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Smart Agriculture Automation using Sensors

Jyotsna Jagannath Bansode

Komal Mahadev Thorat

Vaishnavi Lalaso Suryavanshi

Chetan Prakash Patil

Sushant Shivaji pati

Abstract

This initiative is primarily focused on using new technologies to improve current farming processes in order to boost productivity. Agriculture fields are watered with help of automated drip irrigation system to ensure that the plants receive the proper quantity of water. This initiative is primarily focused on using new technologies to improve current farming processes in order to boost productivity. This system, which is connected to the mobile application and relays, is built using an Arduino. The recommended design also contains features that allow the system to be cloud-based and wireless, allowing the user to operate the system from anywhere using a mobile device. Reduced water waste and enhanced plant growth are the two key advantages of this system.

I Introduction

Based on survey of Food and Agriculture Organization it is observed that, there must be 60% increase in food production by 2050 to fulfill the requirement of food due to increase in population , which is estimated to reach 9 billion people. Not only better in field monitoring but also better monitoring and management will be required to reduce spoilage and food waste. It is also an industry in desperate need of additional data. With technologies that can dynamically adjust moisture and other data, companies like Clean Glow and Solum have started to bring Big Data to The Field.

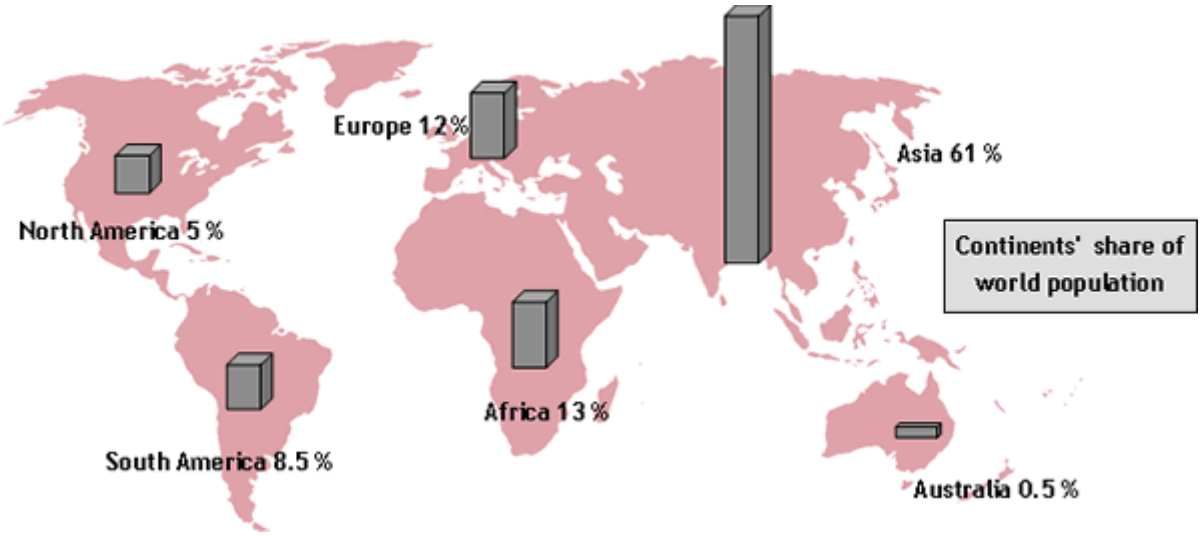


Figure 1 Population share in agriculture

Agriculture is gaining an injection of information & technology thanks to attempts to eat more locally grown food, a new generation of farmers, and lower-cost components. Many technologies are designed to access all sorted data to be captured & analyzed, devices are being controlled over wireless data and network, as the concept of "Internet of Things" becomes more prominent. Ten linked devices, like smart thermostat and lighting system, are finding their way in the households, but agriculture could be other significant new opportunity in IoT field. Temperature, relative humidity, lighting, soil moisture, and CO2 quantity are all important elements for good health of plant growth. Continuous monitoring of these variables provides useful information about the individual effects of the many variables in achieving optimal crop yield.

Objectives

1) To the enhancement of present agricultural methods via the application of contemporary technology in order to increase productivity.
2) Water resource management that is efficient and dependable in agriculture.
3) Provides a smart agriculture model that enables farmers to carry out agricultural operations automatically without the need for extensive manual inspection.

II Methodology and Implementation

Figure 2 depicts the fundamental diagram of the agricultural system. There are four sensors in thesystem, which is an agriculture system. The microcontroller system receives data from these sensors. Analog data is used to feed the microcontroller's input. The controller converts this information into a digital representation. The information is shown on the LCD screen as well as on the Android phone via a mobile application. Temperature, moisture, and other factors are therefore automatically monitored. The embedded system, which is developed using coding, may regulate the parameter values once they have been observed. This is a control system that is automated.

III Result and Discussion

All of the agricultural factors are sensed and measured with the use of appropriate sensors. BLYNKsoftware is used to get the sensed data within the database, as well as to do a comparison analysis based on the sensor data. From time to time, mobile alerts are given to those who are concerned in order to keep them informed about the current state of agriculture. The purpose of the Agriculture Monitoring System is to sense and monitor environmental parameters from a sensor, as well as to stabilize circumstancesif they reach a certain threshold.

The settings are controlled by actuators depending on sensor input. It's possible to accomplish it both automatically and manually. The actuators controlled by the user in the manual mode based oninputs collected via SMS, which is not used in our project. The actuators are regulated in the automatic mode based on the database of the preceding occurrence.

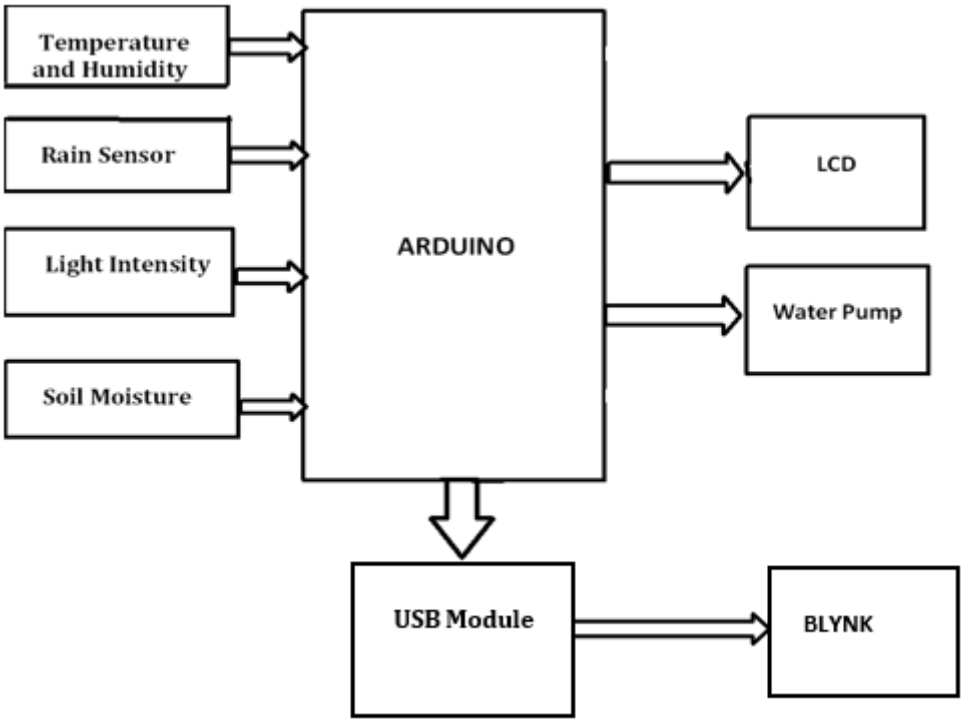
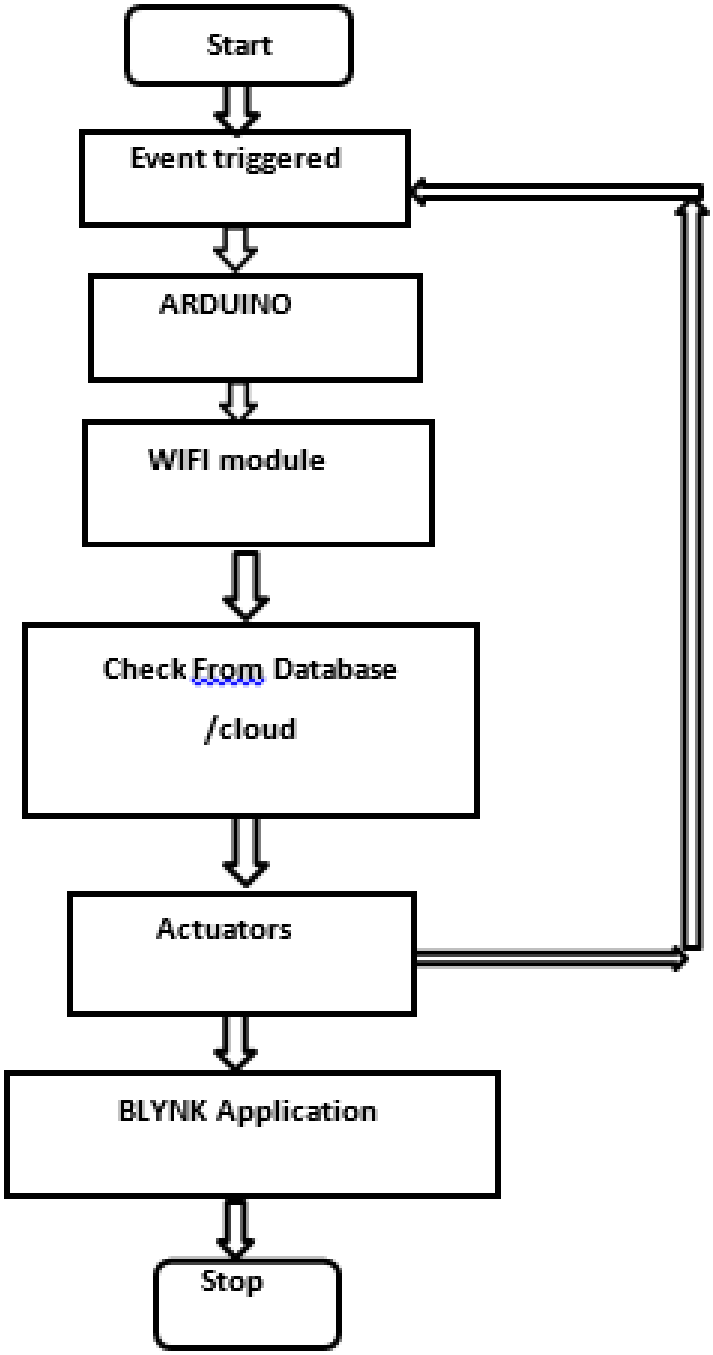


Figure 2 Block Diagram

Flow Chart



The images obtained from agriculture monitoring in BLYNK:

The following image gives the information about the temperature and humidity

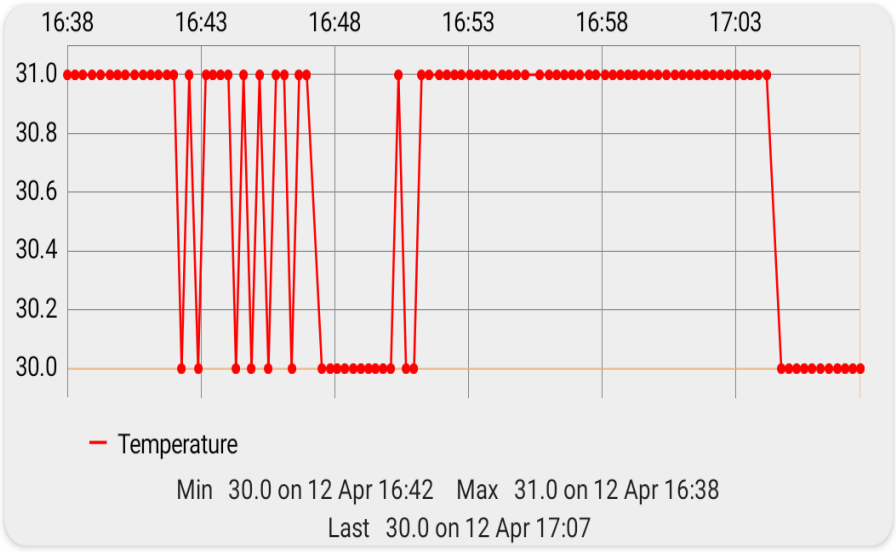


Figure 3 Agriculture monitoring results 1

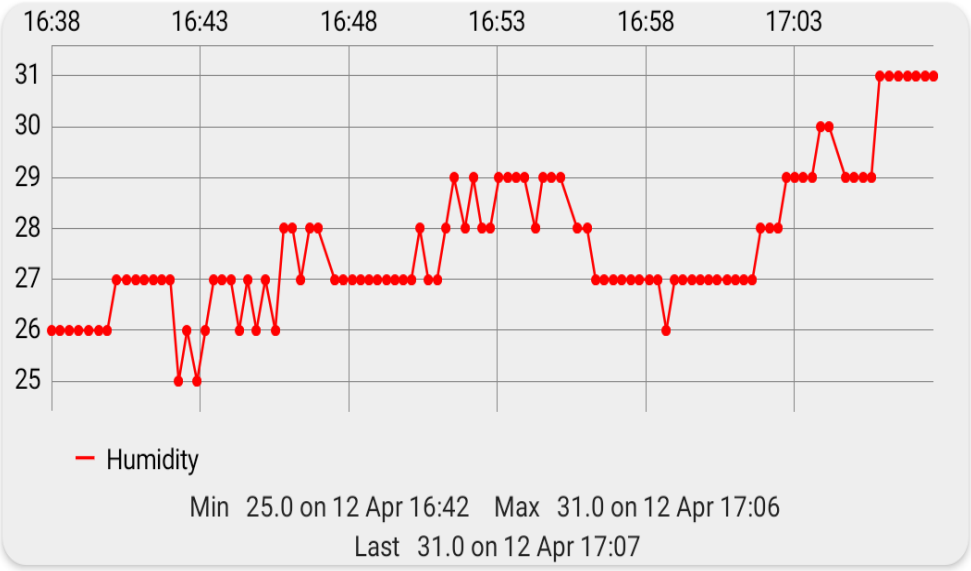


Figure 4 Agriculture monitoring result 2

The following image gives the information about LDR reading

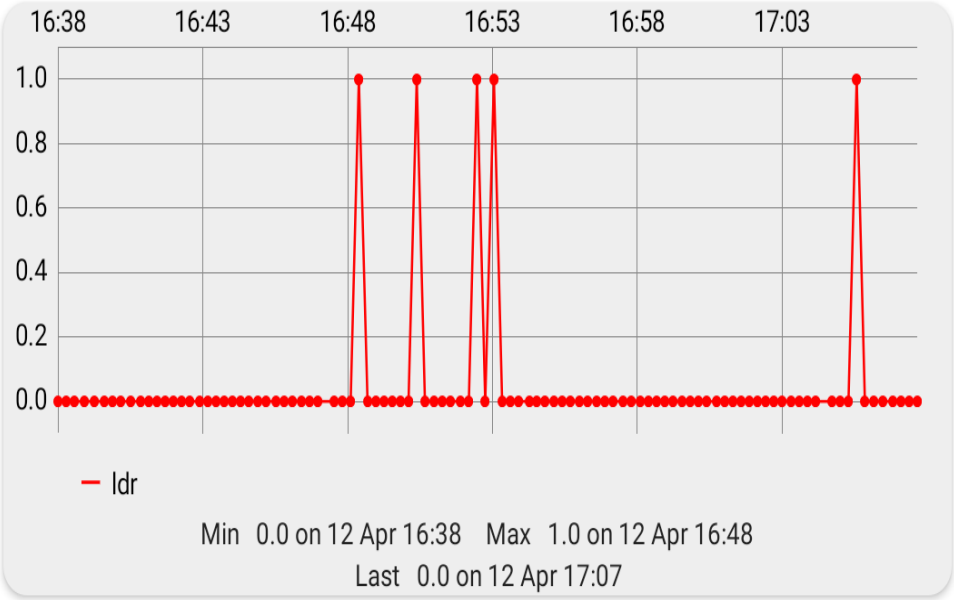


Figure 5 Agriculture monitoring result 3

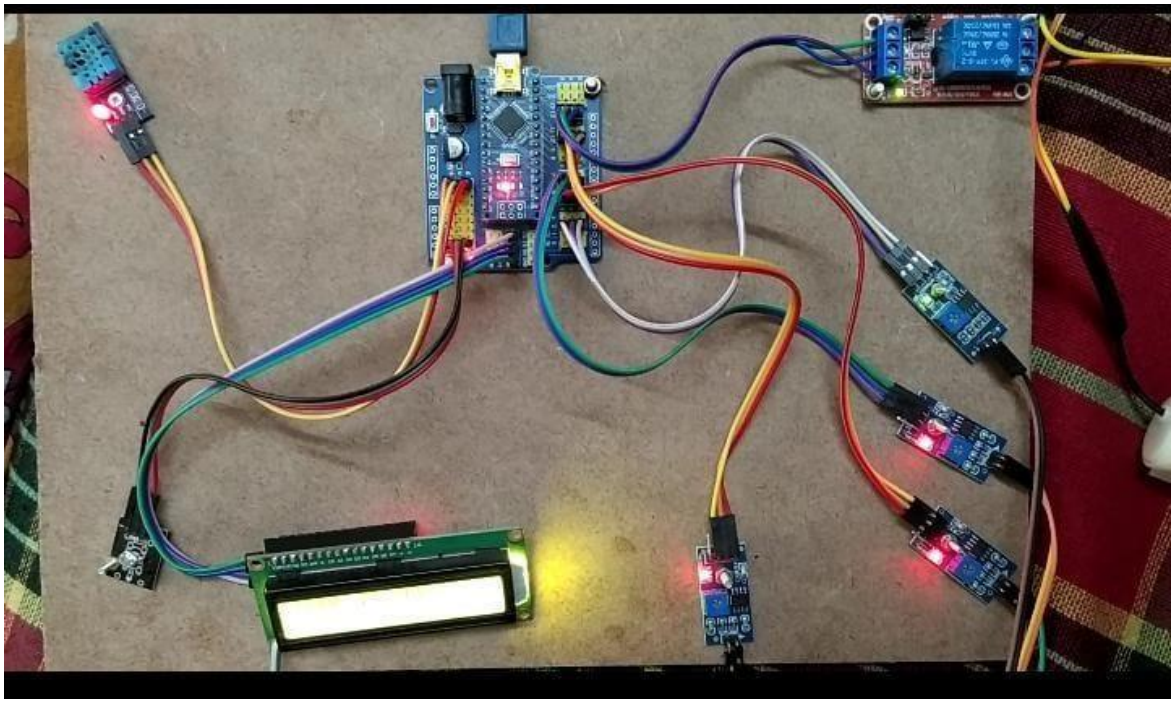


Figure 6 Working model

IV Conclusion

We were able to generate and develop pesticide- and pesticide-free crops using smart agriculture as opposed to conventional farming, a plant-friendly environment. Agriculture, such as selling tube well water, provides an extra source of revenue. Furthermore, this method (Rooftop agriculture) can be implemented by anyone in their home, even if they have no prior experience with farming. It saves the farmer time and effort, making farming a more efficient and profitable occupation. Smart agriculture may be enhanced in many ways and used to a wide range of agricultural applications. The Peltier effect is used to cool autonomous farm equipment that is powered by solar panels and wind turbines. Smart Agriculture has a large scope in the agricultural sector, and produce a change in India's agricultural practises.

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