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Advanced Technologies For Smart Farming Agriculture Using Iot-Aliterature Review

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Abstract: *The Digitalization is the process which converts lower or analog data into digital form which can be accessed by the computer. The digitalization process mainly focused on the information and communication technology. This Technology used to develop and improve the performance in the agriculture which leads to Digitalization Agriculture or Smart Farming. The Device or Tools can be used to improve the Smart Framing through Internet of Things. This paper describes about the tools and technologies implemented in Smart Farming by the various research implemented their ideas or innovation in order to improve their growth of production in agriculture. It's also provides a feasibility survey on basic characteristics, major components, protocol and security issue in the digital agriculture. This paper also summarized the logical and physical resources utilization to estimate the availability using IoT which leads to an effective process.*
Keyword: *Digitalization Agriculture, Technologies, Protocol, IoT, Security, Tools, Devices.*

I. Introduction

Internet of Things (IoT) could be a term that was quite unacquainted to normal folks in older days. However during this era of sensible technology and smarter systems, IoT became a lot of in style. IoT is associate degree rising field which might play a significant role in the majority fields and disciplines as well as agriculture, health sector, home automation, aviation and transport, defense and military applications and far a lot of. the net of things (stylized net of Things or IoT) is that the internetworking of physical devices, vehicles (also spoken as "connected devices" and "smart devices"), buildings, and alternative itemsembedded with natural philosophy, software, sensors, actuators, and network property that modify these objects to gather and exchange information. IoT are often wont to create the objects or things smarter by remotely sensing or dominant it. Net of Things contains things that have distinctive identities and are connected to the net. IoT describes a system accommodates varied things within the physical world, and sensors at intervals or hooked up to those things that are connected to the net via wireless and wired net connections. These sensors will use varied kinds of native space connections like RFID, NFC, Wi-Fi, Bluetooth, and Zig-bee. Sensors may also have wide space property like GSM, GPRS, 3G, and LTE.

II. Literature Review

Review by the innovators or the research with 6publication related to digital farming techniques have been considered and described those innovation below.

Liu Dan et.al., (2017) proposed a farming is the foundation of any Countries economy and there is a solid relationship between's horticultural development and financial flourishing. The customary computerized checking frameworks are wired and bigger in size. It generally utilizes just PC as a reconnaissance terminal, which works effectively however doesn't give convenience. This article proposed a canny Monitoring System which depends on android stage offers office to get to observed boundaries rapidly on portable handsets anyplace from the world, continuous video checking, upkeep and the board. The test and application shows that is steady, modest, acceptable versatility and simple to work, it is a solid reasonableness and application possibilities.

Miguel A.Zamora-Izquierdo et.al.,(2019) clarified about Precision Agriculture (PA), as the reconciliation of data, correspondence and control innovations in agribusiness, is developing step by step. The Internet of Things (IoT) and distributed computing ideal models offer advances to improve PA network. By and by, their utilization in this field is normally restricted to explicit situations of significant expense, and they are not adjusted to semi-dry conditions, or don't cover all PA the executives in a proficient manner. Thus, we propose an adaptable stage ready to adapt to soilless culture needs in full distribution nurseries utilizing reasonably saline water. It depends on interchangeable minimal effort equipment and upheld by a three-level open source programming stage at nearby, edge and cloud planes. At the nearby plane, Cyber-Physical Systems (CPS)

interface with crop gadgets to assemble information and perform ongoing nuclear control activities. The edge plane of the stage is responsible for checking and overseeing principle PA assignments close to the entrance organization to build framework dependability against network access disappointments. At long last, the cloud stage gathers current and past records and has information investigation modules in a FIWARE sending. IoT conventions like Message Queue Telemetry Transport (MQTT) or Constrained Application Protocol (CoAP) are utilized to speak with CPS, while Next Generation Service Interface (NGSI) is utilized for southward and northward admittance to the cloud. The framework has been totally started up in a genuine model in casings of the EU DrainUse venture, permitting the control of a genuine tank-farming shut framework through overseeing programming for definite ranchers associated with the stage.

Shenoy and Yogesh (2017) proposed an IoT-based engineering for poly-house [8]. IoT can be utilized to build efficiency by controlling components like soil pH [9], soil dampness, stickiness temperature, the pace of soil supplements, and so forth. They proposed an IoT model for controlling and checking the plant development. Dampness in the dirt and pH of the dirt is estimated utilizing reasonable potentiometers at different occurrences and is moved to the siphons which give water system utilizing Bluetooth or Wi-Fi. Poly-house opens or shuts the folds to blow air dependent on the temperature detected by the temperature sensor. A focal worker will start sprinklers when the mugginess is low. pH esteem is kept up by including a sufficient amount of antacid and acidic manures dependent on the detected pH esteem. pH sensor is utilized to detect pH esteem. In this manner they make the cultivating stage more astute utilizing the IoT innovation. In gathering level, they utilize mechanical arms implanted with a camera to distinguish the yields to be reaped. Picture acknowledgment calculation is utilized to detect the shading and the state of the yield to be culled. RFID labels are connected to each gathered yield. This RFID label makes the pressing and transportation of yields simpler. In the objective terminal, the RFID labels are eliminated and are offered to the end client. In this way their model tends to practically all periods of a yield from creation till conveyance to end customers. They utilized Arduino based framework with incorporated shields for sensors, GPS module, and RFID labels. The detriment of their framework is about the precision of mechanical arms and picture acknowledgment stages. The case that the achievement edge is almost 60% and can be significantly better by utilizing better calculations and equipment segments.

Swati Dhingraet.al.,(2019) clarified about the Internet of Things (IoT) is an overall arrangement of "shrewd gadgets" that can detect and associate with their environmental factors and cooperate with clients and different frameworks. Worldwide air contamination is one of the significant worries of our period. Existing observing frameworks have second rate accuracy, low affectability, and require lab examination. Along these lines, improved checking frameworks are required. To conquer the issues of existing frameworks, we propose a three-stage air contamination checking framework. An IoT unit was readied utilizing gas sensors, Arduino incorporated improvement condition (IDE), and a Wi-Fi module. This unit can be truly positioned in different urban areas to checking air contamination. The gas sensors accumulate information from air and forward the information to the Arduino IDE. The Arduino IDE communicates the information to the cloud through the Wi-Fi module. We likewise built up an Android application named IoT-Mobair, with the goal that clients can get to important air quality information from the cloud. In the event that a client is venturing out to an objective, the contamination level of the whole course is anticipated, and an admonition is shown if the contamination level is excessively high. The proposed framework is comparable to Google traffic or the route utilization of Google Maps. Moreover, air quality information can be utilized to foresee future air quality file (AQI) levels.

Divyansh Thakur et.al., (2020)described about agriculture assumes a significant part in the life expectancy of person for their endurance as well as for the better financial development of the nation as well. Accuracy agribusiness is the new moving term in the field of innovation whose principle rationale is to lessen the outstanding burden of the ranchers and increment the profitability of the homesteads by utilizing advances like I.O.T, WSNs, Remote Sensing, Drone observation and some more. In this paper, we show the work done by our savvy and solid gadget whose point is to inundate fields just when there is a need of water and to give data about discovery of any interruption in rural fields. The data is sent to the ranchers by utilizing cloud application. The exhibition of our framework is estimated regarding interruption location and dampness of soil for water system.

Thirunavukkarasu et.al., (2020) clarified about Irrigation is a significant factor with regards to modern cultivating. Here we acquaint a framework with screen a solitary plant other than entire field. This strategy is exceptionally compelling than typical field checking framework. It very well may be utilized for observing costly yield. Water is a costly item with regards to a large portion of the spots on the planet. In this paper we proposed and execute a model programmed water system framework with IoT. For this situation sensors are utilized to decide if the time has come to water the field or not by estimating various boundaries. Sensors are

associated with arduino. These sensors can be put at the plant side to understand dampness, mugginess and temperature. In this undertaking, the sensors read the qualities and it is sent to the worker through IOT. In light of the sensor subtleties the engine will turn ON and OFF consequently.

III. Summarization of Logical and Physical Resources

From the above survey of smart farming techniques the following table generated based on logical and physical resources as shown below.

Table 1: Summarization of Logical and Physical Resources

IoT System	Microcontroller or Board Used	Software Platform Used	Sensor Used	Communication Technologies User
Green House using IoT	8051 Microcontroller	LabView	Temperature Sensor Humidity Sensor Pressure Sensor Light Sensor	ZigBee GPRS 802.15.4
Water Regulation in IoT	Undefined	Undefined	Soil Hygrometer RadarSensor	GSM
IoT System for agriculture	Arduino board	Arduino IDE, Open CV	Humidity Temperature Sensor Soil Sensor	Bluetooth, Wifi
Drip Irrigation System	Raspberry PI, Arduino Board	Arduino IDE, Python	Ultrasonic Sensor	Zig bee, GPS
Control System for Intelligent Farming	Arduino Board	Arduino IDE	Humidity Sensor Temperature Sensor Soil Moisture Sensor Light Intensity Sensor	Wi-Fi
Smart Agriculture using IoT	Arduino Board	MATLAB Arduino IDE	Soil Moisture Sensor Temperature Sensor	Wi-Fi

The above table represents the various sensors, communication protocol used for the smart farming system.

IV. Estimated Availability of Architectural Pattern

The process of Estimated Availability (EA) of Smart Farming can be determined based on the client server concepts. The main objective of this process to determine the availability between the mean time between failures (MTBF) by Mean Time To Repair (MTTR). A Central Coordinator are connected with sub coordinator which acts Server – Client Concept. The Central Coordinator will supply large amount to water connected to the sub coordinator which attached by the several sensor. To Determine the EA based on the coordinator, sub coordinator are described below

$$EA = (MTBF/(MTBF+MTTR) \quad \text{----- A}$$

Based on equation A, the following table 2 generated below with architecture pattern.

Table 2: Estimation Availability

Architectural Pattern	MTBF(Hour)	MTTR	EA
Client -Server	23	0.3	0.987124
Peer-Peer	22.5	0.8	0.965665
Coordinator-Subcoordinator	21	0.3	0.985915

From the above table 2, a from the survey determine estimation availability based on equation (**A)** and the following graph are generated as shown in Fig.1.

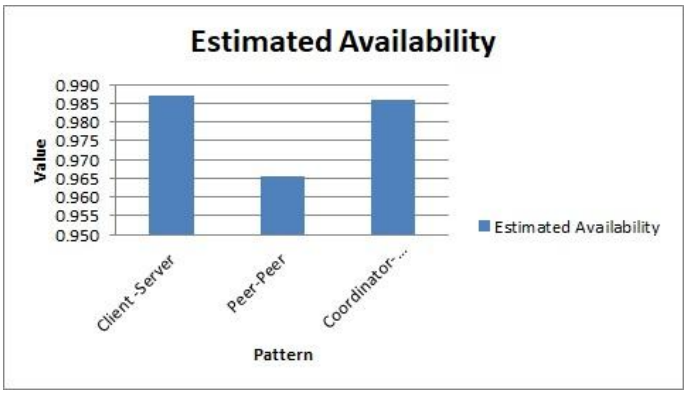

Fig.1 Estimated Availability

From the above graph, estimated availability is determined for the various architectural patterns for smart farming using IOT.

V. Conclusions

This paper provides a summarized report of various technologies, tools, sensor used in the smart agriculture using IoT. This paper concluded with various researchers about their innovation in the field of digital agriculture in the cyber world. Based on the various innovation by the researcher were summarized on logical and physical resources utilization in smart farming techniques. Since summarization techniques leads to an improvement in estimating the availability on various architectural pattern. Hence, concluded that the survey of smart farming using IoT provided efficient existing information system.

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