RASPBERRY PI BASED E-AGRICULTURE SYSTEM

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Abstract:

The present final project offers sensors-based solutions according to the cheapening of mini-computers and in the line with the recent spreading of IOT (Internet of Things) technologies. The main applications field covered is smart agriculture, where it is sophisticated systems that sense environmental conditions and trigger output devices. For this reason, consequently, a proto-type had been designed. Due to a modern approach to computing and technology that demands different and more intuitive user-interactions, IOT wireless options were also considered, as well as voice compatibility. Finally, this whole project pretends to offer the results of a generic research of the issue, whose conclusions may be only partially exposed in the proto-type.

Key words: - IOT, agriculture engineering, smart devices, control engineering.

I. INTRODUCTION

Internet Of Things (IOT) is a new telecommunication field that is currently growing extraordinarily fast. Its practical purpose is to have control of input devices so that output devices show a reaction, which may happen automatically. For instance, when a presence sensor is activated an IOT system may be able to lock some door or send a notification to a very far place in seconds. For this purpose, telematics, electrical and computing engineering need to co-work in order to fulfil the requirements for a particular project. This project analyses the global situation, exposes some of the main problems encountered and proposes their IOT-based solutions. According to tendency information found at Statista.com, it is also clear an exponential increase in the number of devices related to IOT, which obviously means there is a new global market generated over this idea. Furthermore, it may be inferred that investment on applications related to this field would still be very present in the near future.

II. LITERATURE REVIEW

Proposed a paper in which the sensors having humidity and soil moisture sensors are placed within the root area of the plant. supported the sensed values the microcontroller is employed to regulate the availability of water to the sector. This technique is not helpful to the farmer as it does not tells about the status of sector. paper was proposed during which soil parameters like pH, humidity, and temperature are measured so as to get high outcome from the soil. This process is fully automated which switches the motor pump ON/OFF as per the content of moisture in the soil. Proposed a paper in which photo voltaic cells are used to receive power.

Electricity is not required in this system. The soil moisture sensor is used and supported the sensed values PIC microcontroller is employed to ON/OFF the motor pump. meteorology isn't included in this system. Proposed a system in which drip irrigation using IOT is used. In this humidity, temperature, pH sensors, etc. are used.

A computer is used for the updating purpose of irrigation. Internet is needed for accessing the field condition. Proposed an irrigation system based on Iot which uses network of wireless sensors containing different sensors to measure different components of soil. The system is controlled remotely by web providing a web interface. It has a limitation’s that weather monitoring is not available. Proposed a prototype that takes on sensor information, triggers the actuators and transmits data to the server. It's consisting of photovoltaic panels and has a both side communication link available based on a mobile internet interface that helps in inspection of data and irrigation time is scheduled from web server.

III. EXISTING SYSTEM

Existing system does not provide proper guidance to farmers how to sell the products through online.

The current system does not provide classes to farmers to get knowledge about how operate computer.

The current system does not provide any type of courses to learn basics of how to register into sites, sell crops and transactions. And it does not provide any websites to farmers in their local languages.

IV. PROPOSED SYSTEM

We are designing an IOT based Smart Agricultural System which is based on Raspberry Pi that operate automatically by sensing the moisture content and humidity of the soil. It will also study the rainfall pattern in the particular region by using the Rain Sensor and will switch ON/OFF the pump using relay without human intervention and hence result in saving of water. Soil quality will be maintained with the help of pH sensor which will result in proper enrichment of crops. In this project, we learn about IoT Based Smart Agricultural Aid System using Raspberry Pi. Agriculture sector plays a huge impact in the enhancement of countries which totally depend on agriculture. The issues related to agriculture result in declining the progress of the country. The best solution to this problem is sensible agriculture by updating the current old methods or practice of agriculture.

So, the tactic is making our agriculture more advance using different automation techniques and IoT based technologies. With the help of Internet of Things (IoT) we can have proper crop growth monitoring and selection, automatic irrigation, etc. A Raspberry Pi Based Smart Agriculture Aid System is proposed to modernize as well as improve the productivity of the crop in the field.

BLOCK DIAGRAM & WORKINPRINCPLE

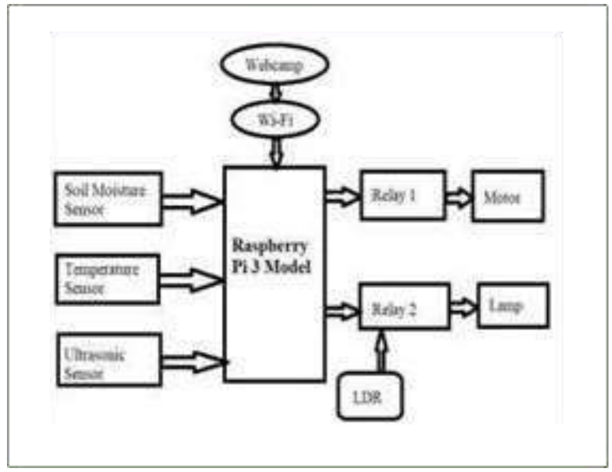

Fig 2: Block diagram

In our project, we are making IoT based Smart Agriculture Aid System by usingsome advance sensors which we can get easily from market. A Capacitive- Soil Moisture Sensor to require to measure moisture content present throughout the soil.A DHT-11 Humidity Temperature Sensor to measure air Temperature and Humidity respectively.

DESIGN STATES

The original idea was to create a simple irrigation system, which is by itself not a new concept. Initially it was thought that a periodical activation of a water pump would be enough. It is true: many simpler solutions use periodical approaches. However, this simple solution is quite limited, as supposes a linear absorption of water, to be periodically supplied. And, of course, this solution takes no environmental conditions into account. It is also evident that air-flow devices were needed too, which, at the beginning, would be thought to be turn on periodically, with the limitation of conceiving stationary conditions of the environment.

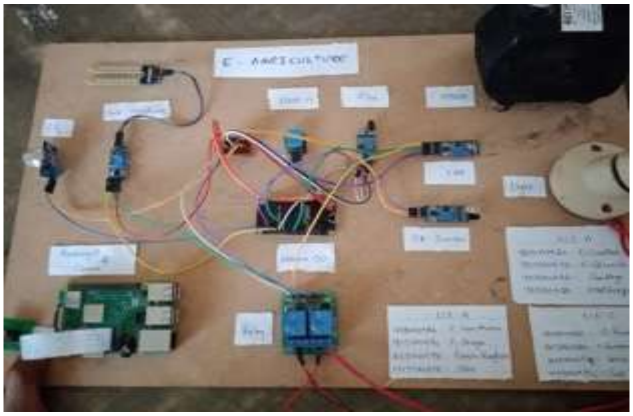

Fig: Sample Design

The next conception of the project understood that sensing was needed. This refers to extracting soil and environmental characteristics by means of sensors so that the different output devices switch automatically, as an autonomous system. The simplest sensing considers both the Soil Sensor and the Environmental Humidity and Temperature device (DHT22). This purpose could be achieved by means of a microcontroller with GPIO pins. However, soil sensor delivers analog signals, while DHT22 uses digital signals.

Raspberry Pi was the first important element to be introduced. Its GPIO structure supports the reading of digital signals, so that the Humidity and Temperature Sensor was able to be directly connected. As for the Soil Sensor, many of them are sold together with a tiny circuit that allows the output of both digital and analog readings. This digital output returns a high voltage whenever a potentiometer- controlled threshold is surpassed, so that a Dry/Wet binary information was available. Never the less, obviously the digital signal created by the threshold does not describe the data as well as with analog readings. For this reason, it was necessary to consider the best way to incorporate both digital and analog sensors, for the previous and also nest sensors.

E-AGRICULTURE

e-Agriculture is a global Community of Practice, where people from all over the world exchange information, ideas, and resources related to the use of information and communication technologies (ICT) for sustainable agriculture and rural development. e-Agriculture Community is made up of over 12,000 members from 170 countries and territories, members are information and communication specialists, researchers, farmers, students, policy makers, business people, development practitioners, and others. Members have a common interest that brings them together, that of improving policies and processes around the use of ICTs in support of agriculture and rural development, in order to have a positive impact on rural livelihoods. Our Mission is to serve as a catalyst for institutions and individuals in agriculture and rural development to share knowledge, learn from others, and improve decision making about the vital role of ICTs to empower rural communities, improve rural livelihoods, and build sustainable agriculture and food security. How and why do we do it? We achieve all this by working together - with partners around the globe. e- Agriculture is all about knowledge exchange between UN agencies, governments, universities, research organizations, NGOs, farmers' organizations, private sector, and the wider community. We recognize that, in its simplest form, knowledge exchange is about starting constructive dialogue. That is why one of the most popular activities is the e- Agriculture Forum Discussions. Topics are demand driven, and lead by partner institutions who specialize in different areas of e-agriculture.

Although ICT activities and other related initiatives to bridge the rural digital divide existed around the world, the e-Agriculture Community (and the term "e- agriculture") came into being after the World Summit on the Information Society in 2003and 2005. It was clear to the WSIS global participants that when addressing the challenges that face the digital divide, especially in a rural livelihoods' context, problems go beyond just technology. It is a multi-faceted problem of ineffective knowledge exchange and management of information content, as well as the lack of human resources, institutional capacity, and sensitivity to gender and the diverse needs of different groups. With WSIS participants identifying and naming "e-agriculture" as a key action line to address the Millennium

Development Goals, the Food and Agriculture Organization of the United Nations (FAO) was assigned to lead the development and subsequent facilitation activities that would truly engage stakeholders at all levels. Bringing together a group of Founding Partners in 2006, the e-Agriculture Community officially launched in 2007. Today, the e-Agriculture Community of Practice is still growing and supporting its members and the communities with which they work daily.

V. RESULTS

By using of e-agriculture can lead to greater efficiencies in agriculture extension, disaster risk management and early waring systems, enhanced market access and financial inclusion, as well as capacity development among rural communities, resulting in better market information for producers, lower transaction costs.

VI. CONCLUSION

There is concern that agricultural production in developing countries will cause environmental threats in the future, as production will have to increase to satisfy the growing demand for food. Intensification leads to high inputs of nutrients in the form of mineral fertilizers and animal feed. Important parts of these inputs leak from the system in the form of nutrient leaching to groundwater and gaseous losses to the atmosphere. Pressure on the existing agricultural land may increase by growing demand for productive land and degradation of the existing agricultural land base. Expansion of agriculture generally leads to massive deforestation. The study presented in this report concentrated on the interactions between livestock production, crop production and land use.

The link between livestock and crop production is through the demand for animal feedstuffs. This report presents long-term scenarios describing these interactions and the possible consequences for crop production and animal waste production. As the world population is expected to stabilize in the second half of the twenty-first century, the scenarios must cover a period of 50-100 years to include the impacts of human population numbers. Not all environmental consequences can be quantitatively evaluated. World agriculture is currently responsible for more than half of the atmospheric increase of nitrous oxide (N2O), two thirds of the global ammonia (NH3) input into the atmosphere, and 40% of global methane (CH4) emissions.

These compounds play important roles in atmospheric chemistry, ozone depletion, aerosol formation and greenhouse warming.

Therefore, a number of examples were selected to be worked out in detail, including the emission of ammonia (NH3) and nitrous oxide (N2O) from animal waste and mineral fertilizers, as well as projections of the emission of methane (CH4) from ruminating animals. A number of other environmental effects related to livestock and crop production are discussed in a qualitative way.

FUTURE SCOPE

Future agriculture will use sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advanced devices and precision agriculture and robotic systems will allow farms to be more profitable, efficient, safe, and environmentally friendly. The report states that, although demand is continuously growing, by 2050 we will need to produce 70 percent more food. Meanwhile, agriculture’s share of global GDP has shrunk to just 3 percent, one- third its contribution just decades ago. Roughly 800 million people worldwide suffer.

Governments can play a key part in solving the food scarcity issue. They need to take on a broader and more prominent role than their traditional regulatory and facilitating function

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