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Smart Agriculture Using IoT

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ABSTRACT: Smart Agriculture helps to reduce wastage of water and effective usage of fertilizers. In this work, we monitor field conditions from anywhere using sensor. The data from sensors are sent to web server database using wireless transmission. The irrigation is automated if moisture falls below the threshold. The nutrients (n, p, k) are dispensed into farm based on the predicted values. By dispensing regulated amount of nutrients better crop yield is achieved. Farmer would be able to monitor the field conditions from anywhere. To control and bring back the normal saturated conditions by supplying adequate amount of food to each and every citizen in our country. We have to adopt modern digital methods in agronomy.

KEYWORDS: NPK sensor, Temperature sensor, Water pump, LCD, Microcontroller

I. INTRODUCTION

When the ball of fire gets cool and concerned, the earth has formed. The man started his civilization life before 18,000 years ago. Accidentally he has turned into a domestic life by the invention of fire. It leads to cooking and had his different types of food. He started to identify the edible crops from the wild varieties. Thus, the cultivation of crop is originated. The origin of cultivation starts with kingdom eras. Later, he started using tools to prepare the land and he termed the animals in cultivation. This leads the man to start his agriculture technique in crop development. Initially it was done with the help of plough and basic tools. As the population increased, man started thinking of advanced technologies to improve agriculture. Some scientist like Dr. M. S. Swami Nathan brought green revolution in our country. There are different types of revolution such as blue revolution, white revolution and sliver revolution. These are eminent turning point in Indian agriculture system by the continuous increase in population. It becomes population explosion and increasing of industrialization, urbanization and colonization leads to shortage and shrinking of cultivable lands. So that population, flood, famine and starvation are widely spread which are not avoidable. To control and bring back the normal saturated conditions by supplying adequate amount of food to each and every citizen in our country. We have to adopt modern digital methods in agronomy. Introducing this type of intervention of IOT and digital sensors in agriculture practices will enhance the yield of pure line breads.

II. PROPOSED SYSTEM

The project consists of system that will readily give the preference to crops for cultivation, rather than going to agriculture department. When a crop is cultivated in the field it requires periodic irrigation, production of the crops and the humidity of the soil. It consists of set of integrated sensors which will give the data about all the soil parameters which is in necessity to produce high yield. The serious problem that a farmer faces is the unpredictable amount of fertilizers required to feed to the crop.

The installed NPK (nitrogen, phosphorous, potassium) system will give the information about the NPK nutrients value at all time. The proposed system will reduce the use of chemical pesticides and promotes the growth of crops as organic and prevents air pollution.
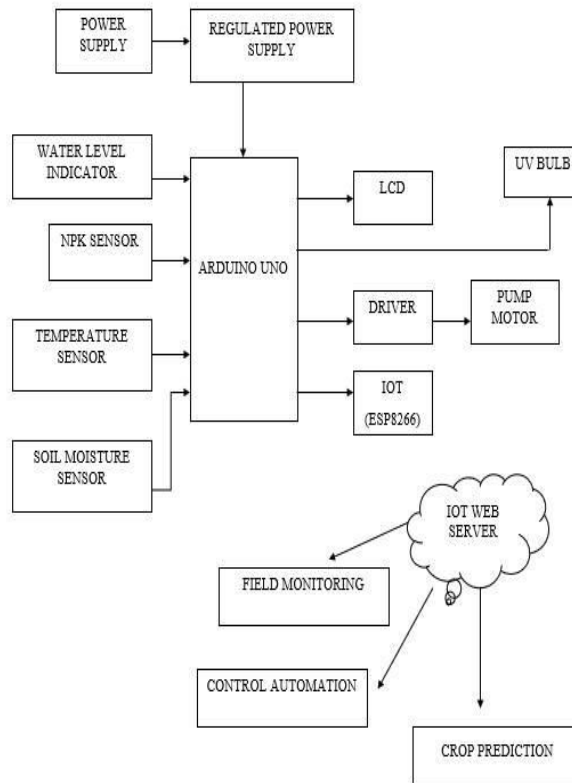
Figure:1.Block Diagram
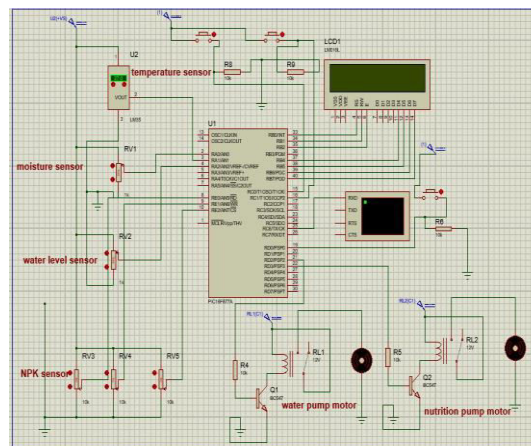
III. SIMULATION PROTOTYPE

Figure:2. Simulation prototype

It is a device that can be operated either manually or automatically. This kind of dual mode can enhance the productivity of crop and continuity functioning of the device. Due to this type of special arrangement the device can be operated without any interruption. Malfunctioning of the device can be rectified immediately by any one of the alternate methods.

A. Proteus 8 Software

ISIS: the acronym of Intelligent Schematic Input System. The program allows us to carry out the electric design of the circuit, including all sorts of components such as resistors, coils, capacitors, power supplies, and even microprocessors. **ARES**: the acronym of Advanced Routing and Editing Software. It's the tool aimed at the design of printed circuit boards or PCBs, with routing, location and editing functions for electronic components.

IV. SOFTWARE RESULTS

The software result is obtained through IOT in web server created in Thing Speak. The farmer has his own login id and password. The data will periodically and permanently in this web server.
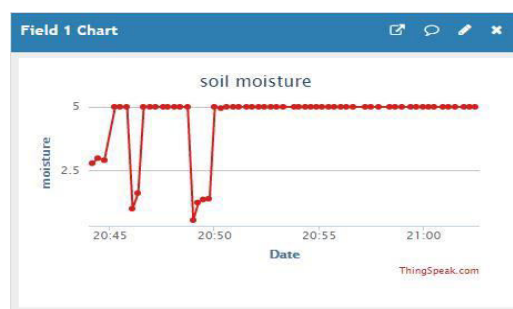
Figure:3. Monitoring moisture sensor data using IoT

Temperature sensor shows a graphical display at regular intervals based on the variation in the atmosphere around the field. With this the optimum level of temperature and the deficient level of temperature can be understood with the help of this graph
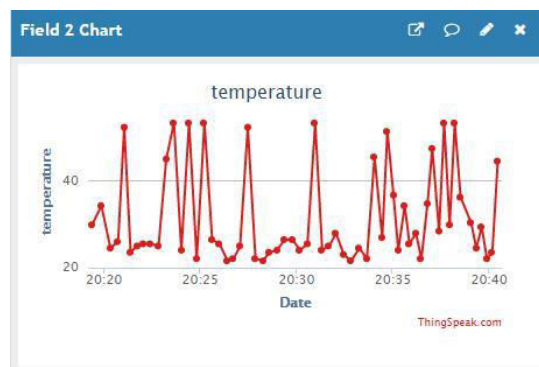

Figure:4. Monitoring temperature sensor data using IoT

The supply of basic nutrients (NPK) is monitored and maintained by NPK sensor. The amount of consumption of individual nutrients such as nitrogen, phosphorous and potassium is shown separately in the graph.

V. HARDWARE IMPLEMENTATION

It is a device that can be operated either manually or automatically. This kind of dual mode can enhance the productivity of crop and continuity functioning of the device. Due to this type of special arrangement the device can be operated without any interruption. Malfunctioning of the device can be rectified immediately by any one of the alternate methods. The hardware prototype shows the entire working process of agriculture automation.
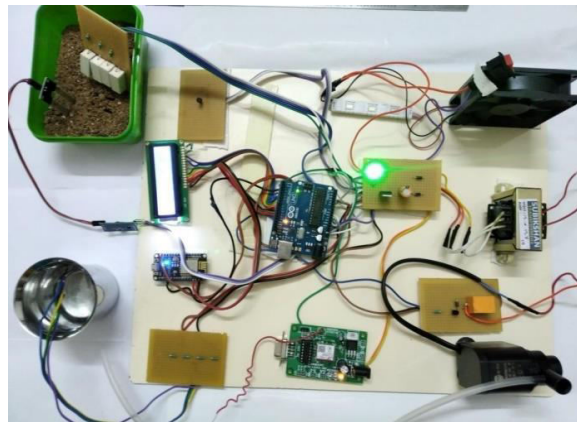
Figure:5. Hardware prototype

When the device is working automatically with the help of button 1, the LCD will display the mode in which it is operating. So that the whole process will be automated and the required amount of water and nutrients to the soil will be monitored and supplied efficiently.

VI. CONCLUSION

The current generation farmers are facing several problems in agriculture and they do not get proper guide to proceed. They had been looking forward to technologies to improve their farming quality and quantity. The IoT and data analysis will be very useful to them and influence their agriculture in the positive way to get precise knowledge in soil parameters. Pure line breeding can be done with this method. Wastage of grains is much reduced. The set of integrated sensor technologies help them to get the information about their field in their hands at any time. This would play a vital role in water management, selecting the appropriate crop for cultivation and also to reduce the use of chemical fertilizer and pesticides. It also promotes the economic level of the farmers. The growth of healthy crop can be developed.

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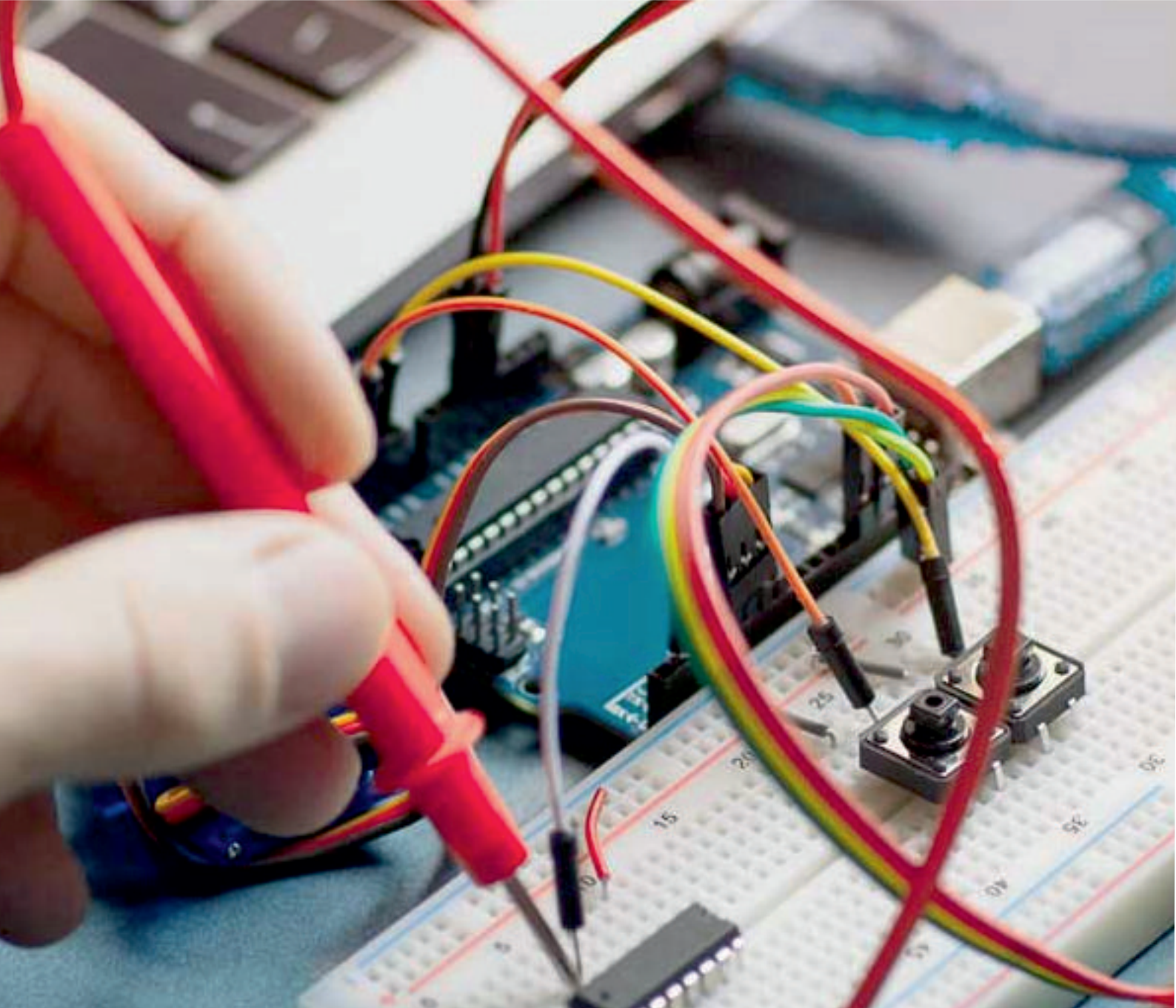
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