

Artificial Intelligence  
Internet of Things

# SMART FARM

IoT-based soil or hydroponic cultivation platform  
capable of actual cultivation



Heating   
Ventilation   
Air Conditioning 



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IoT-based soil or hydroponic cultivation platform capable of actual cultivation



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## Option

Builds a pumping system to control the culture medium including nutrients

### CO2 Generator

Solenoid Valve

### Nutrient Solution

### PH Value Detection Sensor

Detectable Concentration Range : PH0 ~ 14

Response Time: <=5S

### TDS(Total Dissolved Solids) Sensor

Measurement Range : 0 ~ 1000ppm

TDS Probe

### Peltier Thermoelectric Module

40mm Fan

12V/6A

### Heater

12V/10A

Heating Element : PTC

Power : 12V/29A

## Product Features

Provides systems such as heating, ventilation, and air conditioning to monitor or control the light, temperature, and humidity required for plants

Builds a system that can determine the optimal conditions for temperature, luminosity, moisture and CO2 levels, etc.

Provides DC LED lighting for plant growth, water pump control function through moisture sensor

Provides intake and exhaust fans for ventilation systems

Roll screen type door system is configured by installing a motor

Real-time remote management and remote control of fans or door systems with a smartphone

Using IoT connectivity application training equipment based on Wireless Personal Area Network (WPAN) and Low-Power Wide Area Network (LPWAN)

Supports an open integrated development environment based on Visual Studio Code for professional application development

Provides Python-based learning contents

## Software Specifications

List	Specifications
XNode Auto	MicroPython 3 (built in node)
	Soda IDE
	RGB LED, Light, Humidity, Temperature Library & Example
	Button Switch, Limit Switch, LED, Relay, Step Motor, TextLCD Display, Soil Moisture, Library & Example

## Hardware Specifications

List	Specifications
XNode Auto	Xtensa® Dual-Core 32-Bit LX6 Microprocessor(s), Up to 600 DMIPS
	RAM: 4MB
	Flash Memory: 8MB
	Interface: UART, SPI, I <sup>2</sup> C, I <sup>2</sup> S, ADC, PWM, GPIO
	Indicator: RGB LED
	Wi-Fi
	802.11b/g/n Data Rate: 1Mbps to 72Mbps Transmit Power: Up to +16dBm Receiver Sensitivity: -93 to -71 dBm
	Bluetooth
	Bluetooth 4.2 BR/EDR BLE Range: 30M Data Rate: 1Mbps Sensitivity: -97dBm Output Power: 12dBm
	LoRa
	Frequency: 900MHz Range: 10km Data Rate: 300kbps Sensitivity: -148dBm Output Power: 20dBm
	Light Sensor
	Illuminance: 1 ~ 65535(lx) Interface: I <sup>2</sup> C
	Temperature/Humidity Sensor
	Humidity Resolution: 12bit(0.04%RH), 8bit(0.7%RH) Humidity Accuracy: +-3%RH Temperature Resolution: 14bit(0.01C), 12bit(0.04C) Temperature Accuracy: +-4°C Interface: I <sup>2</sup> C
	Relay: 3ch
	DC: 7A/28VDC AC: 7A/240VAC
	Motor Driver
	Dual Full-Bridge Driver(4A/46V)
	Soil Moisture Sensor
	Analog Output
XNode Auto	Ventilation
	Vinyl Curtain: Step Motor Driver FAN 2EA: Relay Control Light Control: RGB LED Strip Power: 12V/3A Adaptor (DC Jack)
	Water Pump
	Flow Rate: 3.5L/Minute 12V/3W(Relay Control) Mini Sprinkler 2EA
	Indoor Sensor
	Light Sensor Temperature/Humidity Sensor Interface: I <sup>2</sup> C
	Carbon Dioxide(CO2) Gas Sensor
	Measuring Range : 0 ~ 10000 ppm Accuracy : ±7% ±50ppm Response Time : 18 ~ 30 sec Interface: I <sup>2</sup> C
	Water Level Sensor
	Output Voltage: (Low(0V), High(5V) Response Time: 500ms Sensitivity: 0 ~ 13mm Waterproof Performance: IP67
XNode Auto	Display
	Character LCD Format Size: 16x2 Interface: I <sup>2</sup> C
XNode Auto	Size
	Body: 400x300x500(mm) Flowerpot: 325x140x125(mm) Flowerpot Stand: 325x175x65(mm) Water Tank: 105x105x255(mm)

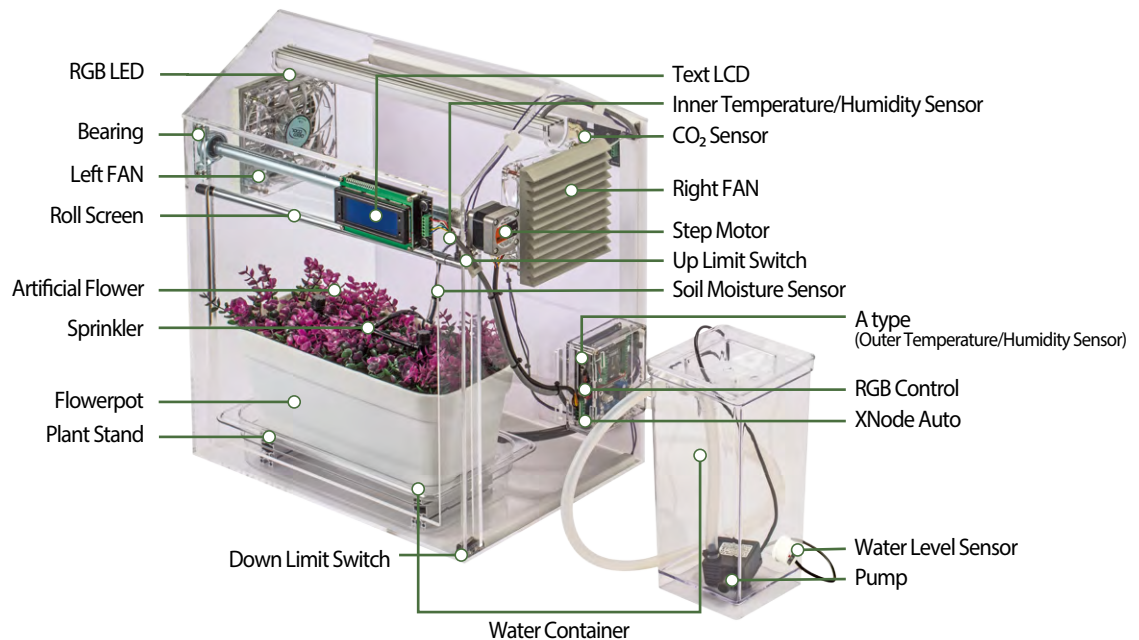
## Training Contents

- Smart Farm Configuration and Lab Environment Configuration
  - Smart Farm Configuration
  - Development Environment
- Smart Farm Control
  - FAN
  - Water Pump
  - Soil Moisture Sensor
  - CO<sub>2</sub> Sensor
  - Water Level Sensor
  - Light Sensor
  - Temperature/Humidity Sensor
  - RGB LED Bar
  - Window Control
  - TextLCD Display
  - Switch Input
  - Auto Control
- Smart Farm Control using Blynk
- Smart Farm GUI Application

## GUI Program



## Layout



## Components

