LITERATURE SURVEY

SMART FARMER – IoT ENABLE SMART FARMING APPLICATION

1) **Design and Implementation of a Connected Farm for Smart Farming System:**

Authors: Minwoo Ryu, Jaeseok Yun, Ting Miao, Il-Yeup Ahn, Sung-Chan Choi, Jaeho Kim

Published: IEEE 2020

Description: In this paper, the authors have presented a connected farm based on IoT systems for smart farming systems. To provide Internet connectivity for the sensors and controllers of the connected farm, they have deployed the &Cube, a standardized (i.e., complying with oneM2M specifications) device software platform for IoT devices. Also, the Mobius platform is used. It is an IoT service platform (also oneM2M-compliant) that provides REST APIs with which the data collected from sensors (e.g., CO2 sensor) can be retrieved, but also the control commands can be sent to controllers (e.g., air conditioner). They have also implemented a smartphone application that allows end users to remotely monitor and control their connected farm, e.g., turn on air conditioner by pushing a button on the smartphone.

2) **Adoption of the Internet of Things (IoT) in Agriculture and Smart Farming towards Urban Greening: A Review**

Authors: A. Raneesha Madushanki, Malka N Halgamuge, W. A. H. Surangi Wirasagoda

Published: International Journal of Advanced Computer Science and Applications 2019

Description: In this paper the authors have reviewed many different journal papers in the topic. It is found that water management is the highest considered IoT sub-vertical followed by crop management, smart farming, livestock management, and irrigation management with the same percentage. As per the observation, the most critical sensor data collection for the measurement is environmental temperature, environmental humidity and there are some other such sensor data also gathered for IoT applications as

soil moisture and soil pH. Wi-Fi has the highest demand of usage in agriculture and farming industry, followed by mobile technology. Other technologies as ZigBee, RFID, Raspberry pi, WSN, Bluetooth, LoRa and GPRS have less demand in the agriculture and farming sectors. When compared to the agricultural sector, farming industry has a lesser percentage amount using IoT for the automation.

3) **A Revisit of Internet of Things Technologies for Monitoring and Control Strategies in Smart Agriculture**

Authors: Amjad Rehman, Tanzila Saba, Muhammad Kashif, Suliman Mohamed Fati

Published: MDPI 2021

Description: IoT can improve the efficiency of agriculture and farming processes by eliminating human intervention through automation. The fast rise of Internet of Things (IoT)-based tools has changed nearly all life sectors, including business, agriculture, surveillance, etc. These radical developments are upending traditional agricultural practices and presenting new options in the face of various obstacles. The goal of this research is to evaluate smart agriculture using IoT approaches in depth. The paper demonstrates IoT applications, benefits, current obstacles, and potential solutions in smart agriculture. This smart agricultural system aims to find existing techniques that may be used to boost crop yield and save time, such as water, pesticides, irrigation, crop, and fertilizer management.

4) **A Multi-collective, IoT-enabled, Adaptive Smart Farming Architecture:**

Authors: G. Kakamoukas, P. Sariciannidis, G. Livanos, M. Zervakis, D. Ramnalis, V. Polychrnos, T. Karamitsou, A. Folinas, N. Tsitsiokas

Published: IEEE 2019

Description: The goal of the work presented in this paper is to increase the farmer's ability to use water effectively. It basically uses a soil moisture sensor to determine

the amount of moisture in the soil and then connects to the Thing Speaks cloud through ESP8266 Wi-Fi to monitor the soil's status. The proposed system is also equipped with an algorithm that forecasts crop irrigation decisions based on information about soil moisture patterns. If this happens, the device also alerts farmers when the water supply is exhausted. Weather forecasting via internet is another benefit of adopting this approach. The device's energy independence and inexpensive cost make it potentially useful in areas with limited water resources and remote locations. The technology's usefulness is increased by the ease with which farmers may use it. By reducing waste, it also conserves water

5) **Traffic-Aware Secured Cooperative Framework for IoT-Based Smart Monitoring in Precision Agriculture**

Authors: Ibrahim Abunadi, Amjad Rehman, Khalid Haseeb, Lorena Parra, Jamie Lloret

Published: MDPI 2022

Description: This study proposes a framework for a system that combines fog computing with smart farming and effectively controls network traffic. Firstly, the proposed framework efficiently monitors redundant information and avoids the inefficient use of communication bandwidth. It also controls the number of re-transmissions in the case of malicious actions and efficiently utilizes the network’s resources. Second, a trustworthy chain is built between agricultural sensors by utilizing the fog nodes to address security issues and increase reliability by preventing malicious communication. Through extensive simulation-based experiments, the proposed framework revealed an improved performance for energy efficiency, security, and network connectivity in comparison to other related works.

6) **Internet of Things and LoRaWAN – Enabled Future Smart Farming**

Authors: Bruno Citoni, Francesco Fioranelli, Muhammad A. Imran, Qammer H. Abbasi

Published: IEEE 2019

Description: In this paper authors have explained about LoRaWAN which is been under the spotlight in recent years due to its suitability to be the standard communication protocol for IoT deployments. It provides long communication range and low energy consumption by drastically reducing the available data rate. They also explained about the development of LoRaWAN enabled smart agriculture test to improve the understanding about the impact of the limitations using experimental test data, and moving towards building predictive models and adaptive network management algorithms for smart farming using the data collected.