IoT Based Smart Crop Protection System for Agriculture

LITERATURE SURVEY

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LITERATURE SURVEY

S.NO.	AUTHOR	TITLE AND YEAR	TECHNIQUE USED	FINDINGS	DISADVANTAGE
1.	DAVIDE ADAMI, MIKE O. OJO, STEFANO GIORDANO.	Design, Development and Evaluation of an Intelligent Animal Repelling System for Crop Protection Based on Embedded Edge-AI (September 2021)	1. DATA SET DESCRIPTION 2. IMAGE PRE-PROCESSING AND IMAGE SETS 3. YOLOv3 AND TINY-YOLOv3 NETWORK STRUCTURE 4. BATCH PROCESSING PATTERN 5. TRAINING PLATFORM	1. 1000 images of the ungulate are captured in Realtime. Data augmentation is necessary to increase the image diversity for better representation of the images. Image preprocessing like jitter, image rotation, flipping, cropping etc. are done for effective data augmentation. The animal recognition model is then trained using these images. 2. Tiny-YOLOv3 predicts objects at two scales. Image size of 416 × 416 is used as the input and two detectors consisting of 3 sub-detectors of YOLO output 13 × 13 and 26 × 26 grids. Various edge computing devices running real-time object detector with custom-trained models to identify the most suitable animal recognition HW/SW platforms are integrated with the ultrasound generator.	1. A large number of real time data is required for the initial data set description. 2. Image pre-processing of those large data consumes more time and it is costly to implement. 3. Tiny-YOLOv3 struggles to detect and segregate small objects in images that appear in groups, as each grid is constrained to detect only a single object.

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2.	UFERAH SHAFI, RAFIA MUMTAZ, NAVEED IQBAL, SYED MOHAMMAD HASSAN ZAIDI, SYED ALI RAZA ZAIDI, IMTIAZ HUSSAIN AND ZAHID MAHMOOD	A Multi-Modal approach for Crop Health Mapping Using Low Altitude Remote Sensing, Internet of Things (IoT) and Machine Learning. (June 2020)	1. DATA PRE-PROCESSING 2. NDVI MAPS 3. IOT SENSORS DATA MAPS 4. MULTI-MODAL DATA INTEGRATION 5. CROP HEALH CLASSIFICATION	1. The data was collected from two heterogeneous sources including IoT Agri nodes and drone, where the data from IoT nodes was sent to the local server with an interval of 5 minutes and drone imagery was collected on weekly basis. 2. The NDVI values of the stitched images were computed to find the chlorophyll content of the crop. which is an indicator of the crop health status. The NDVI of the stitched images. NDVI maps is that they provide an overall picture of crop health and help to identify the crop under stress. 3. The IoT sensors data provided added information to better comprehend the NDVI maps and helped in assimilating the reasons for the stressed crop.	1. Dealing with missing data, feature selection in data pre-processing. 2. NDVI requires calibration for each crop type and presence of wet and dry pixels. 3. IoT requires seamless internet and power connectivity dependence

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3.	AJAY PRAKASH, RAHUL KUMAR, PRABHAT KUMAR SINGH, ANKIT SINGH, SHAHAB AHMED, ABHISHEK JAIN.	A Review on IOT Based Water Irrigation and Farm Protection using Arduino (June-2021)	**TOOLS USED:** 1. ARDUINO. 2. DHT SENSOR. 3. SOIL MOISTURE SENSOR. 4. RELAY 5. DC MOTOR	1. Arduino gets data from the sensors like soil moisture and temperature sensor with unique IDs (UIDs). The information is periodically sent to the cloud. 2. The Arduino board process the data and irrigate the farm if the moisture content is below a limit.	1. Different part of the field has different moisture level, The set up for Irrigating the certain part of the field is costly and hard to maintain.

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4.	DR. AYYASAMY S, ESWARAN S, MANIKANDAN B, MITHUN SOLOMON S P, NIRMAL KUMAR S.	IoT based Agri Soil Maintenance Through Micro-Nutrients and Protection of Crops from Excess Water (May 2020)	**TOOLS USED:** 1. ARDUINO. 2. SOIL MOISTURE SENSOR. 3. DHT-11 SENSOR. 4. WATER LEVEL SENSOR 5. RELAY 6. DC MOTOR 7. NODE MCU 8. CLOUD SERVER BROKERAGE	1. The soil moisture sensor measures the soil moisture level. The pH sensor measures the pH level of the soil. The water level sensor is used to measure the water level in the farmland. The DHT-11 sensor measures humidity and temperature. All the readings are sent to a Cloud Server Brokerage using a Node MCU. 2. The Cloud Storage Brokerage (CSB) commands the relay to turn ON/OFF the suction motor for managing the excess waterlog based on the analysis and the pH value is used to provide the availability of the micronutrients in the soil which can be used to suggest the user supply soil with required nutrients. This can also be performed manually using an application.	1. Account or service hijacking. 2. Insecure interfaces and APIs. 3. Denial of service attacks. 4. Long term measurement is limited due to required water reserve and wick maintenance.

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5.	GOGUL DEV N S, SREENESH K S, BINU P K	IoT Based Automated Crop Protection System (2019)	**ALGORITHM USED:** TensorFlow Image Processing **TOOLS USED:** 1. IR SENSOR AND CAMERA. 2. RASPBERRY Pi. 3. ULTRASOUND SPEAKERS 4. ULTRASOUND DETECTOR 5. FREQUENCY GENERATOR	1. The PIR sensor detects the motion of the animals, the camera will be activated and the image will be captured along with video recording. 2. The image was processed in the Raspberry Pi by the TensorFlow image processing method to identify the type of animal. 3. The frequency generator connected to the Pi modulates the frequency to the specified value. The modulated frequency is transmitted through the buzzer speakers to keep the animals away from the field.	1. There is no GPU support other than Nvidia and only language support. 2. TensorFlow has a unique structure, so it's hard to find an error and difficult to debug.

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6.	MUHAMMAD AYAZ , MOHAMMAD AMMAD-UDDIN , ZUBAIR SHARIF, ALI MANSOUR AND EL-HADI M. AGGOUNE	Internet-of-Things (IoT)-Based Smart Agriculture: Toward Making the Fields Talk.	1. SOIL SAMPLING AND MAPPING 2. DROP DISEASE AND PEST MANAGEMENT 3. ZIGBEE 4. SIGFOX 5. LORA	1. Soil mapping helps in finding different crop varieties to be sowed in a specific field to better match soil properties like seed suitability, time to sow, and even the planting depth, as some are deep-rooted. 2. The advanced disease and pest recognition approaches are based on image processing in which raw images are acquired throughout the crop area using field sensors, UAVs, or remote sensing satellites.	1. This model is more beneficial for large scale as it requires high maintenance.

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1. DAVIDE ADAMI, MIKE O. OJO and STEFANO GIORDANO, " Design, Development and Evaluation of an Intelligent Animal Repelling System for Crop Protection Based on Embedded Edge-AI", September 6, 2021, accepted September 16, 2021, date of publication September 22, 2021, date of current version October 1, 2021.

2. UFERAH SHAFI, RAFIA MUMTAZ, NAVEED IQBAL, SYED MOHAMMAD HASSAN ZAIDI1, SYED ALI RAZA ZAIDI, IMTIAZ HUSSAIN3 and ZAHID MAHMOOD3, "A Multi-Modal approach for Crop Health", May 26, 2020, accepted June 8, 2020, date of publication June 16, 2020, date of current version June 29, 2020.

3. Ajay Prakash, Rahul Kumar, Prabhat Kumar Singh, Ankit Singh, Asst. Prof. Shahab Ahmed and Asst. Prof. Abhishek Jain, "A Review on IOT Based Water Irrigation and Farm Protection using Arduino", Issue 3, May-June-2021, ISSN (Online): 2395-566X.

4. Dr. Ayyasamy S, Eswaran S, Manikandan B, Mithun Solomon S P and Nirmal Kumar S, "IoT based Agri Soil Maintenance Through Micro-Nutrients and Protection of Crops from Excess Water", IEEE Xplore Part Number: CFP20K25-ART; ISBN:978-1-7281-4889-2.

5. Gogul Dev N S, Sreenesh K S and Binu P K, "IoT Based Automated Crop Protection System", 978-1-7281-0283-2/19/$31.00 ©2019 IEEE.

6. MUHAMMAD AYAZ, (Senior Member, IEEE), MOHAMMAD AMMAD-UDDIN, ZUBAIR SHARIF, ALI MANSOUR3 AND EL-HADI M. AGGOUNE,"Internet-of-Things (IoT)-Based Smart Agriculture: Toward Making the Fields Talk", July 7, 2019, accepted July 19, 2019, date of publication August 1, 2019, date of current version. September 23, 2019.