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Intelligent Cloud

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ABSTRACT:
Cloudcomputingisadistributedsystemthatdeliverscomputingasaservice.Itissharingofcomputerresources overanetwork.Thecloudisusedasastoragelocation that can be accessed and computed from anywhere.Artificialintelligencemeansmakingthecomputersasintelligentasman.Itisthestudyofhowtomakethecomputerstobehaveasmuchorbetterthanhuman.Machineswithartificialintelligencecanbemanagedautonomously.Bothcloudcomputingandartificialintelligence are emerging technologies. So the integration ofthese concepts together brings a tremendous advantage in thefield of technology. By applying artificial intelligence to thecloud, a system can be developed, by which the computers canmanage themselves. An intelligent cloud is the combination ofcloud and artificial intelligence. The paper covers a study ofintelligent clouds which includes Artificial intelligence, Cloudcomputing and intelligent cloud. Furthermore the advantagesanddisadvantagesofintelligentcloudservicearealsodiscussedinthepaper.

Keywords—Cloudcomputing,artificialintelligence,intelligentcloud.

I. INTRODUCTION

Thestoragespaceandgooddecisionmakingaretheimportantfactsforanyapplicationsinthefieldoftechnology. Cloud computing is an emerging technologythat provides a large amount of storage. Cloud offers manyother valuable services. There is a high level of interactionbetweennaturalintelligenceandartificialintelligence.Introducing intelligent computing language in the softwaremakesthemachinesautonomous.Theapplicationofartificialintelligencetothecloudmayleadtothedevelopmentofasystemthroughwhichcomputerscanmanagethemselves.Itwillmakethemachinesautonomous. The creation and execution of applications inthecloudwillhelpinpowerfulautomationtohandlesituations and take decisions in real time over the internet.Today,itisnecessarytoconsidercomputers'powerconsumption and regulate their operation according to thespecificneedsatanygiventime,thusreducingenergyexpenditure.AnIntelligentcloudhelpsfortheabovepurpose.Intelligentcloudenablesthemachinestotakedecisions autonomously in real time and use the resourcesand servicesavailable inthe cloudefficiently.

II. CLOUD COMPUTING

Cloud computing is the emerging technology of deliveringmanykindsofresourcesasservices,mainlyovertheinternet.Thedeliveringpartyisreferredtoastheservice providers, while the users are known as the subscribers.Subscribers pay subscriptionfees typically on aper-usebasis. Cloud computing is broken down in to few differentcategoriesbasedonthetypeofserviceprovided.SaaS(Software as a Service) is the category of cloud computinginwhichthemainresourcesavailableasaservicearesoftware applications. PaaS (Platform as a Service) is thecategory/applicationofcloudcomputinginwhichtheserviceprovidersdeliveracomputingplatformorasolution stack to their subscribers over the internet. IaaS(InfrastructureasaService)isthecategoryofcloudcomputinginwhichthemainresourcesavailableasaservice are hardware infrastructure. DaaS (Desktop as aService),whichisanemergingAaSservicedealswithproviding awhole desktop experience over the internet,Cloud database is mostly used as a service called Databaseas a Service (DBaaS). Cloud computing is basically a salesand distribution model for various types of resources overthe internet. A cloud database is a database that typicallyrunsona cloudcomputingplatform.Therearetwocommon deploymentmodels:users can run databases onthe cloud independently, using a virtual machine image, orthey can purchase access to a database service, maintainedby a cloud database provider. Cloud databases are mainlyusedfordataintensiveapplicationssuchasdatawarehousing, data mining and business intelligence. Theclouddatabaseallow storageofahugeamountof dataand easy to manage and reduce the costs as well. Cloudcomputing is very efficient in recovering the informationafter a disaster in the database.A cloudservices

reducesthe cost and complexity of owning and operating computernetworks and provide scalability, reliability and efficiency.In cloud computing the database outsourcing has becomeveryimportantcomponentnowadays.

III. ARTIFICIAL INTELLIGENCE

Artificialintelligencemeansmakingthecomputersintelligent. It is the study of how to make the computers tobehave asmuch or betterthan human. There aremainlytwo differences between natural intelligence and artificialintelligence- The first one is that natural intelligence canforget and lose information and the second is its accuracy.In the case of Artificial Intelligence, whenever the sameinformationisretrievedmultipletimes,theinformationremains the same. But in the case of natural intelligencewhen given thesameinformation,itcannotbeas exact,and is slower. Three recent breakthroughs have unleashedthelong-awaited arrivalofartificial intelligence:

1. Cheapparallelcomputation

Thinkingisaninherentlyparallelprocess,billionsofneurons firing simultaneously to create synchronous wavesofcorticalcomputation.Tobuildaneuralnetwork,theprimaryarchitectureofAIsoftwarealsorequiresmanydifferent processes to take place simultaneously. Each nodeof a neural network loosely imitates a neuron in the brain,mutually interacting with its neighbors to make sense of thesignals it receives. To recognize a spoken word, a programmust be able to hear all the phonemes in relation to oneanother; to identify an image, it needs to see every pixel inthe context of the pixels around it,both deeply paralleltasks. But until recently, the typical computer processorcould onlypingonethingat atime.

2. BigData

Every intelligence has to be taught. A human brain, whichis genetically primed to categorize things, still needs to seea dozen examples before it can distinguish between say,cats and dogs. That's even more true for artificial minds.Even the best-programmed computer has to play at least athousand games of chess before it gets better. A part of theAIbreakthroughliesintheincredibleavalancheofcollecteddataaboutourworld,whichprovidestheschooling that AIs need. Massive databases, self-tracking,webcookies,onlinefootprints,terabytesofstorage,decades of search results, Wikipedia, and the entire digitaluniversebecametheteachersmaking AI smart.

3. Betteralgorithms

Digital neural nets were invented in the 1950s, but it tookdecades for computer scientists to learn how to tame theastronomically huge combinatorial relationships between amillion or 100 million neurons. The key was to organizeneuralnets into stacked layers.Let’s take the relativelysimple task of recognizing that a face is a face. When agroup of bits in a neural net are found to trigger a pattern,the image of an eye for instance,then the result is movedup to another level in the neural net for further parsing. Thenext levelmight group two eyes together and pass thatmeaningfulchunkontoanotherlevelofhierarchicalstructure that associates it with the pattern of a nose. It cantakemillionsofthesenodes(eachoneproducingacalculationfeedingothersaroundit),stackedupto15levelshigh, torecognize ahuman face.In 2006, GeoffHinton, at the University of Toronto, made a key tweak tothis method, which he dubbed“deep learning.” Hewasable to mathematically optimize results from each layer sothat the learning accumulated faster as it proceeded up thestackoflayers.Deep-learningalgorithmsacceleratedenormously a few years later when they were ported toGPUs. The code of deep learning alone is insufficient togenerate complex logical thinking, but it is an essentialcomponentofallcurrentAIs,includingIBM'sWatson,Google'ssearchengine,and Facebook'salgorithms.

The advent of AI didn't diminish the performance of purelyhumanchessplayers.Quitetheopposite,cheap,supersmart chess programs inspired more people than ever toplay chess, at more tournaments than ever, and the playersgot better than ever. There are more than twice as manygrand masters now as there where when Deep Blue firstbeatKasparov.Thetop-rankedhumanchessplayertoday,Magnus Carlsen, trained with AIs and has been deemed themost computer-like of all human chess players. He also hasthehighesthuman grandmaster ratingofalltime.

IfAIcanhelphumansbecomebetterchessplayers,itstands to reason that it can help us become better pilots,better doctors, better judges, better teachers. Most of thecommercial work completed by AI will be done by special-purpose,narrowlyfocusedsoftwarebrainsthatcan,forexample, translate any language into any other language,but do little else. Drive a car, but not converse. Or recallevery pixel of every video on YouTube but not anticipateyour work routines. In the next 10 years, 99 percent of theartificial intelligence that you will interact with, directly orindirectly,willbeautistic,supersmartspecialists.

In fact, thiswon'treally beintelligence, at least not aswe've come to think of it. Indeed, intelligence may be aliabilityespeciallyifby“intelligence”wemeanourpeculiarself-awareness,allourfranticloopsofintrospection and messy currents of self-consciousness. Wewant our self-driving car to be inhumanly focused on theroad,notobsessingoveranargumentithadwiththegarage.

IV. INTELLIGENT CLOUD

Theintegrationofbothcloudcomputingandartificialintelligence provideanotherservice"Cloudas a brain".Artificial intelligence and cloud are symbiotic because eachservicecomplimentstheother.Advancedartificialintelligence tasks can require an entire datacenters worth ofcomputing resources. In some cases, multiple datacenterscould be needed to perform advanced AI tasks. Artificialintelligencerequiresabundantsystemsresourcesandtraditional means of doing these tasks meant going out andbuyingthe equipment orcollocatingservers.

Since artificial intelligence tasks can now be performed inthe cloud, these tasks can be spread across datacenters ifneeded.Artificialintelligenceworksbyhashinglargeamountsofdata.Theartificialintelligenceenginethencompares the datawith data known tobe correct againstthe data the engine proactively gathers and examines. Thealgorithmsaredesignstoaddnewknowledgetoaparticular nesting of data once new data is obtained andconfirmed to be true using internal methodologies. As youcansee,thesetypesofprocesseswouldoverloadyournormal personal computer which is why the public cloud isidealforartificial intelligencetasks.

"The cloudwill take on a more active role in connectingthe Internet of Things by acting as the ever-present 'brain'that ties everything together.The cloud takes on functionsthat mimic or act like our brain in terms of rule execution,inference and deduction similar to Apple computer's Siri orIBM'sWatsonthatisavailabletoeveryone,everywhere[6].

More important, this feature could be built into a futurecloudsothateveryapplicationcouldleveragethesefunctions.ThiswouldactasthegluethatenablestheInternet of Things to work in a coordinated fashion, sharingthese'brain-like'functionsofthecloud."

VI. CONCLUSIONS

- Cloud agents. Intelligent software programs thatact autonomously on behalf of a user to carry outtasks like scheduling appointments with doctors orfinding the best price on products.The Cloud as aBrain will enable new levels of performance bythese agents as they take advantage of unlimitedcomputecapacity,reasoningand smartdata.
- Sensors everywhere. As we instrument the world,monitoringcentersneedtobeabletocorrelatesensor inputs and even have sensors collaboratewith other sensors or trigger other sensors in anarray.Again, Cloud as a Brain becomes the gluetyingthesesensorstogetherandenablingthecollaboration.
- Robot assistants. As robotic assistants, driverlesscars, drones, worker bots and humanoid servantswillbecomecommonplace,robotswillrequirehigh-levels of precision, reliability and the abilityto respond to new situations.That is where theCloud as a Brain will offer collaboration, smartdata,interactionwithsensors,contextualawarenessandmachine learning.
- Augmented reality heads-up displays. In the nearfutureourglasses,contactlensesandpossiblyevenretinaswillbeinstrumentedwithanaugmented reality layer to enhance our situationalawareness. Expanding and continuously updating,searching,identifyingandcontextualizingthereal-time experience encountered through our eyeswill require the Cloud as a Brain to process suchbigdata inrealtime.
- Itwillbeinterestingtoseeifandwhenothermajorcloudplayersopenuptheirintelligentassistants,includingGoogle Now,Microsoft'sCortana (not yet released) and Apple's Siri.Myguess is that the Watson Cloud opens up a newfrontinboththecloudproviderwarsandthesmartphonewars,whereothervendorsarecompelledbythemarketp lacetoreleasetheirCloud asa Brainplatforms.[8]

Intelligent cloud offers a unique way to use and managecloudresources.Cloudprovidesreliability,elasticity,scalabilitywithlowcostandalsoprovidesalargespaceford atastorage.The intelligentc loud ever presents a'brain'thattieseverythingtogether.Theysharesimilarconcepts and features such as schema free database, simpleAPI,eventualconsistency,scalabilitysynchronousorasynchronousreplication,powerfulmanagementandcontr ol etc. Intelligent cloud already became a part of lifefornewgeneration people.Theexisting implementationsofintelligentcloudmaybethefootstepstoavastdevelopmentinfuture.

V. INTELLIGENT CLOUD SERVICES

Watsonisaprimeexampleofartificialintelligence.Watsonrosetofameduetoitsappearanceonthehittelevision game show Jeopardy.IBM has since harnessedWatson's Cognitive Computing model and released it as aservice in the cloud. Watson's Cognitive Computing modellets the system learn from incorrect data therefore Watsonbecomes smarter in its decision making skills, just like ahuman. Watson is available as a Service and organizationscan begin utilizing the artificial intelligence cloud servicewithintheirspecific field.[7]

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