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Enhancing the Farming System Utilizing Artificial Intelligence Techniques

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ABSTRACT

The main aim of the projected work is to design an AI based technologies to estimate and identify the amount of soil moisture which can be controlled to accomplish the exponential rise of demands in agriculture resources. In projected, article, we utilize the data attained from the sensor that is managed by using AI and improvement reason for observing. The determination of moisture in soil gives a variety of analysis indicating in what way soil conditions can transformed over a particular duration. The utilization of inexpensive devices lower down the production and maintenance price and also increase the crop productivity, which can be an ideal solution in rural areas for many farmers and industries. However, one cannot neglect the fact that the excess utilization of technologies in the agriculture lands may reduce the soil fertility and maintenance price. The poor education in farmers, environmental damages and security are some important concerns which needs to be analyzed. Poor performance due to installation of devices, immoderations weather circumstances is few challenges of the projected work. In future, the utilization of robots, satellite images, GPS technologies can be integrated with AI and IoT. Further, mobile and best techniques to the projected automation signify the future opportunity.

Keywords: Harvesting, Farming, AI, GPS

1. INTRODUCTION

In the existing situation, the agricultural structure aspects enormous compression to encounter the demands of farmers. Due to the increase in population, it is becoming difficult for the agriculture sector to execute its services efficiently to the farmers [1]. We see that conventional agriculture is being digitized, but the agricultural sector is not yet fully digitized into smart agriculture. In agriculture sector, it is important to enhance the infrastructure and put through an innovative applied science for smart farming, empowered by essential advanced services to drive home an efficient promise which is needed to attain healthier farming attention, participation and functioning competently. With the bearing out of horticultural AI, ranchers can investigate climate conditions, temperature, water use and soil conditions gathered from their homestead to settle on educated choices on business decisions - like deciding the most attainable harvest decisions that year or which cross breed seeds diminished waste [2]. AI executives' role in enhancing crop quality and accuracy is a business style called precision horticulture. It uses AI innovation to help differentiate between infections among plants, bedbugs and impotent plant foods on farms. Artificial intelligence sensors can identify and target weeds while choosing the herbicides to be applied inside the appropriate substrate - stop the use of herbicides and stop the opposition to herbicides. Farmers use AI to improve horticultural accuracy through the development of probabilistic models for occasional identification [3]. These mannequins can look, a very long time ahead and use the data collected to provide ranchers with base forecasts for the most appropriate yield assortments for the time of year, the ideal planting times and countries. The progress of agrarian AI could then improve the ranch board of directors by collecting choices with respect to the climatic designs expected in the coming season. The precise calibration is at the base of another horticultural AI device: the danger to the board [4]. Totally alone, AI and AI are magnificent devices to reduce the blunder in organizations interact, and breeders exploit the estimate and prescient investigation to reduce the risk of disappointing returns. The development of a practical harvest in massive quantities requires a breeder to face enormous financial challenges that depend on well-refined evaluations of horticultural performance to satisfy the orders of the store network. Although environmental and climate prediction is required to a certain extent, many different factors can be controlled on land. Plant settlements, plant stress, water system, the planning of the territory and the control of irrigation are overseen by the collection of its data to feed the forecast calculations that determine the choices for the harvest of the year [5]. Risk that contributions and calculations made by senior managers will be used to decide on monetary models, item costs, the Commission's inventory network, whether a producer should use the government's protection and minimum return conditions. Man-made reasoning depends on the principle that human cognition can be characterized such that a machine can without much of a stretch copy it and perform errands, from the most straightforward to those that are significantly more mind boggling. The aims of the consciousness created by man integrate consciousness, thought and vision. In [6] the authors examined the miniature regulator-based water system framework which is extremely nice and practical contrasted with other traditional techniques, accuracy water system approaches have been keyed out in [7]. Frame for intelligent water system with raspberry pi help and Arduino was offered in [8]. The attack of the water supply system based on a micro-controller was presented in [9], the location of the farm bugs with the avail of the ultrasonic sensors is shown in [10]. Complete water engineering using IoT was proposed in [11]. Computerized soil control learning methods were provided in.

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As a matter of primary importance, we should take the information from five floor humidity sensor-sensors, LDR sensor, temperature sensor, DHT 11 adhesion sensor and ultrasound sensor. These sensors provide the Arduino with information. Arduino takes the essential choice/ activity, and further educates about the esteem of the sensor and its important activities for the breeder through the cell phone of the breeder by message with the help of the GSM module. In Figure 1combination of equipment created is presented.

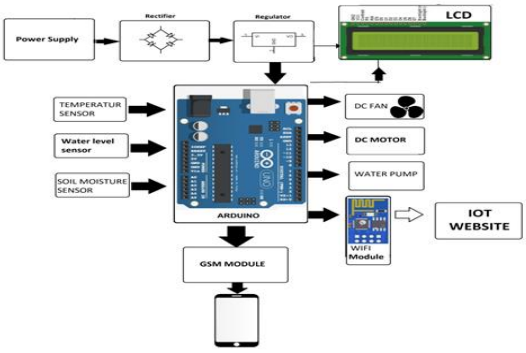

Fig 2. Projected System

3. SIMULATION ANALYSIS

The proposed practice implements the concept of IoT in agriculture using intelligent sensors to make agriculture a more intelligent field. The main aim of the task is to collect data of multiple nodes and to process this information. Manufacturers will be able to regulate actions remotely via a mobile application as well as access accounts via a cloud. The project design is to generate centralized investigation and regulator of agricultural land. This can be held and operated from any wireless location with the help of a mobile device. The request operator can device important amenities of accretion of ecological, loam, fertilization, and irrigation statistics; mechanically assistant such numbers and filter -out specious statistics from the vision of evaluating crop enactment; and number crop estimates and modified product recommendations for several discerning farm by using the application. Of all the necessities for cultivation, the water system has the main task to carry out which is why the examiner focused on the maintenance of water through the ground. This soil moisture sensor has been used. For efficient execution to complete the productive results agent has arrangement of tests utilizing the soil moisture sensor. On the off chance that the water level was underneath as far as possible (without water) the water siphon consequently exchanged on until it came to the necessary level appeared in Figure 2. On the off chance that the water level was up to as far as possible (normal water) it stayed in aloof mode appeared in Figure 3.

Fig 2. Incorporation of flora and soil

Fig 3. Excess water in shrub

Table 1 indicates the analysis of the data received in Line of Sight (LOS) and Non-Line of Sight Conditions (N-Los). We also compare the projected work with different work studied in the past. By determining the moisture level, the need of watering can be defined. If the moisture is less than 70% than there is a requirement of watering and If moisture is more than 70 % than there is no need of watering.

Table 1. Investigation of the collected data

S.No	Statistics Moisture	Moisture Obtained	distance (m)	Time (Sec)	References
1	75	75	05	4.7	[12]
2	56	56	05	6.8	[13]
3	70	70	05	6.3	[14]
4	9.4	9.4	05	0.52	Proposed work
5	5	5	05	0.672	Proposed work
6	9	9	05	0.72	Proposed work
7	92	92	05	5.72	Proposed work
8	100	100	05	5	Proposed work

4. CONCLUSION

The demand in requirement of of agricultural product is increasing day by day due to the ex-potential growth of population across the world. The connection among the soil, farmers and farming field is composite. It is a tough task for the farmers to get well along the use of advanced technologies in farming. The use of advanced technologies will also help to increase the production of the crop. The primary objective of the projected work is to implement an AI based IoT model to determine the moisture at different environment. Smart farming based on Internet of Things (IoT), artificial intelligence (AI), microcontroller and so on. The AI based smart farming includes sensors, camera and multiple smart devices to give the analysis of all the action comprise in farming. The current paper casts a dream of how matched areas of horticulture can be fed using AI. In addition, it examines the thoughts controlled by AI for the future and the difficulties foreseen for the future. The information related to the amount of moisture is estimated. It is also observed that the total time taken to processed the data from transmitter to receiver is also reduced which is 0.48 sec for line of sight (LOS), 0.69 sec, 0.69 sec, 4.95 sec and 6 sec for non-line of sight (N-LOS). Hence, it is concluded that the farmers will receive the information about the moisture quantity in rapid manner irrespective of the environment conditions.

REFERENCES

[1] M. Taneja and A. Davy, "Resource aware placement of IoT application modules in Fog-Cloud Computing Paradigm," 2017 IFIP/IEEE Symposium on Integrated Network and Service Management (IM), Lisbon, 2017, pp. 1222-1228.

[2] N. K. Giang, R. Lea, M. Blackstock, and V. C. M. Leung, “On Building Smart City IoT Applications: A Coordination-based Perspective,” In Proceedings of ACM SmartCities 2016, New York, NY, USA, Article 7, 1–6.

[3] H. Gupta, A. V. Dastjerdi, S. K. Ghosh, and R. Buyya, ‘‘iFogSim: A toolkit for modeling and simulation of resource management techniques in Internet of Things, edge and fog computing environments.’’, Softw Pract Exper. 2017; 47: 1275– 1296.

[4] J. He, J. Wei, K. Chen, Z. Tang, Y. Zhou and Y. Zhang, "Multitier Fog Computing with Large-Scale IoT Data Analytics for Smart Cities," in IEEE Internet of Things Journal, vol. 5, no. 2, pp. 677-686, April 2018.

[5] F. Viani, M. Bertolli, M. Salucci, and A. Polo, “Low-cost wireless monitoring and decision support for water saving in agriculture,” IEEE Sensors J., vol. 17, no. 13, pp. 4299–4309, Jul. 2017.

[6] J. G. Jagüey, J. F. Villa-Medina, A. López-Guzmán, and M. A. Porta-Gándara, “Smartphone irrigation sensor,” IEEE Sensors J., vol. 15, no. 9, pp. 5122–5127, Sep. 2015.

[7] G. Kavianand, V. M. Nivas, R. Kiruthika, and S. Lalitha, “Smart drip irrigation system for sustainable agriculture,” in Proc. IEEE Technol. Innov. ICT Agricult. Rural Develop. (TIAR), Chennai, India, Jul. 2016, pp. 19–22.

[8] Z. H. Qian and Y. J. Wang, “The research of technique and application of Internet of Things”, Acta Electronica Sinica, vol. 40(5), 2012, pp. 1023-1029.

[9] Duan Yan-e, “Design of Intelligent Agriculture Management Information System Based on IOT,” in Proc. Fourth International Conference on Intelligent computation technology and automation, 2011.

[10] O. Elijah, T. A. Rahman, I. Orikumhi, C. Y. Leow and M. N. Hindia, "An Overview of Internet of Things (IoT) and Data Analytics in Agriculture: Benefits and Challenges," in IEEE Internet of Things Journal, vol. 5, no. 5, pp. 3758-3773, Oct. 2018.

[11]. C. Brewster, I. Roussaki, N. Kalatzis, K. Doolin and K. Ellis, "IoT in Agriculture: Designing a Europe-Wide Large-Scale Pilot," in IEEE Communications Magazine, vol. 55, no. 9, pp. 26-33, Sept. 2017.

[12] E. Navarro, N. Costa, A. Pereira, “A Systematic Review of IoT Solutions for Smart Farming”, in Sensors. 2020; 20(15):4231.

[13] C. Mouradian, D. Naboulsi, S. Yangui, R. H. Glitho, M. J. Morrow and P. A. Polakos, "A Comprehensive Survey on Fog Computing: State-ofthe-Art and Research Challenges," in IEEE Communications Surveys & Tutorials, vol. 20, no. 1, pp. 416-464, Firstquarter 2018.

[14] N. K. Giang, M. Blackstock, R. Lea, and V. C. M Leung, “Distributed Data Flow: a Programming Model for the Crowd sourced Internet of Things”, in Proceedings of ACM Middleware Doct Symposium 2015, New York, NY, USA, Article 4, 1–4.

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