A DIRT-FREE METHOD OF GROWING VEGETABLES CALLED HYDROPONICS THAT USES SUPPLEMENTAL, HIGH-TECH WATER

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Abstract
Recent years have seen a number of mechanical advancements in the horticulture industry. One of these is hydroponic farming, a dirt-free method of growing crops with added modern water. While there are a variety of preferences for hydroponic cultivation, the methods are more complicated than those used for conventional cultivation. Due to the developing contained components, framework dissatisfaction is more likely to occur. To efficiently examine and research the framework, a mechanized information security framework (DAQ) based on Arduino was developed. The design, creation, and alignment of the DAQ framework, which can record six different developing circumstances including air temperature, relative humidity, water temperature, water level, pH level, and light power, are shown in this study. Results indicated that the sensors were appropriatelyaligned and exact dependent on standard instruments. Also, plot bends of every parameter were created from the gatheredinformation in the framework.
Keywords: Smart farming, hydroponics,data acquisition system, Arduino

INTRODUCTION

Growing crops and vegetables is not an easy task, and hydroponics makes it even more difficult. The attainment or disappointment of the yield may be influenced by a variety of internal and external factors. The traditional, ineffective, and manual methods of determining what factors affected yield quality includes perception and human estimations. In a time where information is instantly available, accurate information selection and introduction are crucial to maintaining the credibility of the agricultural system. Realities and measurements have been brought together in this resource for research or reference. When all is said and done, data is a must to produce sponsored up and conclusive outcomes that might significantly increase production quality. Most operational exercises will be accomplished through machines wherein people still partake all the while. Through the coordination of savvy cultivating, yield is additionally improved and augmented because of the presence of enormous information and keen cultivating thatincorporates a few computerized innovationsto limit human intercession [2]. The development of enormous information has upset the movement of things on the planet today. Huge information is informational collections that are so huge and complex that customary information handling application programming is lacking to manage them. The investigation of huge information is full of both negative and positive potential.

EXISTING METHOD

Hydroponic cultivating has made a fewleaps forward in the cutting edge and urbancultivating scene. Brilliant cultivating haslikewise been consolidated in various cultivating techniques so as to improve horticulture through present dayinnovations. Huge advancements have beenmade by incorporating brilliant cultivatinginto hydroponic frameworks. Thus, a lot ofgathered can be broke down by a WirelessSensor Network (WSN) by sending information to the cloud and controlling qualities, for example, temperature, light, stickiness among others [12].

The Internet of Things (IoT) allude to a system of articles, gear, vehicles, structures, and other electronic detecting gadgets including programming for interfacing into the system for data trade. The IoT's gadgets contain Radio Frequency Identification(RFID), different sensors and processing notes. The framework needs to have a web association for the transportation of information between gadgets. The converging of the physical world with PC frameworks and virtual assets accessible on the Internet offer some benefit included data and functionalities for end-clients [13]. At present, ranchers need agrarian data and appropriate information to settle on choices and to fulfill educational needs. Through Information and Communication Technology (ICT), rancher enquiries can be tended to so as to enlarge cultivating openings. Since hydroponic cultivating has been demonstrated to be a practical type of cultivating, the expansion of brilliantinnovations pushes its supportability further by being low maintenance and high return that is best reasonable for urban conditions. Urban ranchers can continue with their bustling calendars while keeping up their harvests at the palm of their hands as a resultof IoT.

PROPOSED METHOD

The objective of the information obtaining framework was to naturally quantify and logdistinctive developing conditions in theoutside hydroponic framework. The Arduino-based information lumberjack was intended to gather six unique parameters utilizing five sensors, store the informationin a SD card, and show framework execution continuously. Distinctive developing conditions required various sensors. A DHT11 sensor was utilized for surrounding temperature and relative moistness, one-wire water temperature sensor for store temperature, pH Pro Meter Sensor for repository pH level, ultrasonicrunning sensor for supply water level, and photograph resistive sensor for light force. ADFRobot Arduino Mega 2560 was utilizedas the microcontroller.

HARDWARESYSTEM

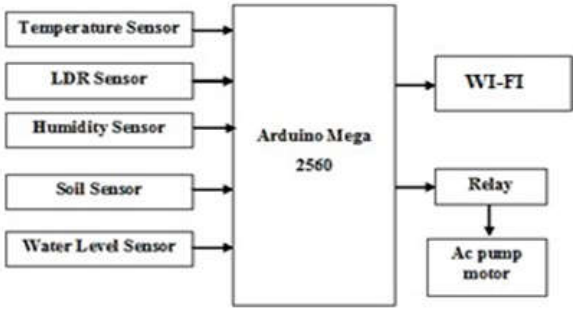

Fig.1. Block Diagram

Information obtaining is the way toward testing signals that measure certifiable physical conditions and changing over the subsequent examples into computerized numeric qualities that can be controlled by a PC. Information obtaining frameworks, truncated by the abbreviations DAS or DAQ, commonly convert simple waveformsinto advanced qualities for preparing. Theparts of information procurement frameworks include: Sensors, to change overphysical parameters to electrical sign. Signalmolding hardware, to change over sensor signals into a structure that can be changed over to advanced esteems. Simple to- advanced converters, to change over adaptedsensor sign to computerized esteems.

RESULT

The information procurement frameworkwas modified to log information at regular intervals. An aggregate of 7602 information focuses was gathered during 27-day developing period.

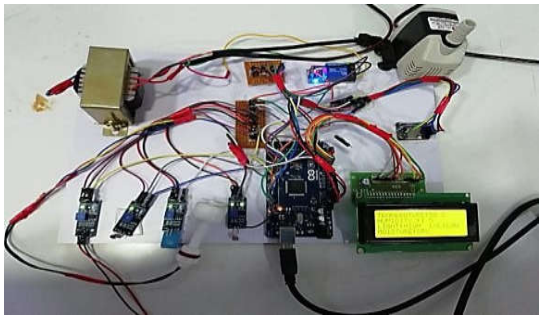

Fig.2. Irrigation Field Unit Model

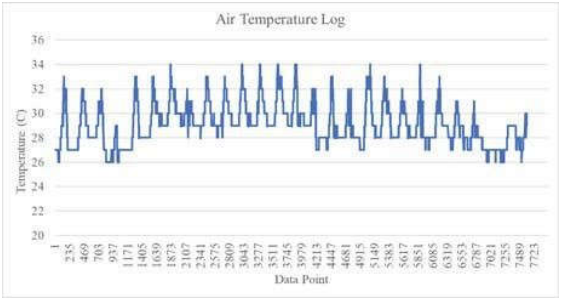

Fig.3. Air Temperature Log from DAQ

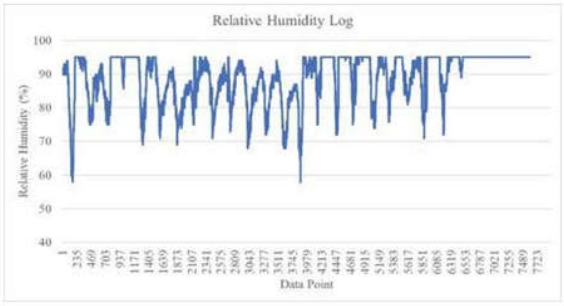

Fig.4. Relative Humidity Log from DAQ

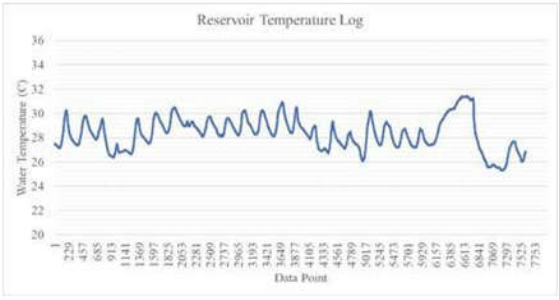

Fig.5. Reservoir Water Temperature Logfrom DAQ

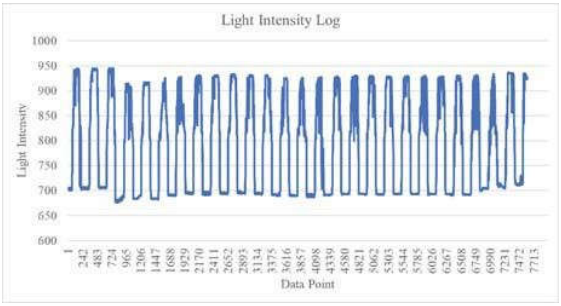

Fig.6. Light Intensity Log from DAQ

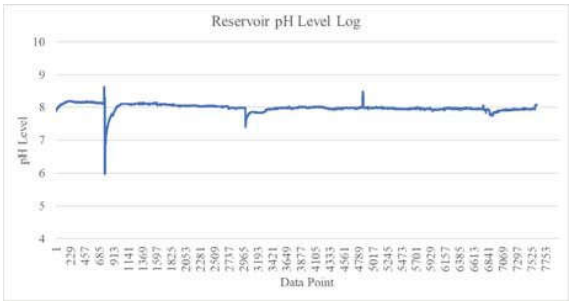

Fig.7. Reservoir pH Level Log from DAQ

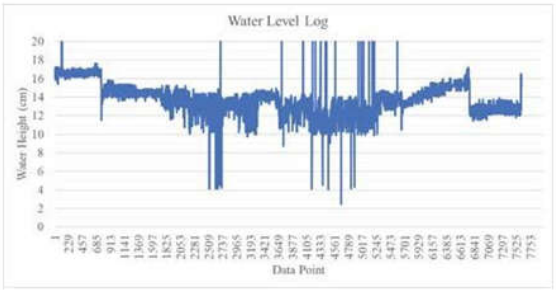

Fig.8. Water Level Log from DAQ

CONCLUSION

The framework for information acquisition was essential to the success of the hydroponic framework since its construction and gathering aided much in the framework's analysis and inquiry. The data gathered by the sensors and stored on the SD card showed how gradually changes in the environment affected the system. This showed how easily the system could check the levels of soil moisture content, the percentage of water used to water the plant, the amount of time the water pump is on, etc. Additionally, we are able to provide a graph of the soil's moisture content. The following suggestions can be considered in order to increase the system's efficacy and efficiency. The option of controlling the water pump can be given to the farmer. The farmer may choose to stop the growth of crops or the crops may get damaged dueto adverse weather conditions. In such cases,the farmer may need to stop the system remotely. The idea of using IOT for irrigation can be extended further to other activities in farming such as cattle management, fire detection, and climate control. This would minimize humanintervention in farming activities.

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