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The Role Of AI In Cloud Computing

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ABSTRACT

Artificial Intelligence in Cloud Computing is a growing field that focuses on building intelligent solutions for myriad industries. AI Cloud Computing offers Machine Learning and Statistical tools capable of performing advanced
calculations that companies can use to create dynamic applications. AI Cloud Computing focuses on building those intelligent applications, helping companies use Big Data, deploy algorithms for advanced app functionality, and predict and forecast future growth that tremendously helps with business profitability and longevity. This paper explores the evolution of AI in Cloud Computing, its benefits for small and large enterprises, the latest market trends, use cases, and future predictions.

Keywords: Cloud Computing, Artificial Intelligence, Machine Learning, Internet of Things, Tesla, Algorithms, Linear Regression, Logistic Regression, Automated ML, Data Management, Synthetic Data, Analytics Platform

I. INTRODUCTION

Artificial Intelligence has already become a permanent part of our lives. GPS tracking services, instant speech recognition, digital assistants, chatbots, and autocorrect services are some common examples of Artificial Intelligence at work;
however, its scope is far beyond Siri or Amazon Alexa. AI paired with Cloud Computing
offers analytics solutions, Data mining and processing applications, Cloud security automation, and overall reduced costs enhanced decision making due to AI-powered solutions. As Big Data gains momentum, there is a growing need for integrated systems for flexibility, security, and efficiency. [1]. In the near future, AI will play a crucial role in organizations in terms of Big Data management, customer experience, and heightened security.
This paper looks into how AI will shape the future of small and large-scale organizations through advancementsin AI technologies and the scope of those technologies.

II. CLOUD COMPUTING

Cloud computing is a form of distributed computing. This means that a huge data processing program is divided into many smaller programs via a network "cloud" to be processed and analysed by a system of multiple servers. The results of these small programs are returned to the user. Cloud service providers consolidate large numbers of computing, storage, and network resources and make these resources available to users through virtualization and other technologies. These resources are allocated as needed and paid according to volume. With the continuous development of cloud computing technology, its application range is getting wider and wider. In the early days of cloud computing, it was simply distributed computing that solved the problem of task distribution and put the results together. That's why cloud computing is also called grid computing. This technology can process tens of thousands of data in a very short time (seconds), enabling high-performance network services.

III. AI IN CLOUD

Artificial intelligence has already become an integral part of our lives. GPS tracking services, instant voice recognition, digital assistants, chatbots, and autocorrect services are common examples of artificial intelligence. But the realm of applications goes far beyond Siri and Amazon Alexa. AI combined with cloud computing provides analytics solutions, data mining and processing applications, cloud security automation, overall cost reduction, and improved decision-making with AI-powered solutions. As big data gains momentum, the need for integrated systems for flexibility, security, and efficiency increases. In the near future, AI will play an important role in enterprises when it comes to improving big data management, customer experience, and security. This white paper examines how AI will shape the future of small and large organizations through advances in AI technologies and the scope of those technologies.

IV. CHARACTERISTICS

1) Super large Scale

Cloud computing makes many resources available to users. These resources do not appear out of nowhere. Therefore, we need a place where we can store these resources. Take Google for example. There are already over a million servers supporting their own "cloud". IT giants such as Amazon, Microsoft, and IBM also have hundreds of thousands of servers supporting their own clouds. Enterprise-level private clouds typically have hundreds or thousands of servers.

2) Virtualisation

Virtualization technology is the foundation of cloud technology. Cloud computing enables users to enjoy a variety of services on their end devices anytime, anywhere. All requested resources are taken from the cloud platform's resource pool. These services run somewhere in the platform. This eliminates the need for users to know where their services are running. Therefore, we can say that the entire cloud service is completely transparent to the user.

3) Independency

Device and location independence allows users to access the system through a web browser regardless of their location or the device they are using (PC, mobile phone, etc.). Infrastructure is off-site (usually provided by a third party) and accessible over the Internet, allowing users to connect from anywhere.

4) Cost

In the past, building a web application and deploying it to the web required purchasing a hardware server. A server is required to operate web pages on the World Wide Web. So when someone visits your site from their computer through a browser (client), a request is sent to the server and a web page is returned to the client.

However, purchasing these servers was expensive and inefficient. For example, if you only need the power of 1.5 servers, you still need to buy 2 servers. For most people who gained access to cheap computing power through cloud services, the cost was prohibitive.

5) High reliability

To ensure high data security, the platform employs a variety of technologies to ensure data security, and highly reliable and fault- tolerant technologies such as multiple copies of data and migration of services. provide services to users.

V. Cloud Services

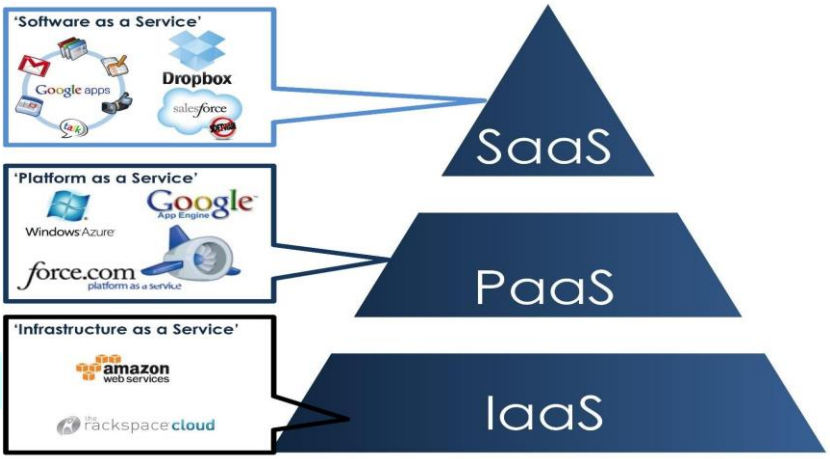


Fig: Cloud Services

Back in the old days, if you wanted to create a web application and deploy it to the web, you would need to purchasa hardware server.A server is necessary for running your web pages on the world wide web, so that when someone accesses your site from their computer using a browser (the client), a request can be sent to your server and return the web page back to the user's client. However, purchasing these servers were expensive and inefficient, because if, for example, you only needed the computing power provided by one and a half servers, you would still need to purchase two servers. These costs were prohibitively expensive for most people whonow have access to cheap computing power via cloud services.

· Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) are just fancy classification terms that describe how low-level these services are, or in other words how much granular control you have overyour server and data storage systems and application.

· **Infrastructure-as-a-Service (IaaS):** In this model, a company rents the servers and storage they need from a cloud provider. They then use that cloud infrastructure to build their applications. IaaS is like a company leasing a plot of land on which they can build whatever they want – but they need to provide their own building equipment and materials. IaaS providersinclude Google Compute Engine and OpenStack.

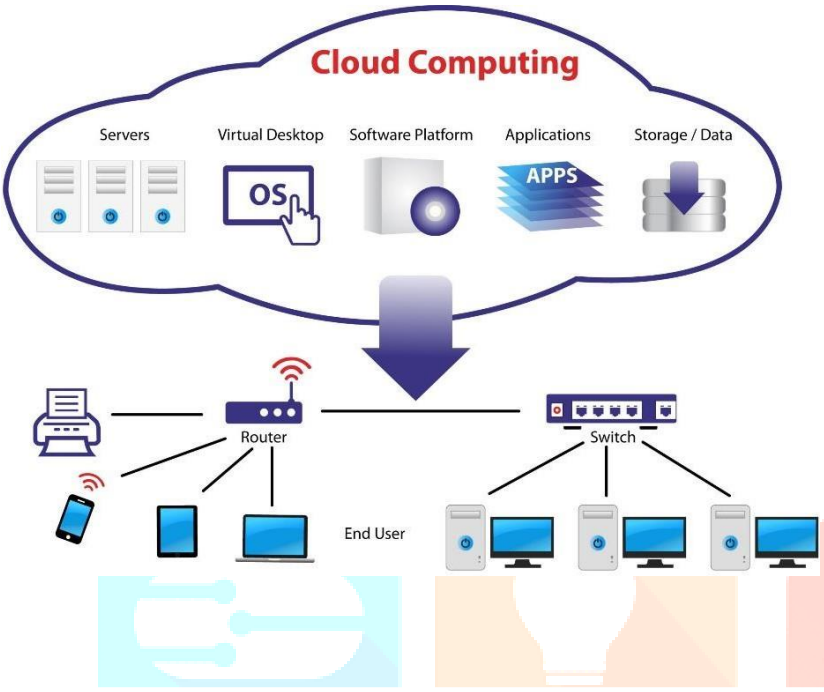
· **Platform-as-a-Service (PaaS):** In this model, companies don't pay for hosted applications; instead, they pay for the things they need to build their own applications. PaaS vendors offer everything necessary for building an application, including development tools, infrastructure, and operating systems, over the Internet. PaaS can be compared to renting all the tools and equipment necessary for building a house, instead of renting the house itself. PaaS examples include Heroku and Microsoft Azure.

· **Software-as-a-Service (SaaS):** Instead of users installing an application on their device, SaaS applications are hosted oncloud servers, and users access them over the Internet. SaaS is like renting a house: the landlord maintains the house, but the tenant mostly gets to use it as if they owned it. Examples of SaaS applications

include Salesforce and Slack.

· **Function-as-a-Service (FaaS):** FaaS, also known as serverless computing, breaks cloud applications down into even smaller components that only run when they're needed. Imagine if it were possible to rent a house one little bit at a time: for instance, the tenant only pays for the dining room at dinner time, the bedroom while they're sleeping, the living room while they're watching TV, and when they aren't using those rooms, they don't have to pay rent on them.

VI. CLOUD ARCHITECTURE



Cloud architecture is the system architecture of the software systems involved in providing cloud computing and typically includes multiple cloud components communicating with application programming interfaces. Typically web services and his 3-tier architecture. This is similar to the UNIX philosophy of having multiple programs, each doing one thing well and working together through a universal interface.

Complexity is controlled and the resulting system is easier to manage than a monolithic system. The two most significant components of cloud computing architecture are known as the front end and the back end. The front end is the part seen by the
client, i.e. the computer user. This includes the client's network (or computer) and the applications used to access the cloud via auser interface such as a web browser. The back end of the cloud computing architecture is the "cloud" itself, comprising variouscomputers, servers and data storage devices.

VII. CHALLENGES IN CLOUD COMPUTING

1) Network connectivity: Cloud-based Machine Learning applications require consistent network connectivity slack of connectivity can seriously hinder the processes that run on ML algorithms. Additionally, it takes time for the data toreach the cloud where it can be further processed. There is a huge time lag between sending data to the cloud, whichimpacts prompt response and quick actions necessary for resolution.

2) Data privacy: Another important challenge with AI Cloud Computing is data privacy. Is data privacy. The information collected through AI sensors captures both customer and vendor data before it is transferred and processed. Lack of security protocols in both web and mobile Cloud Computing can lead to data hacks that may lead to further security issues.

3) Security issues: The security issues in cloud computing includes:

- Data security
- Identity and access control
- Key management
- Virtual machine security

Among these main security issues in the cloud, data security and integrity is believed to be the most difficult problem which could limit the use of cloud computing. In fact, access control and key management are all issues involved in data security. Data security in the cloud refers to data confidentiality, integrity, availability and traceability (CIAT), and these requirements pose major problems for cloud computing.

VIII. CONCLUSION

In this paper we discussed the basics of Cloud Computing, Characteristics, Advantages and Disadvantages of Computing. These are very useful to understand cloud computing. Besides the above topics we discussed some more topics Cloud Architecture,

Cloud Services. Cloud Architecture of Cloud is used to understand the working procedure of cloud, how it is used for organisations and how the cloud is used to store, retrieve and modify the data without physical equipment. We hope this paper will give efficient information about what the readers want about Cloud Computing and be very useful to researchers.

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