Real-Time Monitoring and Climate Control in Small Scale Poultry Farms using FOSS4G

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Abstract

Optimum climitization of poultry farms is an essential issue that needs to be dealt with. Several automated systems are now available for this purpose. However, most available solutions are targeted at large farms and needs of small farmers are often unaddressed due to cost and other factors.

This research aims to address the need of small-scale poultry farmers by providing the entire solution for climitization using Open Hardware, Open Source Software and Open Standards.

Firstly, a Arduino micro-controller based system has been developed to monitor temperature, humidity and ammonia gas inside the the poultry farm. The Heat Stress Index (HSI) is determined using temperature and humidity conditions. The controller is also used to switch on the air-blower based on the calculated HSI value. When high-level of ammonia gas are sensed, the farmer is alerted by SMS message to attend to cleaning operations.

The Arduino based hardware device connects to a Firebase Realtime Database using a WeMos-D1R2 WiFi unit. istSOS is used to archive and visualize the recorded data in near real-time. Further, monitoring and control of sensor device can also be done remotely. UC20-G 3G Shield for Arduino is used for sending SMS alert to the farmers.

The system is an improvement on other low-cost solutions as it offers comprehensive functionality of real-timeliness, alerting and remote-control. The system is scalable as the sensor devices can be easily added to the system using the istSOS interface.

The outcome of this research demonstrates the potential of FOSS4G to support Thailand 4.0 initiative and facilitate cost-effective IoT based smart farming practices.

Keywords : Climitization, Poultry, FOSS4G, Sensor, IoT