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An Iot Platform For Data Driven Agriculture

Mrs.Amita Jojoo[1], Krishna Musmade., Aniket Aher, Pankaj Desai
Assistant Professor
Dept. Information Technology,DYPCOE

Abstract— Data-driven techniques help boost agriculture productivity by increasing yields reducing losses and cutting down input costs. However these techniques have seen spares adoption owing to high costs of manual data collection and limited connectivity solutions .In this project, we present an end-to-end IoT platform for agriculture that enables seamless data collection from various sensors, cameras .Internet of things enables various applications (crop growth monitoring and selection, irrigation decision supported) in Digital Agriculture Domain. Semantic Enhancements to IoT platforms address challenges of interoperability, data fusion, integration of heterogeneous IoT silos, and annotation of data streams.

1. INTRODUCTION

The demand for food is expected to double by 2020, primarily fueled by an increase in population and upward social mobility. Achieving this increase in food production is even more challenging because of receding water levels, climate change and shrinking amount of arable land. According to International Food Policy Research Institute, data-driven techniques can help us achieve this goal by increasing farm productivity by as much as 67% by 2020 and cutting down agricultural losses. In fact, field trials have shown that techniques that use sensor measurements to vary water input across the farm at a fine granularity (precision irrigation) can increase farm productivity by as much as 45% while reducing the water intake by 35%. Similar techniques to vary other farm inputs like seeds, soil nutrients, etc. have proven to be beneficial. More recently, the advent of aerial imagery systems, such as drones, has enabled farmers to get richer sensor data from the farms. Drones can help farmer map their fields, monitor crop canopy remotely and check for anomalies. Over time, all this data can indicate useful practices in farms and make suggestions based on previous crop cycles; resulting in higher yields, lower inputs and less environmental impact.

2. RESEARCH OBJECTIVE

Monitoring the environmental factors is not the complete solution to increase the yield of crops. There are number of other factors that decrease the productivity to a greater extent. Hence automation must be implemented in agriculture to overcome these problems. So, in order to provide solution to all such problems, it is necessary to develop an integrated system which will take care of all factors affecting the productivity in every stage. But complete automation in agriculture is not achieved due to various issues. Though it is implemented in the research level it is not given to the farmers as a product to get benefitted from the resources. Project objectives Availability: The platform should have negligible down time, When there is an outage (for example, due to power or network failure), data collection from the sensors should not stop and the platform should continue to deliver services to the farmers . Capacity: It should support sensors with widely varying requirements: pH sensors reporting few bytes of data to drones sending gigabytes of video. Similarly, the system should be capable of supporting end-user applications with varying needs: from a precision irrigation application that needs the latest sensor data for the entire farm to a crop suggestion application that needs just high level productivity data but across several growing seasons.

3. LITERATURE SURVEY

The security of one's belongings when a person leaves his/her house is always a concern with increasing number of incidents of theft, robbery etc. Many automated systems has been developed which informs the owner in a remote location about any intrusion or attempt to intrude in the house. However, this paper looks into the development of an ANDROID application which interprets the message a mobile device receives on possible intrusion and subsequently a reply SMS which triggers an alarm/buzzer in the remote house making others aware of the possible intrusion. They can provide several useful services such as support for the elderly and disabled people, access control, environmental monitoring, and home automation. Furthermore, with the widespread diffusion of mobile devices and their integration with new auto-identification technologies, the need to control and manage the smart home through these devices is increasing. In this context, the main goal of this work is to develop and validate architecture, both hardware and software, able to monitor and manage a KNX based home automation system through an Android mobile device in an efficient and safe way. With the rapid development of mobile devices and Internet services, managing home security with these devices and services is gaining popularity. To expand the range of usability of conventional home surveillance cameras, we propose the UPnP-based Surveillance Camera System (USCS), which employs UPnP technology to search, control, and manage IP-based cameras. With UPnP, interconnected equipment and the control network inside the home can be accessed for data sharing, communication, and entertainment. However, the current UPnP was originally designed for local networks. Therefore, we integrated the UPnP control module into the Open Service Gateway Initiative (OSGI) framework to access UPnP services from a remote network.

The next paper is aimed to present a new idea of using the embedded system on FPGA platform with the microprocessor Micro Blaze and the real time operating system Free RTOS to control and to monitor household appliances through GPRS and using the PIR sensor to carry out monitoring break-in. Due to the strict requirements of the time constraints, the use of resources and the importance of scheduling, real time operating system (TRTOS) plays a very important role in the development of embedded systems.

B. SYSTEM SPECIFICATION

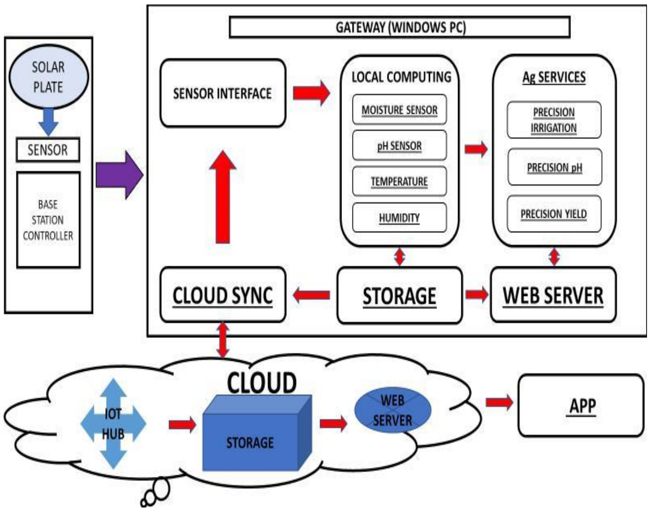
Hardware Requirements

Processor	: Pentium IV
Speed	: 1.1 GHz.
Hard Disk	: 40 GB.
Monitor	:15VGA
Colour.	
Mouse	: Logitech.
Ram	: 256 Mb.

Software Requirements:

Operating system	: Windows XP
Professional/7LINUX.	
Front End	: .Net
Programming Language	: C#,Java
Database	: MYSQL
IDE	: MVC

4. ARCHITECTURE



Sensors : uses off-the-shelf sensors for its applications. Each sensor measures specific characteristics of the farm, such as soil moisture and soil pH, and reports this data to the IoT base station over a Wi-Fi connection. In addition to soil sensors, supports cameras for farm monitoring and drones. The cameras are either connected to the IoT base station over Ethernet or report data over Wi-Fi. They take periodic snapshots and transmit this data to the IoT base station. UAV flights are either periodically scheduled or manually initiated using the Andriod app on the farmer's phone. IoT Base Station: The IoT base station on the farm is powered by solar panels, backed by batteries. Cloud: The Gateway ships data summaries to the cloud, which provides a storage system for long-term data and a web interface for the farmer. The cloud enables three functions: data access outside the farm network (e.g. when traveling), long term applications like crop suggestions, and cross-farm analytics

5. FUTURE SCOPE

Smart farming is a concept quickly catching on in the agricultural business. Offering high-precision crop control, useful data collection, and automated farming techniques, there are clearly many advantages a networked farm has to offer. A recent Beecham's report entitled *Towards Smart Farming: Agriculture Embracing the IoT Vision* predicts that food production must increase by 70 percent in the year 2020 in order to meet our estimated world population of 9.6 billion people. It also describes growing concerns about farming in the future: climate change, limited arable land, and costs/availability of fossil fuels. So, what's the solution? Smart farming.

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