The Importance of Cloud Computing in Agriculture

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***Abstract*— In case of agriculture our coutry has a great potential of development. Agriculture has big role of development of our country Cloud computing is a network-based system in which several computers share calculations, storage, services, applications, and other primary computing resources. All agricultural data such as soil, weather, research, crop, farmers, agriculture marketing, fertiliser, and pesticide information may now be consolidated in the cloud ,cloud makes easy for it. The agricultural industry and the services, that provides to clients have benefited from cloud computing. Cloud computing has had a significant impact. To boost agricultural field growth and productivity, farmers need automatic plant disease monitoring rather than human monitoring. A favourable impact on agriculture and the services it delivers to customers Manual dizease monitoring does not produce adequate results since naked eye observation is an ancient method that takes more time to recognize the disease and requires an expert, hence it is ineffective. This paper, introduced a modern technique to find out disease-related to leaf. In addition, Parameters for cloud computing, characteristics, deployment model, cloud service model, cloud benefits, and cloud computing challenges in agriculture are discussed in this study.**

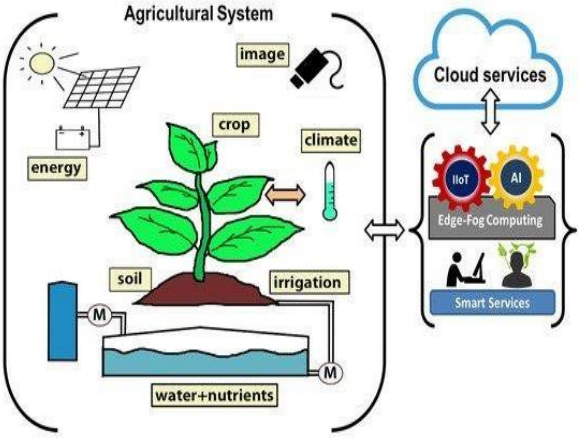
I. Introduction

Huge changes are occurring in numerous sectors around the world as a result of the ongoing and steady Computer and network technologies are progressing.Accouterment. of shared resources, software, apps, and services over the internet in order to meet a customer's ad hoc demand with the least amount of effort and interaction with the service provider.Despite the fact that our country is a major producer of foods, grains, and other goods, agriculture and its production process are still decentralised, unsophisticated, and old methods employed by farmers, as well as numerous limitations, and modernisation is slow. The both farmers and economic situation will affects the determental influence. This problem can be reduced by the use of requisiton of cloud computing in this area. All necessary data must be stored in a centralized location, which must be set up. It can contain a number of different databases. Soil-related, weather-related, research-related, crop-related, and farmer-related data can all be maintained in a single location, ensuring data availability. End-users such as farmers, professionals, consultants, and researchers can quickly access this data from any location at any time using devices connected to the cloud system.

II. Criterion for cloud computing

cloud computing refers to any method of offering facilitated administrations through the Web. The term distributed computing was enlivened by the cloud image, which is generally used to address the Web in flowcharts and charts.. These services are broadly divided into three categories: Services for infrastructure , services for platform, and Services for software. Infrastructure for service provides computer infrastructure as a utility service, usually in a virtualized environment, with great adaptability and scaling potential. A platform for service is a cloud infrastructure that provides a platform or solution stack. It is built on top of the software infrastructure architecture and contains development and middleware capabilities, as well as database, messaging, and queueing. The application is delivered over the Internet or Intranet using a cloud infrastructure built on the underlying IaaS and PaaS layers.

FIG 1 Agriculture system in cloud computing



III. Agriculture and Cloud Computing Technology

India is one of the world's major producers of foods, grains, and other items, but agriculture and its production process are still decentralized, with farmers using primitive and antiquated methods, as well as various restraints, and modernization is gradual. As an outcome,

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there is a distinct divergence between agricultural product supply and demand networks. This will have a detrimental influence on both the farmer's economic situation and the country's overall income. With the adoption of Cloud in the agricultural field, this bottleneck can be alleviated. It has the potential to overcome the farmer's technical knowledge limits, increase the usage of current resources, and overcome the significant reliance on natural climate in specific geographical areas. Farmers can greatly benefit from the transmission of crucial agricultural information via Cloud and other Internet-connected devices.

IV. Peculiars of Cloud Computing:

a) Unconventional
b) On-demand self-service
c) Workload can be scalable
d) Disaster Recovery
e) Secure

V. Models used for the deployment

a) Cloud service offered to multiple customers
The public can use the cloud infrastructure apps, storage, and other resources for free or on a pay-per-use basis. It is owned by a cloud-based services provider. Examples include web service provided by amasone, Google, Windows Asure, and others.

b) Community cloud
The cloud imparts a framework for the particular local area to normal worries (security, consistency, ward, and so on), Regardless of whether it is supervised internally or by an outsider, and whether it is facilitated inside or remotely.

c) Heterogeneous distributed system
The cloud foundation is comprised of at least two mists (private, local area, or public) that are isolated at this point connected by normalized or restrictive innovation that permits information and application movability.

d) Internal cloud
These could be managed by single the organisations. Operate for exclusive use of an organisation It might be owned, managed, and operated by the association or by an outsider, and it could be on-site or off-site. These type are on/off premises.

VI. The process involves in disease detection in leaf

The suggested system is depicted in the following diagram.The suggested method includes collecting a database of leaf and fruit images, pre-processing those images, segmenting those images using the k-means clustering method, feature

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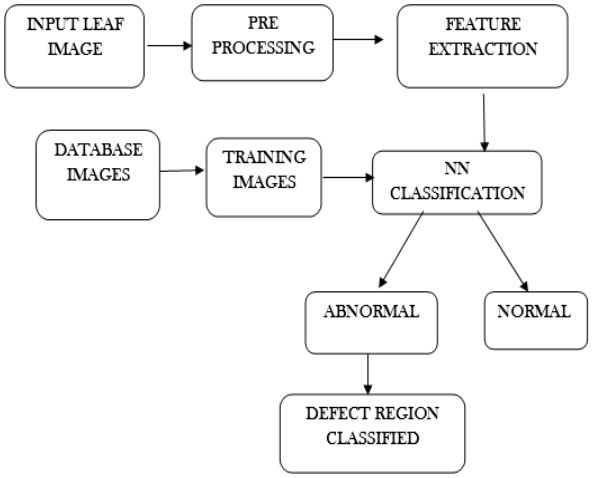

FIG 2 Image Pre-processing

extraction utilizing the GLCM technique, lastly preparing the framework utilizing the SVM calculation.

a) Image Acquiring
The initial step in digital image processing is image acquisition, which involves taking a picture with a digital camera and saving it to a computer for subsequent MATLAB processing.It's also the operation of recovering an image from hardware so that it can be processed further.

b) Image pretreat
Picture pretreat is utilized to further develop picture information that contains undesirable contortions or to improve specific picture properties in anticipation of future handling. The pre-processing method employs a variety of techniques, including image resizing and shaping, noise filtering, image conversion, image enhancement, and morphological procedures.

c) Image split
Image segmentation is a technique for breaking down a digital image into segments and converting it into something that can be analyzed more easily. The object and borderline of an image are located via image segmentation. We employed the K-means clustering approach to partition photos into clusters, with at least one component of each cluster including an image with the diseased part's major area.

d) Feature mining
Include extraction extricates beneficial component vectors like tone, surface, morphology, and design. Highlight extraction is a strategy for diminishing how much assets expected to accurately portray a lot of information. The Dim level co-event grid (GLCM) approach for surface examination creates surface qualities utilizing measurable appropriations of noticed power mixes at a given site contrasted with others.

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e) Preparation & Classification

The assist vector with machining endeavors to find the briefest way between the disconnecting hyperplane and the closest model. Although basic SVM can only do binary classification, it may be modified to do multiclass classification. Additional restrictions and parameters are introduced to optimization problems in these additions to handle the separation of the different classes.

VII. Gains of Cloud Computing In Agriculture

a) Data Readiness any time & anywhere
b) Local and global communication
c) Improve the economic condition of the Nation
d) Enhanced the GDP of the nation
e) Ensure food security level
f) Reduction of technical issues
g) Rural-Urban movement
h) Information is open whenever and from any area.
i) Improve market price of Food, seeds, other product

VIII. problems of Cloud Computing In Agriculture

a) As a result of third-party maintenance and supervision, data security is compromised.
b) There isn't enough data on sales and distribution.
c) Helpless information about the climate gauge, nuisances, and illnesses.
d) Now also most of the farmer unaware about the use of ICT in agriculture
e) Insufficient power availability in rural areas.
f) Attraction to hackers
g) Does not work well with low-speed connections
h) Farmer is unknown for cloud computing technology

IX. Conclusion

This paper may provide the Agribusiness based information, just like a normal asset the executives and information straightforwardly to clients, not just in a restricted region, like steady promoting or shops, yet additionally in a bigger region. Effective utilization of this methodology will likewise advance agrarian areas, bringing about the best increase from cloud relocation. This will have a positive approach to the cloud.

The blast in the method of monetary improvement of the country. As a result, in order to realise its full potential and develop a well-established knowledge base for the country, this strategy requires widespread awareness and promotion among key stakeholders.

X. Reference

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