TECH OFFER

Automated Environmental Control For Indoor Farming

KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Sensors & Instrumentation

Energy - Sensor, Network, Power Conversion, Power Quality & Energy Management

Infocomm - Ambient Intelligence & Context-Aware Computing

Green Building - Sensor, Network, Building Control & Optimisation

TECHNOLOGY READINESS LEVEL (TRL): **TRL7**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174818**

OVERVIEW

Indoor farming presents a range of different challenges to crop yields compared to outdoor farming activities. Traditional outdoor farmers intuitively know what environmental factors affect the growth of the crop. Indoor farming, on the other hand, requires the farmer to simulate the optimal climate conditions for expected crop yields. The indoor climate can either contribute to the yields or, in unfortunate circumstances, lead to the loss of the crop. However, it is not always easy to create an ideal environment for the crop.

This technology offer is a control system that allows the facility manager to align optimal crop conditions with the equipment

settings in their facility, minimising the drift between settings and site-level crop conditions. The control system can also be used to compute the correlation between data across crop production, environment, and business performance. The control system can be customised further by adding other sensors for better accuracy of control.

The technology owner is keen to do R&D collaboration and licensing with innovative industrial automation companies specialising in product development of sensor networks and high-data throughput IoT gateways.

TECHNOLOGY FEATURES & SPECIFICATIONS

The technology offer is a control system that has the following features:

- can be integrated into existing building management system (BMS)
- dashboard for real-time data and reporting analysis
- machine learning techniques to identify the optimal environment

Using this technology, the indoor farming community can expect energy savings of 25% to 35%, improved crop yields by 25% to 75%, and 25% reduction in man-hours.

The control system can take in the climate data, such as air temperature, relative humidity, carbon dioxide and volatile organic compound readings (VOC) from the building management system (BMS); as well as farming data, such as soil temperature, soil moisture, pH level and electrical conductivity. The computational output is then used to control the temperature, ventilation, lights, fogging machines and balance the irrigation and humidity levels where the crops are cultivated.

POTENTIAL APPLICATIONS

This technology offer can be deployed in the following applications:

- Urban agriculture – farming and gardening
- Hydroponic/aquaponic facilities
- Rooftop farms/Community gardens
- Green houses

The technology can also be integrated into soil conditions monitoring and plant video analysis.

UNIQUE VALUE PROPOSITION

- Customisable inputs and outputs
- Energy savings of 25% to 35%
- Enhanced crop performance by 25% to 75%
- Resource (man-hour) optimisation by 25%
- Cost-effective data analysis

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