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CLOUD COMPUTING IN SMART FARMING

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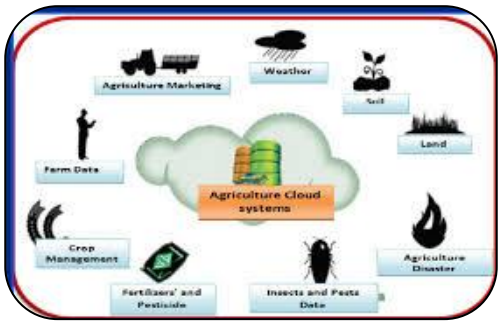
Abstract: Cloud Computing is delivery of computing services rather than the product where by shared resources, software and information are provided to computers and other devices as a utility over a network Cloud Computing is emerging today as a commercial infrastructure that eliminates the need for maintaining expensive computing hardware, software, Information technology, staff, infrastructure, recourses and their maintenance. Cloud computing is a network-based environment that focuses on sharing computations, Cloud computing networks access to a shared pool of configurable networks, servers, storage, service, applications & other important computing resources. In modern era of cloud computing technology very helpful for centralized the all agricultural related data bank (Soil-related, weather, Research, Crop, Farmers, Agriculture marketing, fertilizers and pesticide information) in the cloud.

Index Term

A. Cloud computing
B. Agriculture

Cloud Computing:

Storing and securing huge amounts of data that is accessible only by authorized users, having ability to use applications on the Internet that store and protect data while providing a service. Used in Web services



to integrate photos, maps, and GPS information to create a mash up in customer Web browsers. Cloud computing used in the development of smart agriculture by helping the farmers with the specific tasks like: Crop related , Information , Soil information, Monitoring growth, Farmer's data ,E-commerce, Expert consultation ,etc. The role of cloud computing is Store all the agriculture related information in a centralized cloud, which will be available to all the users at anytime, anywhere , Management of all data related to land, location, area.

Cloud in agriculture:

Smart agriculture using IoT makes use of several sensors for monitoring the climate conditions of the surroundings. the task of the sensor is to collect the data across the field send it to the cloud. The cloud is loaded with some basic measurements which will then be compared with the sensed data.

Soil and land characteristics through centralized decision support systems, high integration & sharing of agricultural information ,It can be eliminate the farmer's limitations of technical knowledge & resources ,Providing agricultural technology service & science, Improvement of the agricultural products marketing, Efficient use of agricultural resources, Promote the circulation of agricultural product and service in wider level. The objective of this paper is define land potential and explicitly and dynamically for unique and constantly changing soil and climate conditions. cloud applications helping the farmers to increase their agricultural yield. The work will also facilitate more rapid and complete integration and dissemination of local and scientific knowledge about sustainable land management. The impact of doing it would cut the cost, time and makes the process much faster and easier.

Cloud computing can be used to aggregate data from tools like soil sensors, satellite images, and weather stations to help farmers make better decisions about managing their crops. ... In recent years, agricultural companies have been harnessing the power of the cloud to create solutions.

Literature review:

The agricultural sciences and technology are usually seen to encompass the plant, animal and food sciences, soil science, agricultural engineering and entomology. In addition, in many research institutions related fields such as agricultural economics, rural sociology, human nutrition, forestry, fisheries, and home economics are included as well. The agricultural sciences have been studied by historians, economists, sociologists, and philosophers. Most of the early work in Science and Technology Studies focused on physics, said to be the model for the sciences. Unlike the agricultural sciences, theoretical physics appeared disconnected from any clear social or economic interests. Indeed, one early study of the agricultural sciences described them as deviant in that they did not follow the norms found in physics (Storer 1980). Prior to the 1970s studies of the agricultural sciences tended to be apologetic and uncritical. Then, critical historical, economic, sociological, and philosophical studies of the agricultural sciences began to emerge. These studies built on earlier work that was not within the purview of what is usually called STS. Moreover, despite attempts to incorporate perspectives from this field, it would be an exaggeration to say that studies of the agricultural sciences form an integrated body of knowledge. Indeed, fragmentation has been and remains the rule with respect to theoretical framework research questions, and methods employed.

Smart Farming:

A. Architecture of agricultural information cloud:

The architecture of a agricultural information cloud technology consists of four layers: physical resource layer, resource pool layer, management of middleware layer and SOA construction layer. The physical resource layer include various kinds of resource servers, memories, internet facilities, database and software in relation to agricultural information; the resource pool layer builds a large amount of resources of the same kind into isomorphic or approximate isomorphic resource pools, like computing resource pool and data resource pool. The construction of resource pool can be regarded as integration and management of physical resource, the main purpose of which is to integrate isomeric agricultural information resources into resource pools of the same kind, so as to create a basis for synergy. Management of middleware layer is the core for agricultural information cloud. It is responsible for management of cloud computing resources and dispatching of various kinds of tasks, so that resources can serve application with higher efficiency and security; the SOA construction layer encapsulates cloud computing capacity into standard Web Services and incorporate them into SOA system for management and using, including service registration, searching, visiting and constructing work flow for services. The management of middleware layer and resource pool are key parts of cloud computing technology. The function of SOA construction layer, to a large extent, relies on external facilities. The usage of cloud computing in smart farming has increased the hybrid cloud service.

B. Hybrid cloud service:

A hybrid cloud is a computing environment that combines a public cloud and a private cloud by allowing data and applications to be shared between them. When computing and processing demand fluctuates, hybrid cloud computing gives businesses the ability to seamlessly scale their on-premises infrastructure up to the public cloud to handle any overflow—without giving third-party data centers access to the entirety of their data. Hybrid cloud computing is a "best of all possible worlds" platform, delivering all the benefits of cloud computing—flexibility, scalability, and cost efficiencies—with the lowest possible risk of data exposure.

Future Enhancement:

Future farming will require a threefold innovation: technological, social and economic. The Netherlands is the home base of future farming and the living lab for (future) farming in the metropolitan area. The developments in cloud computing leads to usage of sensor technology, IoT and robotics will extend the possibilities in smart farming further. It is expected that we will be able to determine the needs of a crop at any specific location and moment in a way that will be increasingly accurate, and from a distance. The further automation of agricultural activities, such as plough and harvesting, will also lead to further developments in smart farming. According to experts the expansion of smart farming will result in increased production per crop, and more efficient production systems.

Benefits of Cloud computing in Agriculture:

- Data Readiness any time & any where
- Local and global communication
- Improve economic condition of the Nation
- Enhanced the GDP of the nation
- Ensure food security level
- Motivation of farmers and researchers
- Reduction of technical issue
- Rural-Urban movement
- Data availability at any time and at any location without delay
- Improve market price of Food, seeds, other product

Challenge of cloud computing in Agriculture:

- Maintenance & Supervision by third party, So data security is less
- Indirect administrator accountability
- Farmer is unknown for cloud computing technology

- Less physical control
- Attraction to hackers
- Need on the network connectivity
- Requires a constant Internet connection
- Platform facility is not easily available for farmers
- Farmers training necessary for this technology
- Does not work well with low-speed connections
- it runs the risk of security

Conclusion:

Smart farming is not only a trend but it also a technology of itself. The move to become more environmentally friendly is more than just a means to a better corporate image ,it is also a means to cost reduction in an ever inflating IT budget .New and improved ways of using this technology seem to appear every day.

The important key to remember is that while this technology is beneficial in some way, the most beneficial to existing corporations are those that directly affect their processes and IT infrastructures. Reducing the number of servers using virtualization is a great way to consolidate but in order to get the maximum benefit the corporation must reorganize its data centre infrastructure and in addition, rethink processes and procedures that utilize these resources from the user's stand point.

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