COMBINATION OF CLOUD COMPUTING AND ARTIFICIAL INTELLIGENCE : A BRILLIANT SCENARIO

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ABSTRACT— When anyone thinks of cloud computing, they think of using the applications with the help of Internet. It can be any game, Photoshop tools or anything. Researchers have also used it in many dimensions. The evolution of Cloud computing, Artificial Intelligence is mentioned in this paper. How Cloud serves as the foundation of Artificial Intelligence is also mentioned in this paper. A brief of AWS is mentioned in this paper. Various relationships among machine learning, AI, Cloud are also mentioned in this paper. All this will bring a better tomorrow.

Keywords— *Future, Cloud, Computing, Artificial, Evolution, Machine.*

I. INTRODUCTION

The term that we call Cloud Computing provides large merits and because of that only, it had become an internal sector of companies in today's modern era. Another term that is Scaling, considered in both ways that is up-scaling and down-scaling has supported the industries in one or the other way. This can produce great outcomes, helping the industries in significant decrement in the usage of resources. This business has grown in an aggressive style over the years. If the outcome of a procedure is rigid, then it's not possible for it to produce exceptional outcomes rather than if flexible. In the dimension of Cloud, three terms have made a great impact. These three words are Platform, Infrastructure and Software particularly acting as a service.

If we consider an iceberg, then we will know that only 30% is visible and the point is that 70% is hidden. This iceberg can be treated as Artificial Intelligence (as an illustration). The actual prospective of Artificial Intelligence is yet to be revealed properly. If we see the corporate world, then two terms that are Cloud Computing and Artificial Intelligence is developing in a manner; it is expected to be the upcoming dimension. The term Artificial Intelligence has the ability to slick the forte of cloud dimension. AI can furnish the Cloud dimension with enormous competence. It made

appliance to behave just similar to homo-sapiens. Artificial Intelligence can make machines or the appliances to learn from past experiences. This will head towards the automatic procedure that will certainly help in the reduction of the term known as "fallacy".

The amalgamation of the Artificial Intelligence and the Cloud dimension has acquired a significant change in the IT extent and different organizations. It has the ability to alter the manner unprocessed raw facts and figures get deposited and processed across different latitudes.

The union of Artificial Intelligence and the Cloud Computing also depicts a distinctive chance for both dimension experts to traverse likelihood for time ahead. There are sure shot opportunities for the professionals in this dimension, and this can be predicted by the current scenario happening in the IT department. Certifications and internships are effortlessly present in different geographic regions and the people can be instructed by the leading professionals in this dimension of Artificial Intelligence and Cloud.

ARTIFICIAL INTELLIGENCE + CLOUD COMPUTING =FUTURE OF TOMORROW

IBM and other big companies in this dimension think the same and are on a progressive as well as a competitive path to explore the extension of the result of the operands i.e. future of tomorrow.

II. EVOLUTION OF CLOUD COMPUTING:

The term Cloud Computing [1] can be depicted as the usage of services like gaming, photo shop etc. over the global network of computer i.e. the internet [2]. The past, present and future of cloud computing can be depicted as a figure shown below as Fig.1.
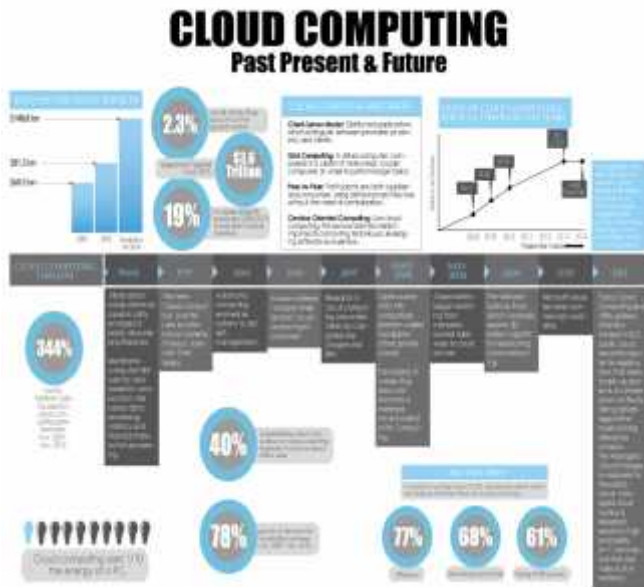
Fig.1 The past, present and future of Cloud Computing

In the case of cloud computing, the resources that are available are delivered or transmitted over a network. The network can be of any type i.e. over the Internet or it can be an intranet [3] based. The technology of cloud computing is being used from a long before but in the present era, it is being enhanced in the business prospective. The pictorial representation that is mentioned above is a proof of this.

In the pictorial representation above there has been a past, present and the future. This basically computes financial processes or transactions and the data that is shared on a market basis. It basically evolved from the decade of 1960s and from that time is being evolving at an exponential rate. The results of various surveys have also been mentioned on the pictorial representation. The operating costs and many other costs can be saved up to a dimension of 40 on a scale of 100.

III. HOW THE CLOUD SERVES AS THE FOUNDATION OF AI

When the organizations drift, to perform the action in the cloud domain, The leading professionals are glancing towards the following skyline: inventive from the Cloud along with the AI.

The Cloud is the latent dais with the storage capacity of unprocessed raw facts and figures as well as the huge processing ability that will switch on the ingenious AI with the velocity demanded. A big number of AI driven technologies are there in terms of linguistics, vision, machine leaning[4] etc. that can benefit the organizations. The experimentation of Accenture company illustrates that 85% of business and executive in IT department invest in one or another AI driven scenarios over the tenure of next 3 years.

In actuality, the term Artificial Intelligence clarifies as well as raises the mankind's involvement with technology. In fact, technology is being made not

difficult to be utilized by Artificial Intelligence through more normal interfaces. For directions and different event reminders, people basically use their cellular devices by the means of their linguistics. The vehicular scenario, follows the order given by the people. In today's scenario, for example the product of Amazon i.e. echo that allows us to use our voices to play songs or even paying the different types of bills. Echo dot is a smaller device.

By the means of sound approach, Artificial Intelligence mechanization can be done by the different organizations to generate engagement tours that are hyper-personalized with their workers as well as customers for the increment in the procedure of loyalty.

IV. CLOUD SUPPORTS INNOVATION AND PACKAGED SERVICES ACROSS AI

The instances mentioned above can be a proof of a good tomorrow in which the people as well as the organizations can attain a considerably larger by the means of Artificial Intelligence abilities. There should always be a precautionary action and everything must be done with a good responsibility as everything is not easy as it looks in the field of Artificial Intelligence and can be extremely dangerous!

The terms considered as Application Programming Interface commonly abbreviated as API [5] can be considered as the peculiar solution of AI, and not as SaaS. These Application programming Interfaces needs convoluted amalgamation to gather in an enterprise-ready programme. Fundamentally, as an increment in the number of organizations converting into a cloud dimension, and they have more involvement in maintaining the high entanglement with packaged Artificial Intelligence services to gain rapid solutions.

The term Cloud assists the extreme storage capacity of unprocessed raw facts and figures, scalability scenario as well as Graphic Processing Units commonly abbreviated as GPUs [6] to manage the enormous storing of unprocessed raw facts and figures and formulas that Artificially Intelligence enabled systems needs to explore periodically. An instance of this is Neural Networks (NN). Cloud Computing also ensures Quality of Service (QoS), making the AI dimension fit for quick transformation.

V. CHOOSE THE BEST-FIT CLOUD PROVIDER AND START INNOVATING WITH AI NOW

As mentioned above that the base of Artificial Intelligence is Cloud [7], There is a suggestion that each and every organization must predict their platform of cloud carefully, so that it must ensure that minimal loss should be there in case of extreme danger. There must be an assistance of AI for the upcoming era too. A variety of Artificial Intelligence Services is being

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provided by the cloud providers that understands the case mentioned above.

If we take the example of Amazon Web Services commonly abbreviated as AWS [8] that has launched Amazon Lex [9]. It is a contentious engine that simplifies the technique to build the chat bots; Amazon Polly that turns text into lifelike speech using deep learning; Amazon Rekognition that does the image analysis using deep learning and Amazon Machine learning too that is a service to make hypothesis for machine learning procedures.

If one working on a project or in some situation, it's the first day then one must try to get the dais in addition to Artificial Intelligence's revolution, and then after that selection of a use case is done that would get the welfare from different services of Artificial Intelligence. In the beginning, it would be started as a very small dimension and when it fails in some cases then only it should use loops and loops to get rapid advancements.

If a planner is willing to provide support of intelligence to its applications, then AWS cloud is a certain option as it is in support of Artificial Intelligence. Dr.Matt Wood, the general manager of AI at AWS has many positive views in accelerating the velocity of transformation.

VI. AMAZON BRINGS ARTIFICIAL INTELLIGENCE TO CLOUD STORAGE TO PROTECT CUSTOMER DATA

For securing the customer's unprocessed raw facts and figures, Amazon is the prime public provider of cloud that has a mixture of AI and cloud storage. This new service is termed as Amazon Macie [10] and it depends upon ML. This feature classifies the probable risks involved with the content, access patterns etc.

A well-liked storage-service that is cloud based as well as people's have faith in is Amazon S3 [11]. The S3 stands for simple, storage, solution. From small entrepreneurs startups to large organizations, that is companies of all sizes can store there data in S3. Buckets play a major role in this scenario that contains data i.e. unprocessed raw facts and figures that have a range of permissions. Anyone can read the data that have the public access and it is also depicted by its name i.e. public.

Security is a concern in case of everything, and it covers the domain of data also in S3 buckets. But numerous users don't take that solemnly. An incident happened in May 2017 concerning security. According to Gizmodo, approximately 60,000 crucial file owned by the government of US have got public access that meant anyone having an internet connection could watch them. Encryption should be kept in mind in this digital era. But approximately files of 28 GB had simple common language passwords that meant to be unencrypted. In the early 2017, NGA depicted that geospatial unprocessed raw facts and figures were captured by intelligence agencies.

The main aim of Amazon Macie's is to discover crucial facts kept on the cloud and is not properly protected. When Amazon Macie's finds that a modern user with a different Internet address is accessing a file/record, it warns the existing persons.

For making the Macie's better as well as intelligent Amazon AWS is using both supervised as well as unsupervised algorithms. For identifying Application Programming Interface keys, Numbers on Credit Cards, passwords, emails a technique known as Natural Language Processing (NLP) [12] is used. Amazon Macie's always uses Classification procedure. Low risk data and high risk data is analyzed and classified into predefined risk level categories. Macie's does the process of Monitoring also. It uses Artificial Intelligence and OLAP (historical data) for detecting non-authorized access and preventing the releasing of unprocessed raw facts and figures.

It felt amazing that how Amazon Macie does all this. This feature depends on 3 autonomous plugin for this- :

- Data: Documents formats like Microsoft Word, Excel, Notepad files may contain keywords/identifiers. Amazon Macie's withdraws those words then senses the sensitivity of the unprocessed raw facts and figures. For example, a Privacy Enhanced Mail will be treated as a high risk in comparison to a text file.
- Meta Data: Amazon Macie also finds the data about data in a file/record. In one or the other cases, it can be more beneficial in identifying as well as classifying the data into high or low risk.
- Access Information & Credentials: Amazon's Macie listens into another service provided by Amazon that is called as Cloud Trail [13]. The Cloud Trail helps in logging procedure, on each Application Programming Interface request made to Amazon Web Services resources. Macie also extricate processed data from Identity and Access Management commonly abbreviated as IAM [14].

The 3 plugins that are mentioned above are totally responsible for the classification as well as protection of unprocessed raw facts and figures. Amazon Macie at most assists Amazon S3 as its unprocessed raw facts and figures origin. AWS can conduct RedShift, RDS, and Elastic file system into the field. It's just the start of AI-authorized framework services. Microsoft, IBM and Google are in a mood to bring some change in this dimension too.

VII. EVOLUTION OF ARTIFICIAL INTELLIGENCE

The term Artificial Intelligence [15] simply means intelligence shown by a human-made object known as machines. Every aspect has something to do with one or the other thing and is evolving day by day by performing various experiments. Same with the case of Artificial Intelligence. This can be depicted in Fig.2.
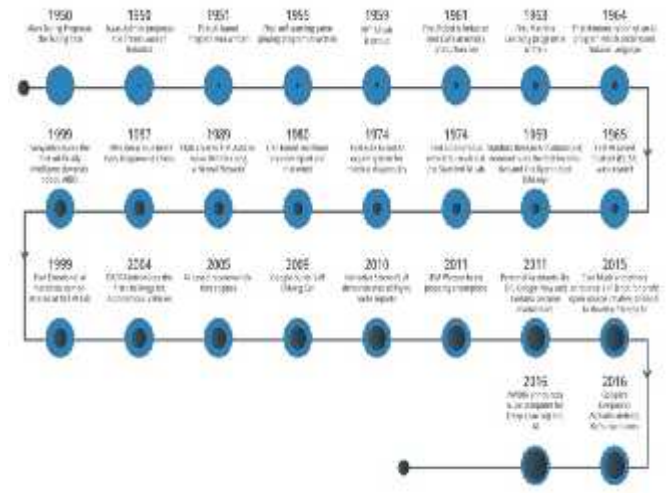

Fig.2 Evolution of Artificial Intelligence

The Evolution of Artificial Intelligence commonly abbreviated as AI started from the 1950's and are still on a path of development and all of us think that this is the future of tomorrow; no one knows what will be its end.

VIII. THE TECHNOLOGICAL ASPECT OF CLOUD AND THE ARTIFICIAL INTELLIGENCE

The potential of cloud [16] is known to everyone that has the anxiety to know the same. Its positive effects on the business segment can be either huge or little like a penny. The impact of the cloud computing has evolved from its very starting point. One feature was auto-scaling and it needed to be refined, the result of the refinement was a further release of ESDS eNlight cloud that has the vertical auto-scaling feature. The Emerging trends like Internet of Things (IOT) [17], mobile computing, have improved the segment of cloud computing in utilization and their need.

Artificial Intelligence can play a really major role in cloud computing segment that owns to the massive amounts of data stored in it.

IX. CLOUD: {A [MACHINE LEARNING] PLATFORM} (MACHINE LEARNING IS A SEGMENT OF ARTIFICIAL INTELLIGENCE)

The Technological companies like Amazon, IBM etc. created the artificial intelligence that can finally learn.

One question that arises in my mind that, what is the adequate or the ultimate source to get information or in other words processed data that can be applied to machine learning? The answer is, Cloud with an enormous amount of processed data. Any type of data can be stored or shared on a cloud, it means that there can be an Artificial Intelligence that supports voice, pictorial representations as well as Artificial Intelligence bots that will respond to text like the message bots. A few examples can be Alexa belonging to Amazon, Cortana that belongs to Microsoft and last but not the least Siri that belonged to Apple and all responds to the voice commands. Another name of them can be called as Virtual Assistants.

We are not done; it means that still, a huge or we can say enormous amount of work needs to be done in the field of the intelligence that is artificial, where the Artificial Intelligence is constructed to face the humans as humans and not the robots! The Cloud is spread across the various servers that are available, across various locations with multiple languages and that is loaded with the data i.e. immense which is extremely large or big or great! Technological companies can use this unprocessed information really effectively and to construct the artificial intelligence then can make conversations, decision making processes, suggestions and make the life of people really easy!!!!
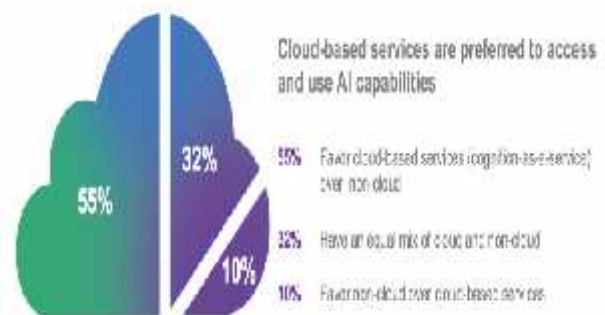

Fig.3 Cloud-based Services preferred to acces and use AI capabilities

X. THE RELATIONSHIP BETWEEN ARTIFICIAL INTELLIGENCE AND CLOUD COMPUTING

A Google event uncovers the services of cloud computing and that would allow any developer or business aspect to use a subset of Artificial Intelligence known as machine learning technologies and that can be helpful in the development of Artificial Intelligence (AI) procedures.

The Artificial Intelligence makes use of huge or enormous volumes of data stored that can be of 2 types. One type can be structured and the other can be unstructured. This data obtained can further be used for

the utilization of cloud robotic segment, the automation processes, the intelligent actions and machine learning that belongs to artificial intelligence. In todays' world the Organizations use the Artificial Intelligence to its full or enhanced potential for their benefits and developing their organization from the same case.

The Artificial Intelligence with the cloud segment is not only deploying what organizations have developed so far, but also adding advancements or we can say there is enhancement, in the use of new cases to study. AI is required in the execution of the technology as well as business strategies. The Enterprise Cloud [18] plays a really important role in this case.

XI. THE RELATIONSHIP AMONG AI, CLOUD AND HUMANS

AI and cloud computing technologies are the most needed technologies, where the Artificial Intelligence makes the human life easy and the Cloud makes the Artificial Intelligence easy. When the possibilities of the Artificial intelligence are focused, the results can help us to get the enormous amounts of data that can be processed while depending on the circle of our interests. Some examples of the results that really enhances the dimensions are security, any forecasting activities or even entertainment activities.

In starting, Humans helped the Artificial Intelligence and by that time the deep machine learning [19] was not invented, but now with deep machine learning, Artificial Intelligence is proving to be the one that is a great help to humans. This co-operation between both of them is still very strong due to which, the technological section is so advance and developed that it can be applied to any field that requires the attention of both these aspects.

XII. CONCLUSION

In the words of the Chief Executive Office of Google i.e. Sundar Pichai, The Computing scenario is being evolved from a mobile-first to an Artificial Intelligence-first world. The Delivery models of Cloud i.e. PaaS (Platform as a Service) and SaaS (Software as a Service) will be more benefitted due to the waves of the cloud and the artificial intelligence when taken as a single unit. If the 3 models can combine i.e. Artificial Intelligence, machine learning and stored data then it will help the humans to analyze and utilize it for purposes of Artificial Intelligence that combines with Cloud to be the Future of Tomorrow. The day is not far when the artificial intelligence will become the integral part of a life of a normal human being. As it was mentioned that cloud has the capability to change and when it will be mix with AI, it will drastically change the era.

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