Farm Automation Using Cloud and Sensor Network

Dipak Kadam, Sachin Khedkar, Rahul Kote, Laxman Thorat

***Abstract*— Farm automation is not new. Throughout history, we have continuously strived to automate tasks in the Farm in order to make our lives easier. Technology has now advanced to the point at which we wish to take an integrated approach to farm automation, allowing appliances to communicate with each other and to be controlled in flexible ways. A wired network approach to this communication and control provides an easy, cost-effective and scalable solution to farm automation.**

The farm automation systems provide mutual interoperability between various electrical devices as well as interactive interface for people to control their operation. These features are very helpful to optimize and to economize water consumption whereby saving water for coming years. These technologies make people life easier. These systems exist of course, but there are many non-interoperable, expensive systems.

***Index Terms*— Automation, Electric Devices, Wired Network, Cloud.**

I. INTRODUCTION

Nowadays world is getting changed tremendously, new technologies emerging to reduce human efforts and gain large amount of output in short span of time. To achieve such goals the demand for automation is increased.

The intent of developing this project is to provide the farmer with an interface to control or automate his farm appliances remotely. This project aims at reducing the human effort, reducing water consumption and increase the production.

The techniques previously used for farm automation were having some limitations, such as some techniques are not user friendly and some of them do not have cloud support and they do not take history based decision. In our system we overcome some problems form previous systems. Farm automation system consist of 2.4 GHz Intel (R) core 2 Duo processor, 2 GB RAM that is based on windows 7/8 platform and on android smart phone.

II. PROPOSED SYSTEM

The farm automation system is consist of four layers such as, fetching values form sensors, storing the fetched data on cloud, apply data mining and automation. As shown in Fig.1. sensors in placed in the farm. There is various types of sensors like water level sensor, temperature sensor, humidity sensor and soil moisture sensor. The fetched values form sensor is stored on the cloud. On this values data mining is apply. After applying the data processing system can automatically take history based decision like when water pump is ON/OFF. Using this system automation is achieved.

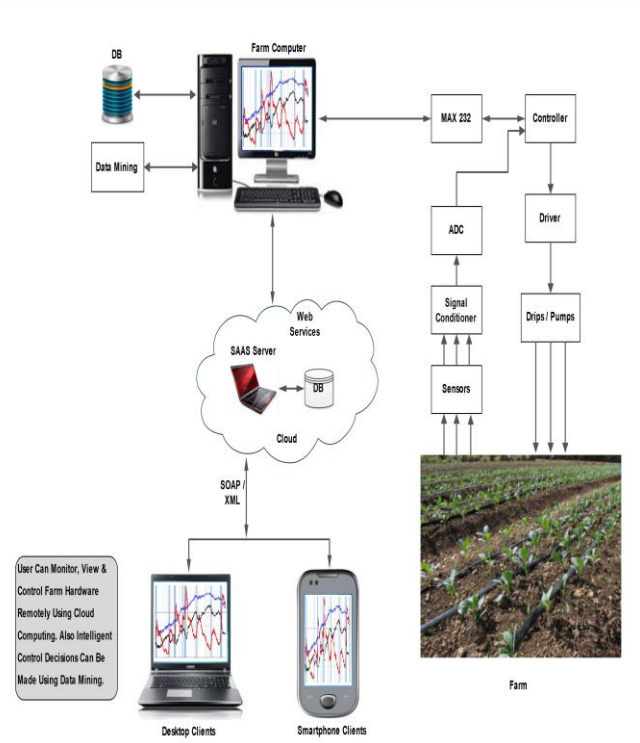

Fig 1 Proposed system architecture

This system farmer can handle using Pc and android smart phone anywhere form the world.

III. CLOUD COMPUTING TECHNOLOGY OVERVIEW

Cloud computing is a distributed computing technology, through a computer network the huge computing handler will be split and analysed by a number of separate servers, then ultra-millions or even hundreds of millions of information services will be available within seconds, so the users not only can get super computing capabilities but also can reduce resource inputs and waste. This is a paid service usage model, with ready access to demand unlimited expansion metering pay features, including IaaS (Infrastructure-as-a-Service), PaaS (Platform-as-a-Service), SaaS (Software-as-a-Service) and three levels of service(Chen & Deng,2009). Thus, cloud computing means computing power can be used as a commodity or service to be circulated and consumed through the Internet. Cloud computing technology application system framework is shown in Fig.2

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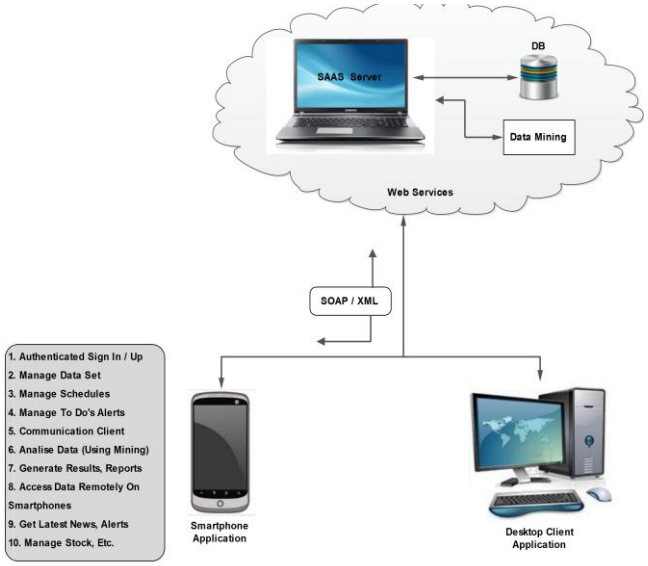

Fig2. Cloud+ Android overview

IV. NAIVE BAYES CLASSIFIER

In simple terms, a Naive Bayes classifier assumes that the presence (or absence) of a particular feature of a class is unrelated to the presence (or absence) of any other feature, given the class variable. For example, a fruit may be considered to be an apple if it is red, round, and about 4" in diameter. Even if these features depend on each other or upon the existence of the other features, a naive Bayes classifier considers all of these properties to independently contribute to the probability that this fruit is an apple.

An advantage of the Naive Bayes classifier is that it only requires a small amount of training data to estimate the parameters (means and variances of the variables) necessary for classification. Because independent variables are assumed, only the variances of the variables for each class need to be determined and not the entire covariance matrix.

In farm automation system Naive Bayes is used for taking history based decision. Applying Naive Bayes on the data which is fetched from the sensors, Naive Bayes gives the values that are useful for automation.

V. ADVANTAGES

There is lots of advantages of farm automation system. The first big advantage is that system is fully automated. Farmer can handle the farm form any place form the world. Another big advantage of this system is that it save the large amount of water and electricity. It also reduce the manpower. System can take history based decisions which is useful for next crop or another farmer. Data sharing is allowed in this system. More than one farmer can share their data on the system which is useful for another farmer.

VI. CONCLUSION

We proposed and developed a cloud-based system to manage cultivation. The functions of the system were briefly described. The system helps many farmhouses to manage agricultural work to accomplish cost-effective precision agriculture. We plan to conduct experiments to evaluate how usable the system is and how well it performs. Moreover, it is expected that data collected with the system will comprise big data for precision agriculture. Analysis of big data will lead to improved precision agriculture and cultivation management in the future. The results of the system are encouraging to do the further research in this technique.

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