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ADVANCE WEATHER MONITORING SYSTEM

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Abstract

The system proposed in this paper is an advanced solution for monitoring the weather conditions at a particular place and making the information visible anywhere in the world. The programmer behind this is the Internet of Things (IoT), which is an innovative and powerful solution for connecting things to the Internet and connecting a network to the whole world of things. There may be stuff like computer gadgets, cameras, and electronic automotive equipment here. The system manages monitoring and keeps track of temperature, humidity, speed and direction of the wind, amount of rainfall, etc. The machine shows these readings on a monitor in real time. It also keeps track of hourly and daily historical details. This information can be displayed on an LCD and sent to the web page and then plotted as graphical statistics with the sensor data. The modified data from the deployed framework can be accessible from anywhere in the world on the internet.

Keywords: *IoT, Weather, Monitoring, GSM, Sensor*

I. INTRODUCTION

India still occupies the second position in the list of most populated countries in the world. It is also predicted that by 2030, India will surpass China to occupy the first place in terms of population. The day is not far away when we would have to cultivate our own crops or vegetables to survive if the present situation of Indian agriculture prevails. India, as an agricultural country, has been shown to be unable to meet the growing demand for agricultural products due to an exponential population growth. There are very damaging repercussions for Indian agriculture from the population explosion[1]. As shown in the report, agricultural land is decreasing alarmingly due to the rise in population and urbanization. In the current sense, at least for Indian farmers, agriculture is not proving to be a profitable and sustainable option. The new agricultural practices, despite the hard work, do not produce the desired results in favor of farmers. Farmers are under a great deal of pressure to meet the ever growing demand for agricultural products, while resources such as water, machinery and equipment are scarce (high cost). In addition to these factors, Indian agriculture is also affected by current climatic

conditions, such as humidity, wind speed and humidity levels, which play a significant role in crop development. Population control and climate control, at least in the near future, tend to be insurmountable[2].

The alternative to this would be to establish a forecast of low-cost weather and monitoring systems to provide farmers with central, real-time climatic and prevailing weather conditions so that most of the farming tasks can be carried out in a timely manner, thus preventing untimely losses. One of the earliest weather station implementations was generated with serial communication. The job, based on serial communication, showed the implementation of the weather system. Then the research work developed on using GSM and Ethernet modules with the Internet access alternative. Humidity, temperature, rain, solar radiation and UV radiation were controlled as parameters. The ZigBee communication technology is well associated with automation and its low-data rate capability makes it as good choice for PA systems, especially in weather stations, With the ZigBee protocol and Arduino, two such implementations came back-to-back and were able to measure the weather data, including barometric pressure, dew point temperature, air temperature, wind speed and wind direction, relative humidity in the first implementation, while air temperature and humidity values were obtained by the latter. One more research post, with the popularity of ZigBee technology, came up with a mini weather station that provided crop protection against frost and strong winds[3].

The system was controlled by a central station that processes the data from mini stations and as an output it generated alarms well in advance against high amplitudes of frost or winds so that the necessity actions could be initiated. Meanwhile, due to miniaturizations and recent developments in semiconductor technologies, reduced costs, led researchers to make use of wireless sensor networks for sensing the weather parameters. Using wireless sensor networks, the rainfall monitoring system was established and rain gauge measurements were sent via GPS to the public web server. One of the wireless sensor network monitoring system implementations in green houses was created by, in terms of data delivery speeds, some of the parameters such as temperature, humidity and illumination were calculated, the performance and efficiency of the proposed algorithm were done. The design and operation of the data acquisition system, which offers various functionalities to assess irrigation requirements based on weather and soil percolation, may be seen as a similar implementation based on wireless sensor networks. Some researchers thought of making use of non-conventional energy resources into the weather systems. One such work included the construction of a solar powered remote weather station for the measurement of relative humidity and temperature, solar radiation and rain. The established system relied entirely on the energy of the sun, which could cause problems during cloudy and rainy conditions due to the lack of a backup power storage module to ensure that it operates in unfavorable climatic conditions without interruption. In addition to extracting the energy of the sun, it is the necessity of any PA system to make very wise use of scarce agricultural resources such as water and fertilizers[4].

This PA system requirement was met when the authors were able to develop and test a web-based decision support system for water management and intelligent irrigation scheduling. Geographic Information System maps were used by the system to provide information on the

climate and soil properties. Another criterion for PA systems is that they must use the latest cutting-edge technology, but the cost factor must be held to a minimum at the same time. It was in the same year that an embedded design was developed for a low-cost weather station that monitored three parameters of the weather: wind speed, wind direction and temperature. To make it cost-effective, the implementation included only simple types of sensors (a reflective optical sensor, a potentiometer and a temperature sensor). A low-cost sensing platform was produced in a similar work and tested by mounting it on a small Unmanned Arial Vehicle (UAV) which was used to measure and control the temperature of the canopy in a sugar beet field in order to manage the field's irrigation. Using a cost-effective infra-red sensor, temperature measurements were carried out[5].

IoT is one of the latest cutting edge platforms which is capable of providing one more dimension to the present conventional agriculture practices to a connected (Internet) farming or smart farming so as to take the Indian agriculture altogether to new heights which would ease the burden on the farmers and make agriculture sustainable and profitable for them. Agriculture altogether to new heights which would ease the burden on the farmers and make agriculture sustainable and profitable for them. This necessity led researchers around the world to improve the farmers' precise weather system so that they get compensation for their hard work and prevent debts and losses from going through them. Because of the advent of the IoT, which has led to many startups, capability development in the automation industries? In order to get the most out of the data generated, it has become the latest trend in connecting items (objects, actuators and other devices) to the internet. This resulted in the need of weather stations based on the IoT. From the literature survey, it is clear that there have been advances that have been made to the earlier weather systems to keep them up to date with the new technology available. But when it comes to the Indian scenario, the agriculture sector has not seen any significant technological advances such as improved quality & quantity, resource utilization, atomization, to name a few, despite so many technological advances in recent times. People therefore need to move agriculture closer to technology, and IoT is one such platform that has the potential to fully turn current farming practices into more profitable, less labor intensive, and more sustainable practices. Broadband internet connectivity, dropping mobile and computer device prices have led to IoT applications almost everywhere, such as smart cities, smart homes, and smart industries, and so on. The purpose of this research is to attract the attention of the researchers towards the agriculture domain, so that the small to medium holding farmers get benefitted from the cutting edge technologies like IoT and get the reward for their on-field hard work[6].

Present technological innovations focus primarily on managing and tracking various operations. To achieve human needs, these are increasingly emerging. To monitor and evaluate the circumstances in case of exceeding the prescribed level of parameters (e.g. noise, gas and radiation levels), an effective environmental monitoring system is needed. When objects such as environments embedded with sensor devices, microcontrollers and multiple software applications becomes an environment of self-protection and self-monitoring, it is also called a smart environment. In such an environment the alarm or LED alerts automatically occur when

some incident happens. The impacts on livestock, crops and humans due to the environmental modifications can be tracked and regulated by a smart monitoring system for the environment. By making the environment interactive with other objectives by using embedded intelligence, this is one of the applications that targets a smart environment. Human needs are dependent on the type of information collected by the sensor devices, different kinds of monitoring systems. The two categories to which applications are categorized are based on event detection and spatial process estimation. Initially, sensor systems are implemented in the environment to detect parameters (e.g., temperature, humidity, pressure, LDR, noise, CO and radiation levels, etc.) while acquiring, computing and controlling information (e.g., noise and gas levels variations in the specified levels)[7].

II. CONCLUSION & DISCUSSION

This System monitors the changes happening over the environment and provides enough ways for the users to access the information from anywhere through the cloud. The temperature and humidity sensor will monitor and give the details about the changes happening over the climate. The gas and sound sensors are used for monitoring the pollution over the environment. The Monitored condition will be updated in the cloud. Holding the embedded devices in the control environment helps the environment to be self-protected (i.e., smart environment). In order to enforce this, it is important to deploy sensor devices for data collection and analysis in the environment. Then the collected data and analysis results will be available to the end user through the Wi-Fi. The smart way to monitor the environment and an efficient, low cost embedded system is presented with different models in this paper.

III. REFERENCES

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