



Title: Internet of Things for Smart Farming: Measuring Productivity and Effectiveness

Authors:

Muhammad Bilal email: bilal679.edu@gmail.com 1
 Muhammad Tayyab email: tayyabsultan.pak@gmail.com 1
 Ali Hamza email: alihamza29100@gmail.com 1
 Kiran Shahzadi email: bsf2005078@ue.edu.pk 2
 Farva Rubab email: farvarubab9@gmail.com 3

Address:

(Department of Agriculture, Forest and Range Management, Bahauddin Zakariya University, Multan 66000, Pakistan) 1, 2, 3
 (Department of Zoology, Education University of Lahore Multan campus, Multan 66000, Pakistan) 4
 (Institute of Botany, Bahauddin Zakariya University, Multan 66000, Pakistan) 5

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Introduction

- The aim of the Internet of Things (IoT) is to connect and share data among different physical and digital devices.
- The Internet of Things (IoT) has changed agriculture, improving profitability and ecological.
- Profitable, ecologically beneficial, conserving water resources, and ensuring a resilient and diverse ecosystem are all benefits of smart agriculture.
- In order to meet the population's growing demand for food, smart agriculture uses sustainable agricultural methods.
- The best irrigation operation is achieved by smart farming, which employs cutting-edge technologies in the fields.
- Precision farming has the ability to further reduce the effects of global warming by addressing runoff issues, pollutants, and the use of less pesticides and fertilizers on agricultural goods.
- Farm management, animal monitoring, water control, greenhouse control, drone use, and automated farm equipment are a few of the farming applications for IoT.

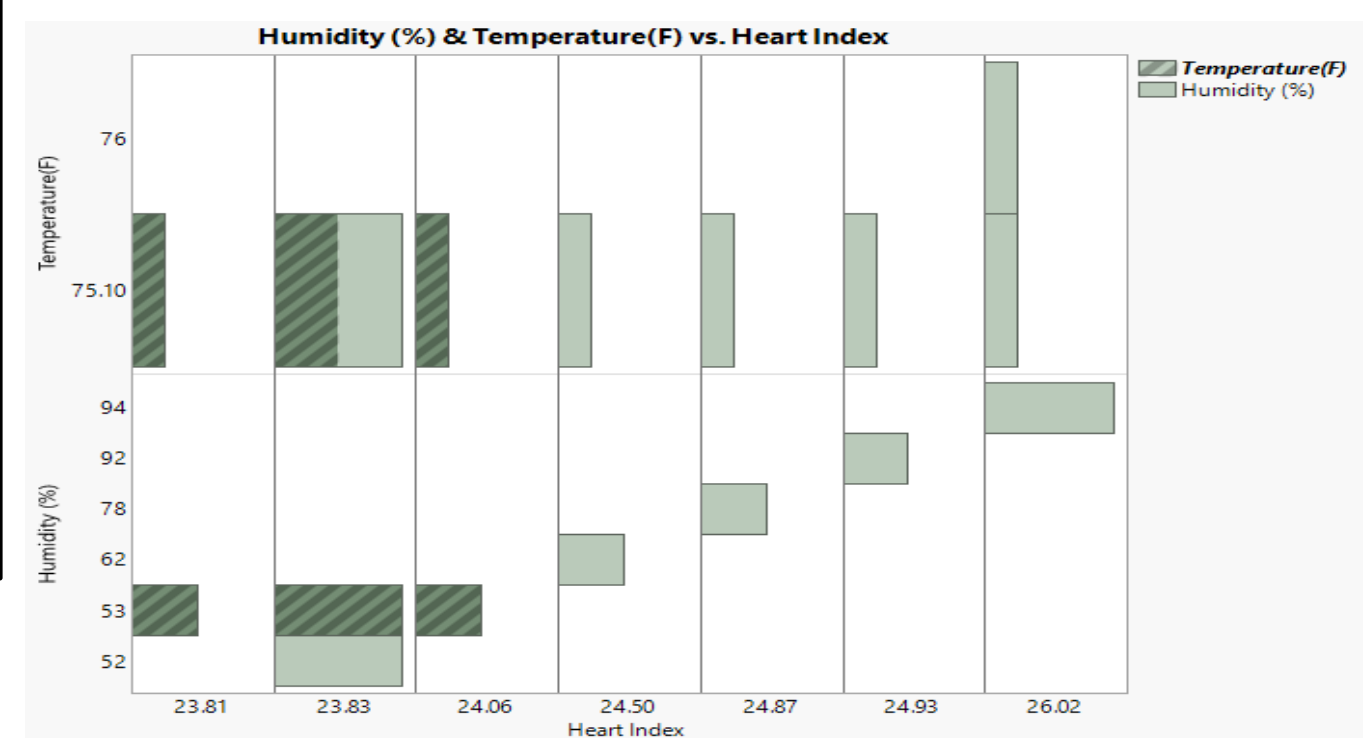
Result

- Innovative techniques based on sensor and IoT technology increase crop output more than traditional agricultural practices
- Indoor agriculture produces crops that are less impacted by the environment
- Sensors are utilized in greenhouses to detect and keep track of interior characteristics
- IoT makes it feasible for farmers to communicate directly with consumers to increase farming's efficiency and profitability
- Vertical farming (VF) is possible maintaining plants in a highly controlled environment, considerably lessening the use of resources while simultaneously boosting output.

Methodology

- IoT-based smart farming monitoring system for crop farming
- Sensors gather information on air humidity, temperature, and light intensity
- Raw data is sent to a cloud platform for analysis and farmers receive notifications via email, SMS, or mobile app
- Three levels of IoT architecture: perception, network, and application
- IoT-based solutions have the potential to increase crop output, manage diseases, and improve the quantity and quality of crops.
- The network layer of IoT utilizes gateways, routing and switching functions, Wi-Fi, Bluetooth, and other technologies to route data across the internet.
- The development of mobile and communication technologies, IoT, and cloud computing enables the creation of low-cost solutions and applications in smart farming.
- IoT-based solutions have the potential to increase crop output, manage diseases, and improve the quantity and quality of crops.

Using IoT	Agriculture Application	advantages for agriculture
WSNs: Sensor nodes capable of radio communication	sensors collaborating to monitor various physical characteristics	data from sensors can be easily managed and collected
Internet-based computing known as "cloud computing" or "on-demand computing"	access to a pool of computer resources and data on demand for PCs and other devices	Maps of agricultural fields and cloud storage are two examples of data produced using cloud computing services that are simple to maintain and gather.
Massive Data Analysis: The study and analysis of enormous data sets	a variety of data types are accessible	Learn about market trends, customer preferences, and other crucial information.
A computer system called an embedded system comprises of both hardware and software	The system performs certain tasks, such as efficiently coordinating various processes and keeping tabs on and controlling them.	Production costs might be drastically reduced, increasing profitability and sustainability.
IoT systems rely on communication protocols to allow connectivity	Several different types of data sharing are made possible by these protocols for data transfer via the network.	Simple management of enormous volumes of data gathered from sensors and cloud computing, cloud storage, etc..



Conclusion

- IoT technology has greatly benefited the farming sector by enabling remote data collection, smart objects, and automation of agricultural processes.
- The use of remote sensors such as temperature, humidity, soil moisture, water level sensors, and pH value can help farmers conduct precise and useful agriculture.

