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BIGDATA AND ITS APPLICATIONS

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Abstract

Technology has changed a lot in this digital era. Earlier we had landline phones but now wehave Smartphones, Laptops and Tablets that are making our life smarter. We were usingbulky desktops for processing huge amounts of data, we were using floppies and hard disksto store the data earlier. Now we can store data in the cloud. Due to the enhancement oftechnologyweweregeneratingalotofdata,forexampleeachsmartphoneuserapproximately generates 40 Exabyte's of data every month in the form of texts, emails,phone calls, videos, photos, searches, music, etc., if this number is multiplied by 5 billionsmartphone users, that is a large amount. Traditional computing systems cannot handle thislarge amount of data. You have no idea about how much data you are generating in eachminute.Butthechallengingparthereisthatthedataisnotpresentinastructuredmannerand it is huge in size. Data is being generated in millions of ways and it is one of the biggestfactors for the evolution of Big Data. With the exponential growth of the data, people startedto store it in relational database systems. But with the advancements in the internet anddigitalization, they are insufficient. In order to overcome this, big data came into the picture.This Big Data.Provides a new set of tools and technologies to store a large amount ofunstructured data.

Industryinfluencers,academicians,and other prominent stakeholders agree that Big Datahas become a big game-changer in most industries. The primary goal for most organizationsis to enhance customer experience, cost reduction, better-targeted marketing, and makingexistingprocessesmoreefficient.Inthispaper,welookintothevariousapplicationsthatBig Data offers to the industries, Industry-specific challenges that these industries face, andhow Big Data solves these challenges.

KeyWords:BigData,DataMining,DataAnalytics,Industries,Business,Customers.

International Journal for Innovative Engineering and Management Research
A Peer Reviewed Open Access International Journal
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Introduction

EveryonenowadaysusesFacebook,Instagram,YouTube,andavarietyofothersocialmediaplatforms.2.1millionsnapsare posted on Snap chat every minute, 3.8 million Googlesearchesaremade,onemillionindividualslogontoFacebook, 4.5 million videos arewatchedonYouTube,and188millionmailsarereceived.Youhavenoideahowmuchdatayou are producing every minute.

Abuzzword that has grabbed the maximum attention these days is Big Data. It is probablyon everyone's mind for quite some time now. The truth is that Big Data is spreading likewildfire and is on the approach of overtaking the entire globe. It has not only taken over theITbusiness, but has also taken over other industries. Because of the advantages it providesin a variety of businesses, it has become a vital element of them. Big Data is graduallydisplacingearliertechnologies,whichisamajorsourceofanxietyforthosecurrentlyworking in the field. Big Data is a collection of structured, semi structured and unstructureddatacollectedbyorganizations that can be mined for information and used in machinelearning projects, predictive modeling and other advanced analytics applications. Big Dataanalyticsisthestudyofenormousamountsofdatainordertofindhiddenpatterns,correlations,andotherinsights.Withtoday'stechnology,youcanevaluateyourdatavirtually,instantlyandgetanswersfromit.BigDataenteredintothepictureandthespectatorprovidedanewsetoftoolsandtechnologyforstoringlargeamountsofunstructured data. This allows us to store a large amount of unstructured data and that helpsus to reduce the costs and increase memory analytics performance. Because of client needsand happiness, Big Data allows us to make faster and better decisions. It helped us to expandthe availability of new products and services concept of big data and its importance now.Data capture, storage, analysis, search, sharing, transfer, visualization, querying, updating,informationprivacy, anddata source areall issues inBig Data analysis.

Applications
Weather Forecast

When a storm strikes unexpectedly and you are unprepared, it is a terrible situation. As aresult, it is extremely inconvenient if the weather abruptly changes; dealing with cyclones,hurricanes, and floods without warning is very difficult. It is extremely difficult to anticipatetheweatherinadvancedueto the vastness and complexity of weather systems. So wecreated a weather prediction engine that uses a data analysis tool to forecast the weather forthe next several days. Big data enables us to gather all of the information needed to forecastthe weather, such as climate change, wind direction, precipitation, past weather reports, andso on. After gathering all of the information, we can use the weather prediction tool todetermine what will happen next. By analyzing all of the spectator weather prediction, Itgeneratesaccuratepredictionsoftheprobablerainsornaturalcalamity.Aweatherpredictionengine is used to predict the weather of every place around the world for any

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given timeperiod. By using this type of engine we can be well prepared for any climatic change or anynatural calamity. Big Data is used to deal with such a situation. Predicting a landslide isextremely difficult with just the basic warning signs. This lack of foresight can result insignificant loss of life and property. The University of Melbourne has created a cutting- edgetechnology that combines Big Data and applied mathematics. We can forecast the boundarywhere a landslide is likely to occur two weeks ahead of time using this method. Accurateprojections like this, made two weeks in advance, are useful for emergency preparation tosave lives and health, as well as moving people in that location. It also provides an insightinto the magnitude of the upcoming destruction and helps in relocating the people. So BigData is very useful in weather forecasts and predicting any natural calamities across theworld.

PredictingWeatherisveryimportantinsome areasforexample

Agriculture: In order to plant, water, and harvest crops on time, a prediction is required.

Inordertomanageacropbyregulating pests and fertilizer use, the prevalence of fungalinfections in the wind is also displayed in weather predictions.

Sports: Weatherpredictionplaysanimport antroleinsports;therearenumerousapplicat ions that tell us where to play, how many days we have to play, what the optimumtime is, and what the present climate of the location where the game will take place.

Medication: Environmental factors such as temperature, humidity, dust, air quality, cold orwarm climate, and so on are linked to patient health, forecasts are useful for patients withasthma, allergies, wheezing, cold and coughing, eye-flu, and so on to get a current picture ofthe current situation in a specific location.

Forestry: Proper forecasting is necessary for preventing and managing forest fires, ensuringthe safety of wildlife and wildfires, and predicting the spread of dangerous insects, amongother things.

Airandlandfreight: Weatherdataisused byboththeairandlandfreightindustrytopi ckroutes and roads.

HealthCare

Big Data is widely used to save many lives, making it one of the most significant fields. Thelargevolumeofdatacanbestoredsystem aticallywiththe help of Big Data. It's mostlyuseful in the healthcare industry. Medical research is done more efficiently with the use ofBig Data, and new treatments and medicines are discovered by analyzing all prior medicalhistories. Using Big Data Analysis, we can locate medicine for incurable diseases. Becauseone drug may not be beneficial for all patients, personal care is essential for each patient.This care is delivered to each patient based on their previous medical history, individualmedical history, and physical parameters are analyzed. The cost of medical treatment riseswith each passing day; this can be minimized by reducing the readmissions. We can take along time efficient treatment by analyzing all the data, which protects the patient from

beingreadmittedfrequently.Dataanalystsareutilizingthisdataasaresultofglobalizationtobuildmore and more effective treatments. It is now regular practice to look for unique patterns inparticular drugs in order to find ways to generate more cost-effective solutions. Big DataAnalytics has improved health care by providing personalized medicine and prescriptiveanalytics. In addition, researchers are mining the data to see what types of treatments aremore effective for specific conditions, and based on that, they identify patterns related todrug side effects, and then provide solutions that can help the patient and reduce the cost andunhealthy and technologies.

Big Data is very useful in some sectors of Health care for example

Big data to fight cancer: Cancer is afflicting people all around the world at an alarmingrate. Big data can aid in the more effective fight against cancer. Healthcare providers will bebetter able to detect and diagnose diseases early on, assign more appropriate medicationsbased on a patient's genetic composition, and adjust drug doses to reduce adverse effects andimproveefficacy.

Monitoring patient vitals: Big data makes it easier for hospital employees to work moreefficiently by monitoring patient vitals. Sensors are utilized to continuously monitor bloodpressure, heartbeat, and breathing rate in addition to patient beds.

Smoother Hospital Administration: With the use of Big Data, healthcare administrationbecomesconsiderablymore efficient.It aids in lowering the cost of care measurement,providing the greatest clinical support, and managing the at-risk patient group.

HealthcareIntelligence: HealthcareIntelligenceapplicationscanbenefitfromBigData.Byestablishing smart business solutions, hospitals, payers, and healthcare agencies will be ableto enhance their competitive advantages.

Fraud Prevention and Detection: Big data aids in the prevention of a wide range of errorsmade by health administrators, such as wrong dosage, wrong medications, and other humanerrors. It will be very beneficial to insurance companies. They are capable of preventing awide range of insurance fraud claims.

Telemedicine: It's utilized for primary consultations and first diagnoses, as well as remotepatient monitoring and medical education for healthcare providers. Tele surgery, wheresurgeons can use robots to perform surgeries, and high-speed real-time data transfer withouthaving to be physically present with a patient are some of the more particular applications.Telemedicine helps to cut expenses and enhance service quality by keeping patients out ofhospitals. Patients save time by not having to wait in lines, and doctors save time by nothaving to waste time on unneeded consultations and paperwork. Telemedicine also increasestheaccessibilityofcarebyallowing doctors to monitor and consult with patients fromanywhere and at any time.

MediaandEntertainment

The entertainment and media sector is enormous. In the media and

entertainment businessBig Data is commonly used. Big Data produces excellent results while lowering a company'srevenue.Youcanseeadvertsons ocialmediasitesandinyouremailinboxesbe causeyour

data, such as your past browsing history and purchase data, is analyzed. They display whatyou like in the form of advertising that is interesting to look at once they have analyzed yourpreferences. This is known as Customer sentiment analysis. Customers are extremely crucialto businesses. If the consumer is satisfied, the company's revenue will rise. You may havenoticed a segment that says the most recommended list for you while purchasing an itemfromanE-Commercesiteorwatchingvideosonanente rtainmentsite.Thislistisapersonalized list that is made available to you by analyzing all of the data such as yourprevious watch history, subscriptions, likes, and so on. The recommendation engine is aprogramme that filters and analyses data and then presents you with a list of items that youare most likely to be interested in. This allows the site to retain and engage clients for a longtime. The next step is customer churn analysis, which occurs when a consumer cancels theirservice subscription. By analyzing the behavioral patterns of previously shown consumers,anyorganizationcan identify which of the effective programmes for customer retentionletters now looking at and use case of Starbucks big data is effectively employed by theStarbucks Cup. With 17 million users, you can

imagine the amount of data generated. data

intheformoftheircoffeebuyinghabitsdistor tavisitandtothetimetablechairsallofthisdat a is fed into the earth so that when a customer visits a new Starbucks location, the systemanalyses all of the data and provides us with their preferred order this app also suggests newproductstothecustomerinadditiontope rsonalizedoffersanddiscountsonspecialoc casions

These are some applications of Big Data in Media and Entertainment industry:

Taking Care of Customers: Nobody is more essential to a media and entertainment firmthan its users, and keeping them satisfied is their most difficult responsibility. Companiesmust ensure that all of their customers' wishes are met. To do so, they must understand whattheir clients require. The usage of recommendation algorithms, which is a product of BigData analytics, is the greatest aspect.

See-through the Customer's Eyes – Optimize: Big Data has broken down all barriersbetween users and distributors in the media and entertainment business since its inception.Big Data analytics is allowing businesses to connect with their customers in ways they neverhave before. Additionally, this aids them in increasing their earnings. Other services, such ason-demand and scheduled viewing, were conceivable only after Big Data analytics becameavailable.

Making People Mad with Ad: The more effective their advertising strategy is, the morenew clients they will acquire. Big Data analysis enables businesses to

create more tailoredadvertisementsandprovidesinsightsintotheoptimaltimestobroadcastthoseadvertisementsinordertocapturetheattentionofthegreatestnumberofcustomers.Because Big Data has enabled media companies to grasp their client's exact preferences, it isquite simple for them to engross them.

Content is the King: The media and entertainment industries are increasingly benefitingfromBigData.It provides them with new revenue streams on a regular basis. Productupgrades have become increasingly cost-effective as Big Data has assisted them in knowingwhat all of their customers require.

BankingandSecurities

Big Data is more than a trend in the banking industry. Keeping up with the competition hasbecome a requirement. Banks must recognize that a data scientist may assist them in betterfocusingtheirresources,makingbetterdecisions,andimprovingperformance.We'vecompiled a list of data science use cases in the banking industry to give you anidea of howyoumay deal with large volumesof data and make efficientuse of it.

The fraud detection: Machine learning is critical for successful detection and prevention offraud including credit cards, accounting, and insurance, and more proactive fog detection inbankingiscriticalfordelivering security to customers and workers. The earlier a bankdetects fraud, the faster it can respond. It has the ability to limit account activity in order toreducelosses.Whenanyunusuallyhightra

nsactionsoccur,the bank's fraud protectionsystem is set up to put them on hold until the account holder approves the transaction, this isanexample of effective bulb detection.

Managing customer data: Banks are required to gather, analyze, and store huge amounts ofdata, but instead of viewing this as a compliance exercise, machine learning and data sciencetechnologies may help banks learn more about their customers and develop new incomeopportunities.Nowadays,asdigital bankingbecomesmore popular and widely used, itgenerates terabytes of customer data. The first step for data scientists is to double the amountof truly relevant data. After that, armed with information about customer behaviors in dragand preferences tables, table specialists can unlock new revenue opportunities for banks byusing accurate machine learning models.

Riskmodelingforinvestmentbanks: Investmentbankingevaluatestheworthofcompanies to create capital in corporate financing for synodic mergers and acquisitions,conduct corporate restructuring or reorganizations, and for investment purposes, which iswhyriskmodellingis a high priority for investment banks because it helps to regulatefinancial activities and plays the most important role when pricing financial instruments.

Personalizedmarketing: Makingapersonalizedofferthatmeetsthespecificclient'sdemands and preferences is the key to marketing success. Data analytics allows us to createpersonalized marketing that

delivers the right product to the right person at the right time ontherightdevice.BigDataiscommonlyuse dtoidentifypotentialcustomersfornewprod ucts. Data scientists use behavioral demographic and historical purchase data to build amodel that predicts the likelihood of a customer responding.

Lifetimevalueprediction:Client lifetime value (CLV) is a forecast of the total valuederived from a company's whole relationship with a customer. The value of this metric israpidly increasing because it aids in the development and maintenance of good relationshipswith specific clients, resulting in increased profitability and business growth.

Real time & predictive Analysis: Because every use case in banking is closely interrelatedwith analytics, machine learning algorithms and data science techniques can significantlyimprove banks' analytics strategy, because every use case in the banking industry is closelyrelated to analytics due to the rapidly growing availability of analytics have become a moresophisticated and accurate real-time analytics help to understand the problem that holds backthebusiness.Whilepredictiveanalytic saidinselectingtherighttechniqueto solve itsignificantlybetterresultscan be achieved by integrating analytics into the bank workflowto avoid potential problems in advance.

Customer segmentation: Customer segmentation is the process of identifying groups ofcustomers based on their behaviour (behavioural segmentation) or specific

characteristics(demographicsegmentation),such as region, age, and income. Data scientists use a varietyof techniques, such as clustering, decision trees, and logistic regression, to learn the CLV ofeach customer segment.

Recommendationengines: Datasciencea ndmachinelearningtoolscan create simplealgorithms that analyze and filter a user's activity in order to suggest the most relevant andaccurateitems.Forexample,recommen dationenginesshowitemsthatmayinteresta user

even before he searches for it himself. To build a recommendation engine, a team of expertsmustanalyze and process a large amount ofdata to identify customer profiles.

Customer support: As part of customer service, outstanding customer support services arenecessarytomaintainproductivelong- termrelationshipswithyourcustomers.Ines sence,all banks are service-based businesses, so the majority of their activities involve elements ofservice. This includes responding to customers' questions and complaints in a fair and timelymanner. Obtain a competitive advantage, banks must recognize the value of incorporatingBigDataintotheirdecision- makingprocessanddevelopingplansbased on actionableinsights from their clients' data.

EducationSector

Big Data is being used in the field of education. Students educational experiences are betterunderstood when modern institutions utilize their student

data. This provides educators withunparalleled chances to reach out to kids and teach them in novel ways. It will offer them abetter knowledge of what students go through in school. Big Data is also being used tochangetheeducationalsystemsothatchildrencanreceiveawell-rounded education.Thousandsofstudentsenrollinavarietyofcoursesatvariousinstituteseachyear,generating a massive amount of data. Course information, enrollment year, student ID, examgrades, and specific subject marks make up the student data.

Enhancing Student Results: The grades achieved in exams, projects, and assignments arethe most popular techniques of analyzing a students performance. However, all of thesegrades can be added together to create a unique data trail that the student leaves behindthroughout their lives. Analyzing these data trails can aid educators in better understandingstudent behaviour and performance. With Big Data, it will be feasible to track their actions,such as their response time for exam questions, the sources they use to educate themselves,and the questions they skip. The real-time analysis will aid in providing students with muchmoreenhancedfeedbackontheirperformance.Feedbackhasthepotentialtogreatly enhanceoutcomes.Analyzingthisdatastreaminrealtime betereducation to their students.

Improve Grading System: Big data assists educators in keeping track of their studentsprogress. The analysis aids in the comprehension of individual and collective performance.Thestatistical analysis of individual grades will assist educators in better understandingstudents areas of interest. The grading method should be improved to emphasize the majorareasinwhichthestudentexcelled.Teacherswill be able to provide vital feedback tostudents and assist them in picking the proper career path using this method.

GainingAttention: Theprocessofgrabbingastudent'sattentionisoneofthemostfascinating and valuable Big Data applications in education. There will always be a fewinattentive pupils who are gazing at their phones or at others, no matter how entertaining thelecture is. A lecture, on the other hand, can only be effective if everyone listens. Students'biometric data, such as pulse rate, facial expressions, and objects touched during the lecture,wouldbeused,accordingtoBigData experts.Acameramounted on the ceiling or asmartwatch-like gadget can be used to collect this data. This information can be utilised toassess each student's attention level. Once the data has been returned to the teacher, he or shecan take action.

Customized Programs: Customized curriculum for each individual student can be designedusing big data. Even if there are thousands of students in a college or university, tailoredprogrammes can be established for each of them. This is made feasiblewwill be a better understanding of stu via a process knownas blended learning, which combines online and offline learning. This allows students tofollow classes that interest them and study at their own pace while still having the option ofreceivingoffline advice from

professors.This is already happening in the case of MOOCs, which are currently being produced anddistributed all around the world.

Reducing The Number of Dropouts:
Dropout rates at schools and colleges would decreaseasBigData in the education sector helped to improve student achievements. Predictiveanalytics can be applied to all of the data collected by educational institutions to provideinsight into future student results. Such predictions can also be used to do scenario analysisonacourseprogrammebeforeitisimplemented,reducingtherequirementfortrial-and-error. In reality, big data can be used to track how students fare in the job marketaftertheygraduatefromcollege.This willalsoaidfuturestudentsinselectingtheappropriate college and course.

Targeted International Recruiting:
Institutions can more correctly estimate applicants andexamine the probable elements that affect the application process using Big Data in theeducation sector. Institutions will be able to change their recruitment methods and allocatecashbasedonthisinformation.Thisinfluxofinformationwillalsoassiststudentsinanalyzinginformationonschoolsallacrosstheworld,speedingupthesearchandapplicationprocessforinternational students. In the future years, big data has the potentialto transform the learning business. The impact of smarter students on organizations andsociety will be favourable.

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