Practice Abstract 9 -
Smart Mushroom Farming Technology/SIP 2 ADS

Summary for practitioners

Problem:

Mushroom production is a very technical process and represents a special case of controlled environment agriculture (CEA). The sector of specialty mushrooms is dominated by small- and medium-scale producers across Europe. Specifically, oyster mushrooms (***Pleurotus*** *spp.*) are cultivated for commercial production on substrate blocks, such as sawdust or straw in single use plastic bags. T**he viability and proliferation of the mushroom formation, growth and development is dependent on a combination of intrinsic and extrinsic factors, which can act separately or synergistically**. Environmental factors such as temperature, humidity, illumination, and carbon dioxide are important drivers in mushroom growth. In addition, the spatial and temporal variability of clusters within the farm introduce complexities associated with various sources of uncertainty including production yields and demand patterns that remarkably complicate decision making. An efficient localization and accurate yield mapping of complex morphology agricultural product such as the oyster mushrooms can help farmers to tackle this variability and mitigate the labor-intensive cost associated with optimum yield and manual harvesting.

Solution:

The Smart Mushroom Farming tool developed in Farmtopia offers an **integrated** solution for the continuous, automated and real-time crop growth monitoring. D**ata analysis of temporal and spatial data, in turn, allows mushroom farmers to perform precise crop scouting and yield mapping.** This enables farmers to monitor growth and environmental parameters more accurately, ensuring uniform yield and reducing resource input. The tool can integrate data and provide information to the farmer, for example, it can create an alarm to notify the farmer when specific metrics reach critical thresholds, allowing for timely intervention.

Practical Recommendations:

- Monitor production data: It provides recommendations for maturity stage, helping farmers track production performance and optimize harvesting schedules.
- Receive alerts and insights: It notifies the farmers when environmental conditions require adjustment, helping prevent losses and ensuring optimal yield.
- Improve decision-making: Farmers can make informed decisions about climate control, harvesting, and resource management.
- Enhance efficiency: It ensures consistent mushroom growth and yield forecasting.
- Integrate with farm automation: It might be integreated into advanced machinery and robotics for agricultural task automation.

Further information

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About this Practice Abstract and Farmtopia

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Farmtopia: The project is running from September 2023 to August 2026. The overall goal of Farmtopia (***GA No.: 101083541)*** is to democratize digital farming to empower small and medium farms.
Website: https://farmtopia.eu/

UCD: As part of the Farmtopia project, UCD leada SIP2 on Agricultural Digital Solutions (ADS) in mushroom production. It is developing an integrated solution for real-time monitoring and control of mushroom yield by the synergistic use of smart sensor solutions and artificial intelligence algorithms (AI).
Website: https://www.ucd.ie/biosystems/

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