Application Layer

5. Web Engineering
   (1) IoT Web Server Experiment
   (2) IoT SQL Experiment
6. Visual Programming Language
   (1) VPL Application Experiment
   (2) IoT Cloud Experiment
   (3) Smart Device Application Experiment

● Experiment List of Edge Computing

1. Computer Vision
   (1) Computer Vision and Image Processing Experiment
   (2) Perform Image Manipulation Experiment
   (3) Open and Stream Vidio Experiment
   (4) Track Face Detection In Vision Experiment
   (5) Train on Images by TensorFlow Experiment
2. Edge Computing With IoT
   (1) Face Recognition Experiment
   (2) Head Pose Experiment
   (3) Facial Landmarks Experiment
   (4) Emotions Recognition Experiment
   (5) Smart Home Experiment

● Accessories (IOT-19003)

1. Storage case
2. IOT-19101: MediaTek MCU
3. IOT-14081 : 802.11 b/g/n Wireless broadband router with built-in 4-port(or more) 10/100 MB switch hub
4. Experiment Manual
5. USB Cable
6. Ethernet Cable

● System Requirements

1. Above i5 8th Generation.
2. Above GTX 1060 (or RX 590)
3. Above 8GB RAM.
4. Above 500GB storage.
5. Windows 10 or Upper Version
6. Wireless Router (For Wi-Fi Communication Experiment)

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