

IOT-BASED SMART FARMING FOR BLACK SOLDIER FLY (BSF) CULTIVATION

Bridging the gap between complex data and user understanding through effective UI/UX solutions.

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mart farming has emerged as an innovative approach to modern agriculture by integrating digital technologies, particularly the Internet of Things (IoT),

to improve efficiency and productivity. One promising application of this concept is in the cultivation of Black Soldier Fly (BSF) larvae, which are widely used for organic waste management and as a high-protein animal feed source. However, traditional BSF farming methods often rely on manual monitoring of environmental conditions, leading to inconsistent temperature and humidity control that can negatively affect larval growth. This study proposes the development of an IoT-based smart farming system designed to monitor and control environmental conditions in BSF cultivation. The system utilizes a DHT11 sensor to measure temperature and humidity, an ESP32 microcontroller to process data, and the Blynk application to display real-time information. When humidity levels fall below a predefined threshold, the system automatically activates a relay to turn on a water pump, maintaining optimal environmental conditions. The research adopts a prototype development method, including system design, implementation, testing, and evaluation.



Experimental testing demonstrates that the system is capable of real-time monitoring and automatic control, improving environmental stability within the BSF enclosure. By integrating monitoring and control into a single IoT-based platform, this smart farming system enhances operational efficiency, reduces manual intervention, and supports sustainable waste management practices. The proposed solution offers a practical and scalable innovation for small- and medium-scale BSF farmers.