Rosary College of Commerce & Arts

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Department of Computer Applications

BITS N BYTES

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Principal's Message

In today's fast growing competitive world, Businesses are focusing on agility and innovation rather than stability. Technology has crept inside every business arena and hence, it has become an essential part of every processing unit. There is no doubt that industries are going ablaze with the huge eruption of data. None of the sectors have remained untouched by this drastic change and businesses today are increasingly turning towards Big Data and Big Data Analytics.

I am happy that our BCA Department is bringing up this new issue of Bits N Bytes focused on Big Data. Through this electronic platform our students and teachers of Computer Applications can express their views and ideas in this emerging field that could benefit society at large.

I congratulate Asst. Prof Mildred Lemos, Asst. Prof. Janice Fernandes and all who have contributed to Bits N Bytes.

I hope and wish Bits N Bytes will inspire and ignite many minds.

Rev. Dr. Simão R. Diniz
Principal

Introduction to Big Data

- **Asst. Prof. Mildred Lemos**

Big data is often characterized by the 3Vs: the extreme volume of data, the wide variety of data types and the velocity at which the data must be processed.

Although big data doesn't equate to any specific volume of data, the term is often used to describe terabytes, petabytes and even exabytes of data captured over time. Such voluminous data can come from myriad different sources, such as business

sales records, the collected results of scientific experiments or real-time sensors used in the internet of things. Data may be raw or preprocessed using separate software tools before analytics are applied.

Data exists in a wide Variety of file types, including structured data, such as SQLdatabase stores; unstructured data, such as document files; or streaming data from sensors. Further, big data may involve multiple, simultaneous data sources, which may not otherwise be integrated. For example, a big data analytics project may attempt to gauge a product's success and future sales by correlating past sales data, return data and online buyer review data for that product.

Velocity refers to the speed at which big data must be analyzed. Every big data analytics project will ingest, correlate and analyze the data sources, and then render an answer or result based on an overarching query. This means human analysts must have a detailed understanding of the available data and possess some sense of what answer they're looking for.

With Big Data databases, enterprises can save money, grow revenue, and achieve many other business objectives, in any vertical.

Applications of Big Data

Government

In public services, big data has a very wide range of applications including: energy exploration, financial market analysis, fraud detection, health related research and environmental protection.

Insurance industry

Big data has been used in the industry to provide customer insights for transparent and simpler products, by analyzing and predicting customer behavior through data derived from social media, GPS-enabled devices and CCTV footage. The big data also allows for better customer retention from insurance companies.

When it comes to claims management, predictive analytics from big data has been used to offer faster service since massive amounts of data can be analyzed especially in the underwriting stage. Fraud detection has also been enhanced.

Health Care

Big data is in extended use in the field of medicine and healthcare Big data helps physicians to keep track of all the patients' history. Today data is used to such an extent that doctor prescribes the medicines without even visiting the patient by knowing the heartbeat and temperature through the heart and temperature monitoring watch fitted on the patient's hand that stays in a remote place.

Financial Sector

Big data is used to monitor financial market activity. Currently network analytics and natural language processors are used to catch illegal trading activity in the financial markets.

Retail traders, Big banks, hedge funds in the financial markets use big data for trade analytics used in high frequency trading, pre-trade decision-support analytics, sentiment measurement, Predictive Analytics etc.

The industry also heavily relies on big data for risk analytics including; anti-money laundering, demand enterprise risk management, "Know Your Customer", and fraud mitigation.

Communications, media and entertainment industry

Organizations in the Communications industry simultaneously analyze customer data along with behavioral data to create detailed customer profiles that can be used to:

- Create content for different target audiences
- Recommend content on demand
- Measure content performance

Optimising Machine and Device Performance

Big data analytics helps machines and devices become smarter and more autonomous. For example, big data tools are used to operate Google's self-driving car. The Toyota Prius is fitted with cameras, GPS as well as powerful computers and sensors to safely drive on the road without the intervention of human beings. Big data tools can also optimise the performance of computers and data warehouses.

Improving and Optimising Cities and Countries

A number of cities are currently piloting big data analytics with the aim of turning themselves into Smart Cities, where the transport infrastructure and utility processes are all joined up. Where a bus would wait for a delayed train and where traffic signals predict traffic volumes and operate to minimise jams.

Improving Sports Performance

Most elite sports have now embraced big data analytics. Video analytics are used to track the performance of every player in a football or baseball game, and sensor technology in sports equipment such as basket balls or golf clubs allows players to get feedback (via smart phones and cloud servers) on their game and how to improve it. Smart technology can also be used outside the sporting arena to track athletes nutrition and sleep, as well as social media conversations to monitor emotional wellbeing.

BLOCKCHAIN

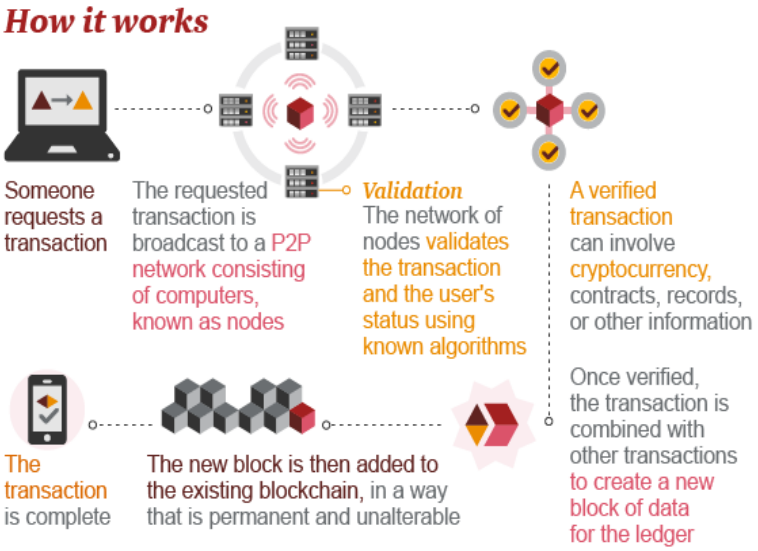
- compiled by Asst. Prof. Janice Fernandes

A look at blockchain technology

The blockchain is a decentralized ledger of all transactions across a pier to pier network. Constantly growing as 'completed' blocks (the most recent transactions) are recorded and added to it in chronological order, it allows market participants to keep track of digital currency transactions without central record keeping. Each node (a computer connected to the network) gets a copy of the blockchain, which is downloaded automatically. Using this technology, participants can confirm transactions without a need for a central clearing authority. Potential applications can include fund transfers, settling trades, voting, and many other issues.

Blockchains –use distributed ledger technology (DLT) .Currently, the technology is primarily used to verify transactions, within digital currencies though it is possible to digitize, code and insert practically any document into the blockchain. Doing so creates an indelible record that cannot be changed; furthermore, the record's authenticity can be verified by the entire community using the blockchain instead of a single centralized authority.

Blockchain is the technology that enables the existence of cryptocurrency (among other things). Bitcoin is the name of the best-known cryptocurrency, the one for which blockchain technology was invented. A cryptocurrency is a medium of exchange, such as the US dollar, but is digital and uses encryption techniques to control the creation of monetary units and to verify the transfer of funds.



BREAKING DOWN 'Blockchain'

A block is the ‘current’ part of a blockchain, which records some or all of the recent transactions. Once completed, a block goes into the blockchain as a permanent database. Each time a block gets completed, a new one is generated. There is a countless number of such blocks in the blockchain, connected to each other (like links in a chain) in proper linear, chronological order. Every block contains a hash of the previous block. The blockchain has complete information about different user addresses and their balances .

The blockchain was designed so that transactions are immutable, meaning they cannot be deleted. The blocks are added through cryptography, ensuring that they remain meddle-proof: The data can be distributed, but not copied. However, the ever-growing size of the blockchain is considered by some to be a problem, creating issues of storage and synchronization.

Blockchains and Bitcoin

Bitcoin isn’t regulated by a central authority. Instead, its users dictate and validate transactions when one person pays another for goods or services, eliminating the need for a third party to process or store payments. The completed transaction is publicly recorded into blocks and eventually into the blockchain, where it’s verified and relayed by other Bitcoin users. Based on the Bitcoin protocol, the blockchain database is shared by all nodes participating in a system. Upon joining the network, each connected computer receives a copy of the blockchain, which has records, and stands as proof of, every transaction ever executed. It can thus provide insight about facts like how much value belonged a particular address at any point in the past. Blockchain.info provides access to the entire Bitcoin blockchain.

Extensions of Blockchains

To use conventional banking as an analogy, the blockchain is like a full history of a financial institution's transactions, and each block is like an individual bank statement. But because it's a distributed database system, serving as an open electronic ledger, a blockchain can simplify business operations for all parties. For these reasons, the technology is attracting not only financial institutions and stock exchanges, but many others in the fields of music, diamonds, insurance, and Internet of Things (IOT) devices. Advocates have also suggested that this kind of

electronic ledger system could be usefully applied to voting systems, weapon or vehicle registrations by state governments, medical records, or even to confirm ownership of antiquities or artwork.While banks were initially hesitant to explore these technologies because of their concerns about potential fraud, they have started looking into how the blockchain might provide generous cost savings by allowing back-office settlement systems to process trades, transfers and other transactions much faster.

Advantages of Blockchains

Efficiencies resulting from DLT can add up to some serious cost savings. DLT systems reduce the expense, mistakes, and delays caused by traditional methods for reconciliation of records.

The widespread adoption of DLT will bring enormous cost savings in three areas, advocates say:

Electronic ledgers are much cheaper to maintain than traditional accounting systems; the employee headcount in back offices can be greatly reduced.

Nearly fully automated DLT systems result in far fewer errors and the elimination of repetitive confirmation steps.

Minimizing the processing delay also means less capital being held against the risks of pending transactions.

In addition, some smaller number of millions will be saved by shrinking the amount of capital that broker/dealers are required to put up to back unsettled, outstanding trades. Greater transparency and ease of auditing should lead to savings in anti-money laundering regulatory compliance costs, too.

Blockchain's removal of almost all human involvement in processing is particularly beneficial in cross-border trades, which usually take much longer because of time-zone issues and the fact that all parties must confirm payment processing. Blockchain systems can set up smart contracts or payments triggered when certain conditions are met. The blockchain cotton transaction mentioned above, for example, used a smart contract that automatically made partial payments when the cotton shipment reached specific geographic milestones.