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Intelligent Computing Relating to Cloud Computing

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***Abstract*—This paper contends that the real understanding of natural language and the fulfillment of cloud computing cannot be reached without dealing with the significant sentimental factor. This paper points out that the achievement and enjoyment of cloud computing is highly reliant on breakthroughs in advanced intelligence. In this paper, advanced intelligence refers to the high level of interaction between natural intelligence and artificial intelligence. It's part of a drive to create applications, executed in the cloud, that go beyond basic automation to anticipate situations and take decisions in real time over the Internet. We introduce intelligent computing language in the software so that machines can take decisions autonomously and in real time.**

***Index Terms*—Cloud computing**

I. Introduction

The Internet of Things (IoT) is a term that has been introduced in recent years to define objects that are able to connect and transfer data via the Internet. 'Thing' refers to a device which is connected to the internet and transfers the device information to other devices. The cloud-based IoT is used to connect a wide range of things such as vehicles, mobile devices, sensors, industrial equipment's and manufacturing machines to develop a various smart systems it includes smart city and smart home, smart grid, smart industry, smart vehicle, smart health and smart environmental monitoring. In the IoT, cloud computing environment has made the task of handling the large volume of data generated by connecting devices easy and provides the IoT devices with resources on-demand.

Reporting the latest progress and future prospects, we attempt to unify engineering and affective computing with the concept of advanced intelligence.Cloud computing has recently become a very popular topic. Instead of discussing the concept and intension of cloud computing, this paper focuses on how progress in engineering field, including natural intelligence processing and natural intelligence understanding, will enormously aid in the achievement of cloud computing. It particularly deals with how to construct clouds, how to sweep clouds, and how to predict and exploit clouds. Another concept discussed in this paper is affective computing. To a large extent, this is a breakthrough in advanced intelligence. Here, it refers to a high fusion of natural and artificial intelligence, and depends on the emotional capacity entrusted to the computer, including the capability of affective recognition and affective generation. The difference between natural intelligence (e.g human intelligence) and artificial intelligence is hard to define, as not much is known about natural intelligence. Artificial Intelligence (AI) can learn, just like natural intelligence (NI). When programmed to, Artificial Intelligence can sense changes in its environment and react accordingly. It can then refer to the ways it reacted to previous changes to help decide what to do the next time a similar change occurs.

The IoT and Artificial Intelligence (AI) will play a vital role in numerous ways in the future. There are multiple forces which are driving the growing need for both technologies and more and more industries, governments, engineers, scientists and technologists have started to implement it in manifold circumstances. The potential opportunities and benefits of both AI and IoT can be practiced when they are combined, both at the devices end as well as at server. For example, AI combined with Machine learning can study from the data to analyze and predict the future actions in advance, such as order replacements in marketing and failure of equipment in an industry just in time. Moreover, AI can be used with machine learning in smart-homes to make a truly grand smart home experience. Similarly, AI methods with IoT can be used to analyze the human behavior via Bluetooth signals, motion sensors, or facial-recognition technology and to make the corresponding changes in lighting and room temperatures. This special issue aims to gather recent research works in emerging artificial intelligence methods for processing and storing the data generated from cloud-based Internet of Things.

II. Artificial Intelligence

Artificial intelligence (AI) [1]-[3] is the intelligence of machines and the branch of computer science that aims to create it. AI textbooks define the field as "the study and design of intelligent agents" where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. Who coined the term in 1956, defines it as "the science and engineering of making intelligent machines."

The field was founded on the claim that a central property of humans, intelligence can be so precisely described that it can be simulated by a machine. This raises philosophical issues about the nature and the ethics of creating artificial beings. Artificial intelligence has been the subject of optimism, but has also suffered setbacks and, today, has become an essential part of the technology industry, providing the heavy lifting for many

of the most difficult problems in computer science.

AI research is highly technical and specialized, deeply divided into subfields that often fail in the task of communicating with each other. Subfields have grown up around particular institutions, the work of individual researchers, the solution of specific problems, longstanding differences of opinion about how AI should be done and the application of widely differing tools. The central problems of AI include such traits as reasoning, knowledge, planning, learning, communication, perception and the ability to move and manipulate objects. General intelligence (or "strong AI") is still among the field's long term goals.

III. Affective Computing

Affective computing is the study and development of systems and devices that can recognize, interpret, process, and simulate human affects. It is an interdisciplinary field spanning computer sciences, psychology, and cognitive science. While the origins of the field may be traced as far back as to early philosophical enquiries into emotion. A motivation for the research is the ability to simulate empathy. The machine should interpret the emotional state of humans and adapt its behaviour to them, giving an appropriate response for those emotions.

In case of advance intelligence we can relate to an equation; The value of cloud computing v can be described as v = d ∗ s ∗ (1 + n) ∗ (1 + ai)2 (1) Where d signifies the value of resource pools, s the value of service, n the value of Language understanding and ai the value of advanced intelligence.

IV. Cloud Computing

Cloud computing [4]-[6] is the use of computing resources (hardware and software) that are delivered as a service over a network (typically the Internet). Cloud computing entrusts remote services with a user's data, software and computation. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services. Although we literally discussed “clouds” and “cloud computing”, this paper stresses on affective computing, and advanced intelligence.

Cloud computing is an information technology (IT) paradigm that enables ubiquitous access to shared pools of configurable system resources and higher-level services that can be rapidly provisioned with minimal management effort, often over the Internet. Cloud computing relies on sharing of resources to achieve coherence and economies of scale, similar to a public utility.

Third-party clouds enable organizations to focus on their core businesses instead of expending resources on computer infrastructure and maintenance [1]. Advocates note that cloud computing allows companies to avoid or minimize up-front IT infrastructure costs. Proponents also claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and that it enables IT teams to more rapidly adjust resources to meet fluctuating and unpredictable demand [1]-[3] Cloud providers typically use a "pay-as-you-go" model, which can lead to unexpected operating expenses if administrators are not familiarized with cloud-pricing models [4].

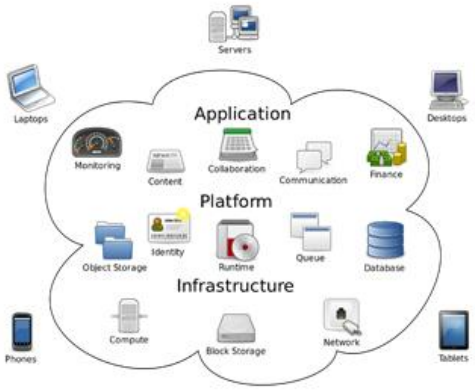

Fig. 1. Cloud computing

V. Algorithm

Algorithm 1: MRW (_)
Input: a classical planning problem_
Output: a solution plan
1 s ← sI ;
2 hmin← h(sI) ;
3 counter ← 0 ;
4 while s does not satisfy sG do
5 if counter > cm or dead-end(s) then
6 s ← sI ;
7 hmin← h(sI) ;
8 counter ← 0 ;
9 s ← RandomWalk(s,_) ;
10 if h(s) < hmin then
11 hmin← h(s);
12 counter ← 0;
13 else
14 counter ← counter + 1;
15 return plan;

AI's scientific goal is to understand intelligence by building computer programs that exhibit intelligent behaviour. It is concerned with the concepts and methods of symbolic inference, or reasoning, by a computer, and how the knowledge used to make those inferences will be represented inside the machine. Of course, the term intelligence covers many cognitive skills, including the ability to solve problems, learn, and understand language; AI addresses all of those. But most progress to date in AI has been made in the area of problem solving -- concepts and methods for building programs that reason about problems rather than calculate a solution.

Cloud is nothing but the group of servers and datacenters that are placed at different places and these severs and datacenters are responsible for providing on demand service to its users with help of internet. The service provided by cloud is not present on user’s computer. User has to access these services with help of internet connection through subscribing them. The main advantage of Cloud computing is

that it eliminates the need for user to be in same location where hardware software and storage space is physically present. Cloud makes it possible to store and access your data from anywhere anytime without worrying about maintenance of hardware software and storage space. All these services are provided to user at low cost. User has to pay according to storage space he is using. Due to this flexibility everyone is transferring his data on cloud.

VI. Proposal

As the Internet becomes faster and more robust, the desktop or laptop computers we all work with will become, primarily, tools to access the cloud. That in itself is not too much of a surprise. After all, the use of applications that live on the Internet has gained momentum since we entered the 21st century. Every time we check a web-based email, like Hotmail, or interact with our friends on social networking sites, we are cloud computing. But the challenge for cloud computing now is for business to take advantage of it. However, current research on cloud computing has focused mainly on attempts to construct resource pools, including data, platforms, software, and so on. In fact, real cloud computing should be built upon the basis of natural language understanding, because the attainment of cloud computing should rely on lightweight devices (such as cell phones) to access services, and not on traditional facilities (such as heavyweight PCs). Cloud computing can be regarded as the development of distributed processing, parallel processing, and network computers, or even as a commercial product of computer science. Customers can access the cheap services delivered by cloud computing at any place (as long as they can see the “sky”) and any time (unless a solar eclipse and power outage occur simultaneously). It is exciting to forecast that only a laptop or cell phone is required to access a service through the Internet

VII. Services Provided for Deep Learning

Various companies are providing facilities to perform deep learning analytics on the cloud. Google Cloud Platform added support for NVIDIA Tesla K80 GPUs, providing new capabilities for deep learning processing for users. The NVIDIA GPUs have been integrated with Google Cloud Machine Learning and TensorFlow to help reduce the time taken to train machine learning models at scale [7]. AWS and Microsoft Azure, the two leaders in the cloud IaaS space, have been working to provide GPU integrations. Cirrascale is a company which is a specialist in designing and hosting compute infrastructure for deep learning. The company uses its data center near San Diego to provide this infrastructure as a service. It has similarities with Amazon Web Services in the way it provides its cloud servers. Unlike AWS, which provides virtual server instances, Cirrascale’s deep learning cloud is a bare-metal cloud service. It provides a dedicated high-performance box to run the requisite software [8]. Customers doing machine learning development work are new to the world of high-performance computing. Setting up, managing, and cooling an HPC cluster is not an easy and trivial task. Thus researchers will be happy to offload that problem to someone who understands it and focus on the analysis part. A solution for hosting and distributing trained deep learning models on Algorithmia using GPUs in the cloud. Researchers and developers can train their neural nets locally, and deploy them to Algorithmia’s scalable, cloud infrastructure. There they become smart API endpoints for other developers to use. Native support for the Caffe, Theano, and TensorFlow frameworks, and 15 open source deep learning models that run as micro services to start [9]. GPUs on-demand and running in the cloud, eliminate the manual work required for teams and organizations to set up and experiment with cutting edge deep learning algorithms and models, which allows them to get started for a fraction of the cost. Nervana Cloud is a full-stack hosted platform for deep learning. It allows developing and deploying high-accuracy deep learning solutions at a fraction of the cost of building your own infrastructure and data science team.

VIII. Conclusion

The combination of advanced analytics software and the availability of cheap processing power makes the cloud a perfect place to perform analytics using deep learning. Machine Learning Is Everywhere and deep learning is the phrase de jour. The Cloud’s power is inescapable. Analysis, computation and statistics are made easier on the cloud and the workloads are highly variable. Deep learning requires heavy computing resources. It is cost prohibitive to build the infrastructure yourself and power it locally. Deep learning in the cloud can utilize the massive infrastructure available online thus the combination of these two will be feasible.

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