Networked Farming (SL2a – 12)

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Two groups are involved: SL2a-12 & SL2b-12
SL2a-12: Hardware design, MCU programming
SL2b-12: Software and user interface

Introduction:
In our networked farming, all such parameters are monitored and controlled automatically via a communication network. In past, all parameters are monitored and controlled manually. When the scale of the farming becomes large, it is difficult for manual control. Networked farming can enhance the efficiency and accuracy of monitoring and control of various parameters for a large farm.

Objective:
Our final target is to build a real-time centralized monitoring and control system for a farm.

Targets of our project include:
- Monitoring and controlling temperature, water level and luminosity
- Building a low power consumption system
- Enhancing the viability of organisms

Methodology

Microcontroller Unit (MCU)
It is the main controller. It responds to monitoring and controlling each of devices in the system.

Bluetooth module
It is used to communicate between the MCU and user interfaces.

Wi-Fi module
It is used to communicate with the SERVER to save data and get control command.

Thermoelectric Cooling Device
It is a two-sided device with one being able to decrease while the other side being able to increase the temperature. It can cool down the water in a very short period of time.

Ultrasonic Sensor
It can measure the displacement within 50cm. It is used to measure displacement between the water surface and the sensor.

Thermometer
It is used to measure an object's temperature and send back to the MCU.

Glass monochrome sensor
It is a PSI meter that can measure the PSI value. The brief principle is to compare the reference solutions in the glass membrane with the testing sample.

Light-emitting diode (LED)
It is used to simulate the sunshine of the organisms. It combines with three colors LED (blue, green and red). Different intensity of color light can be generated to meet for various requirements.

Water Pump
It is used to maintain a water flow for the water tank.

Voltage Regulator
It is an electronic component that can automatically maintain a constant voltage level.

Result

Our results are demonstrated in the following figures:

- The top level is five small breeding chambers for shrimp.
- The 2nd level is the five small breeding chambers for fish.
- The 3rd level is a large chamber for breeding large multi organisms without conflict.

- We successfully controlled water flow using water valve in breeding chamber.
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- The bonding chamber is 814.40cm (L), 48.30cm (W), 49.00cm (H), with large centralised monitoring and control system.