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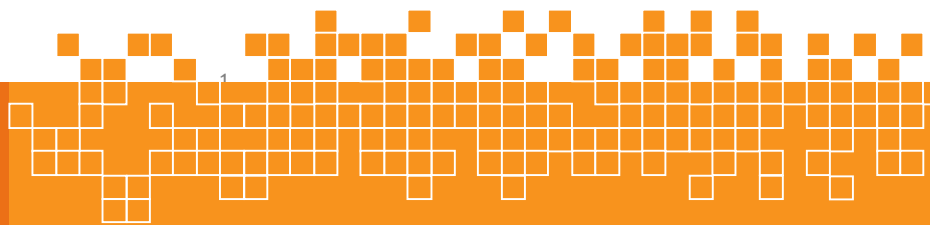
## Department of Information Technology

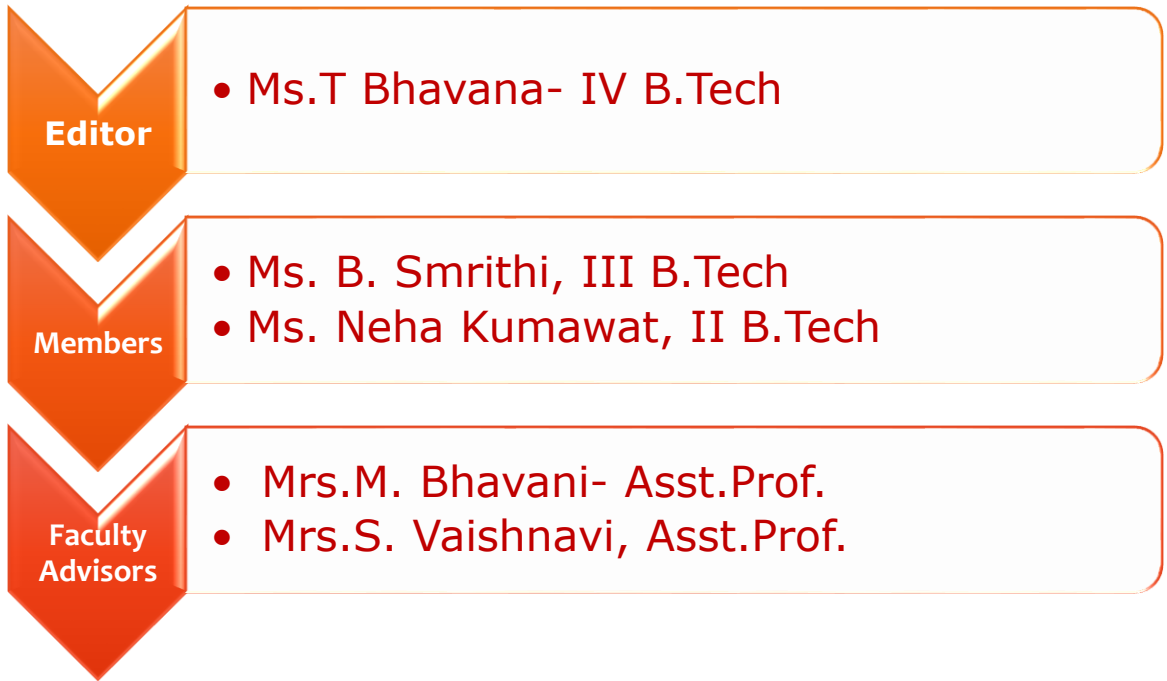


**XI EDITION  
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### Voices

- IT Technical magazine is a platform for IT students to express their creativity and showcase their literary skills.
- VOICES is designed to present to its readers the technical developments and technical papers that have been prepared by IT students.

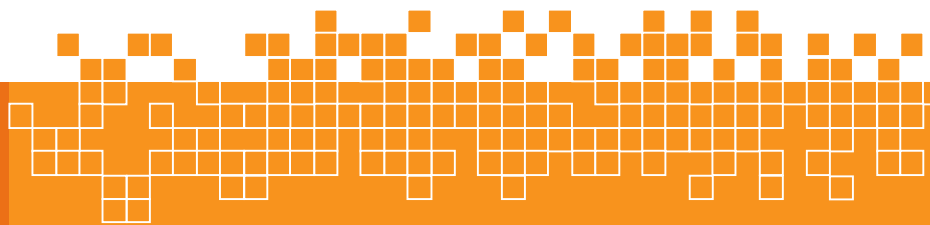




To build a collaborative academic environment that responds swiftly to the challenges of Information technology.



To foster an intellectual environment that delivers virtuous Information Technocrats with commitment to industry and society by strengthening the logical, analytical and applicative skills to excel academically and professionally. To inculcate good communication skills in students and introduce them to various codes of professional practices for carrying out effective team collaborations and project management in the field of IT.



## Message from HOD's Desk:

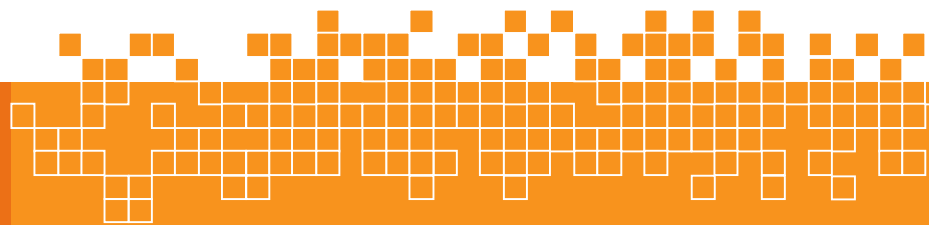


I feel very elated and at the same time privileged to share a few words as you go through the pages of the magazine “VOICES”. IT department endeavors to help students to seek the best from the surroundings. The knowledge thus gained becomes a ladder for them to soar into greater heights. It's often the collective effort that leads to the discovery and fulfillment of aspirations.

I feel proud to be a part of VOICES an instrument in moulding the students. We try to shape every sphere of a student's personality in the IT Department. I take this opportunity to express my sincere thanks to all the members of the faculty and auxiliary staff for their sincere contribution in making this Edition.

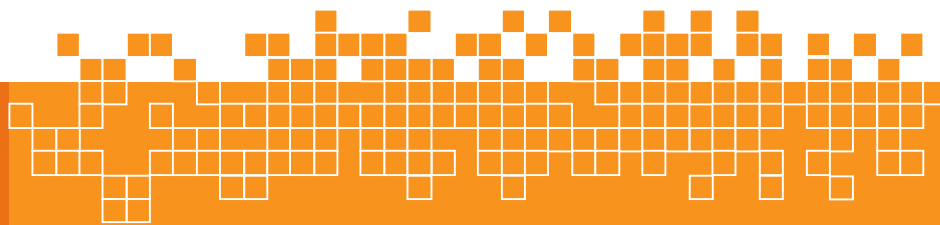
**Dr.I.Ravi Prakash Reddy**

**Professor & HOD**



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# BLOCKCHAIN TECHNOLOGY

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## INTRODUCTION :

Block chain is simply a distributed ledger. This technology is playing a vital role in many of the applications today. The first application came out from this technology is **BITCOIN** , then after there are many now. This technology has changed the whole scenario because of its unique features, for example it has replaced the banking systems i.e, in avoiding hacking of accounts. We now-a-days are very familiar in listening about cyber security, so through block chain we can easily get rid of hacking. It provides a highly secured distributed network. It follows a rule of 51% acceptance of the computers present in the network ,then only it treats that transaction as the valid one, so at a time it is impossible to manipulate data from the 51% of the computers in network, so even if one of the account got hacked, the other 50 can know the original details. In this way, block chain is highly secured. It maintains a database to store the user's details.

## STORAGE OF DATA:

The blocks are stored in the form of linked list(one by one), where each block consists of the transaction details of the particular member and it is also given a number on the basis of account details of the next user present on the next block. The users are given a public key and a private key to access their accounts. Public key is similar to a bank account number where user gives account

number to others for transferring the money and this key also tells whether user account is with in the network or not. Private key is similar to pin number where user uses this key to access the account. If private key is gone, user cannot access the data, it is very difficult to get back again.

**BITCOIN:** It is a crypto currency (the currency can be encrypted and decrypted). Its a virtual or digital currency. The bitcoin was first owned by a name "**SATOSHI NAKAMOTO**" and the amount was transferred to Gavin Andresen. These bitcoins are created through some miner called "**Antminer**", when ever a new block is to be added to the chain, they have to solve a mathematical problem which requires a high computational power and the block which solves the problem is rewarded with a new bitcoin. Adding a new bitcoin is mining. It takes 10 mins to add a new block to the chain. And user can have any name, it is not mandatory to specify his realname and a single user can have many accounts. Bitcoin wallets are also available these days, which consists of user's public key and primary key.



ANTMINER

**Mining:**

Traditionally, there was a technique which is used to solve the mathematical problems by consuming enormous power to mine bitcoins, but now a new technique with new rules has made in order to save power and cost. This cryptocurrency is named as "BITCOIN CASH" where the traditional way of techniques were not used. These mathematical problems involves guessing type questions. So, more power is consumed in guessing more possible answers and if one of them matches then a new bitcoin is created.

**Error detection:**

Error can be identified in the block with help of numbers(which are given to a block on the basis of next block).So, for example if money got transferred from one account to another the number given to its previous block should be changed accordingly, so it shows the error which indicates the change in account details. So these new details are treated as valid if they are accepted by 51% of the computers within the distributed network.

**Drawbacks of Bitcoin:**

- We know that there are three types of web, they are surface web, deep web and dark web. Surface web consists of open sources where every one can access them. Deep web consists of the sites where user should specify their credentials to log on to the site. Dark webs are those which consists of illegal sites(for example through which drugs, weapons etc are bought).if a bank user transferred the money to buy them, then he can be easily caught. But through bitcoins , he can never caught. So, it is misleading in some cases.
- Consumes more power to solve the computational problems.

- More expensive because it needs miners to mine the bitcoins which consumes more power to solve.
- More bitcoins leads to more illegal activities.

**ETHEREUM:**

Ethereum is the other application of block chain technology. It is used in contracts. Ethereum is a language which is used in writing a executable program for contracts, which consists of details regarding the buyer and seller of the property and signatures of buyer and seller are also specified. This program uses the block chain technology and is executed using a EVM (Ethereum Virtual Machine).When this program is executed then only the money(ethers) will get transferred to the seller's account. Here , "ethers" are used as cryptocurrency. Ether is the second most popular cryptocurrency. These are the SMART CONTRACTS. Without any third party or government's involvement.

There are many cryptocurrencies like ripple, zcash, ethers etc. Therefore, with this block chain technology we can remove the third party involvement in any transaction. For example, if we consider the ola cabs, we can remove the involvement of ola organization where we can directly pay money to the drivers. This is seen in future as decentralised cab system.





## BLOCKCHAIN TECHNOLOGIES FOR BIOMEDICAL/HEALTH CARE APPLICATIONS WHEN COMPARED TO TRADITIONAL DISTRIBUTED DATABASES

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Why blockchain distributed ledger technology may be feasible for biomedical and health care applications, we describe the key benefits or comparative advantages of blockchain by comparing it with the traditional distributed database management system (DDBMS) such as Structured Query Language (SQL)-based systems like Oracle and NoSQL-based systems like Apache Cassandra.

The first key benefit of blockchain is *decentralized management*. DDBMSs are logically centralized while blockchain is a peer-to-peer, decentralized database management system. Therefore, blockchain is suitable for applications where independently managed biomedical/health care stakeholders wish to collaborate with one another without ceding control to a central management intermediary.

The second key benefit is the *immutable audit trail*. DDBMSs support create, read, update, and delete functions like all database systems, while blockchain only supports create and read

functions. Thus, blockchain is suitable as an unchangeable ledger to record critical information.

The third is *data provenance*. On DDBMS, the ownership of digital assets can be modified by the system administrator, while on blockchain, the ownership can only be changed by the owner, following the cryptographic protocols. Also, the origins of the assets are traceable, increasing the reusability of verified. Therefore, blockchain is suitable for use in managing critical digital assets.

The fourth benefit is both *robustness* and *availability*. Although DDBMS and blockchain are based on distributed technology and thus do not suffer from single-point-of-failure, it would be costly for DDBMS to achieve the high level of data redundancy blockchain does. Thus, blockchain is suitable when the preservation and continuous availability of records are important.

The final key benefit of blockchain is related to the improved *security* and *privacy* using cryptographic algorithms

To summarize, the key benefits for adopting blockchain technology in biomedical and health care applications include: (1) decentralized management, (2) immutable audit trail, (3) data provenance, (4) robustness/availability, and (5) security/privacy.

As the benefits of blockchain described above are crucial for biomedical and health care applications, health care has become one of the most important emerging application areas of the blockchain distributed ledger technology. In general, blockchain is treated as a distributed ledger to store health care-related data for sharing, exchanging, analyzing, recording, and validating purposes among stakeholders.

Among the biomedical/health care applications, the one most discussed is related to the adoption of blockchains as an underlying infrastructure for Health Information Exchange (HIE), or health transactions between patients, providers, payers, and other relevant parties. These applications can further be categorized based on their main goals to exploit the blockchain-stored data, and are described in the Improved medical record management, Enhanced insurance claim process, and Accelerated clinical/biomedical research sections. The applications beyond HIE are depicted in the Advanced biomedical/health care data ledger section. For each category of application, we further discuss the use cases and key benefits of adopting blockchain technology.

### **Improved medical record management**

Many studies or ongoing projects focus on exchanging patient care data using blockchains to improve medical record management, Deloitte and Accenture, are also involved in applying blockchain technology to store health care data and manage medical records. Another famous example is Guardtime, a company

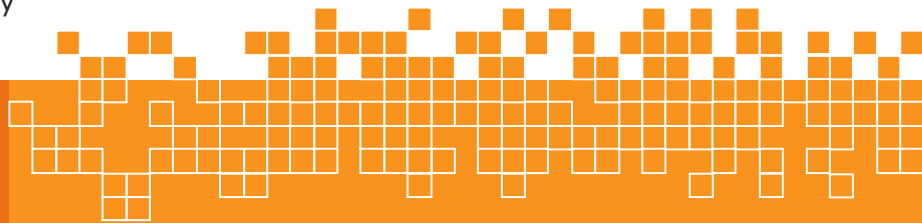
providing a blockchain-based system in Estonia to secure 1 million health records.

### **Accelerated clinical/biomedical research**

Several researchers also propose accelerating secondary use of clinical using blockchain technology, including MedRec, Data Lake, and blockchain-based data sharing networks. Also, ModelChain adopted blockchain to increase the security and robustness of the distributed privacy-preserving health care predictive modeling across multiple institutions

### **Advanced biomedical/health care data ledger**

Besides exploiting blockchains as ledgers of patient care data, many studies and projects have also proposed using them to store various types of health care-related data, such as genomic and precision medicine data, patient-centered or patient-related outcomes data, provider/patient directories and care plans data, clinical trial data, patient consent data, pharmaceutical supply chain data, and biomarker data.



# Updates on Blockchain

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The Internet is an enabler of many disrupting technologies – of which the blockchain is currently one of the most exciting technologies. The blockchain can act as a virtual public ledger that records transactions processed and maintained by a network of communicating nodes running cryptocurrency software. It was invented in 2008 as part of Bitcoin by a person with the computer nickname Satoshi Nakamoto.

As of today, the value of one bitcoin exceeds USD 600 and the trading cap of the crypto currency has recently exceeded USD12 billion. Bitcoin's popularity is on the rise. It is a public ledger that holds immutable data in a secure and encrypted way and ensures that its transactions can never be altered.

The strength of the block chain is that it has no single point of failure. The "One Internet" report released by the Global Commission on Internet Governance (GCIG) at the OECD meeting specifically mentioned that "distributed ledger technologies" such as the

blockchain "let people who have no particular confidence in each other collaborate without having to go through a neutral central authority".

Several new blockchain technology developments show promise for improving particular aspects of IAM, such as the provenance of identity attributes and cryptographic keys.

Today, blockchain technology, with its wide applications and inherent traits of

immutability and hack-resistance is an obvious choice for record-keeping in a secure, transparent and traceable manner.

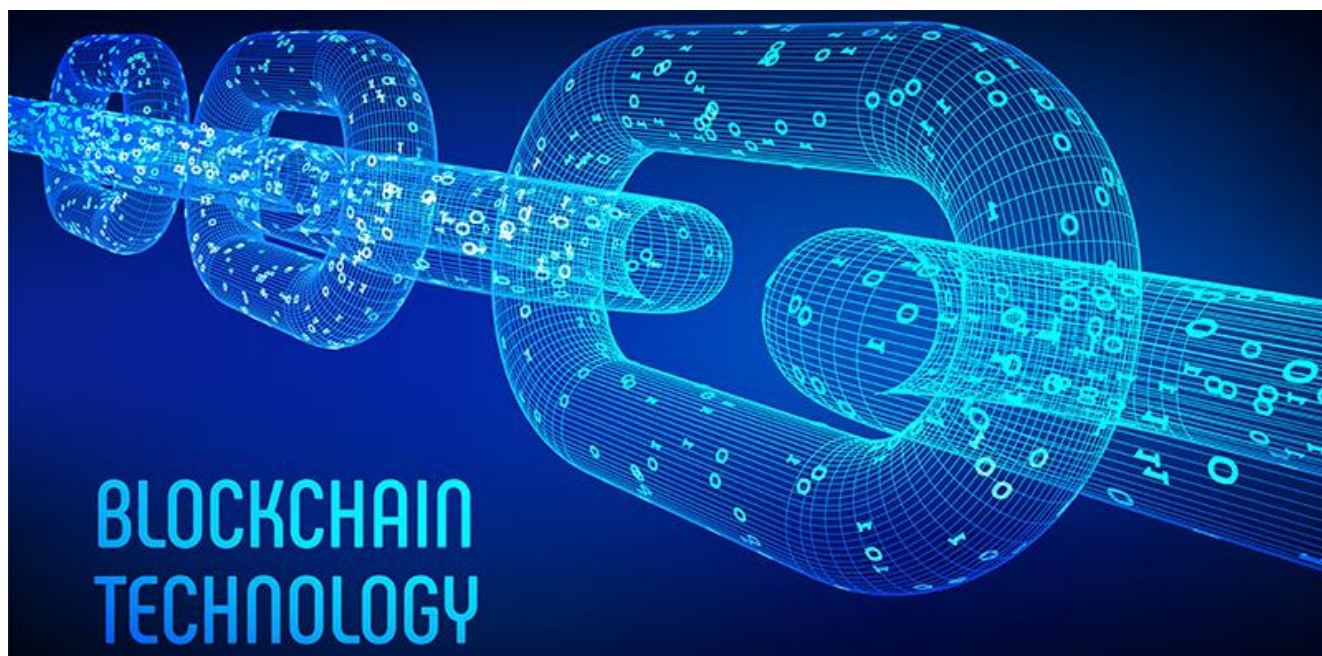
Blockchain seems to be creeping into more aspects of our daily lives. A mobile app has been launched on the iOS platform that uses blockchain technology to allow users to pay for various utilities. LALA World, a Singapore-based fintech company, has launched the blockchain and artificial intelligence-based payments app for iOS users in India and the UAE. Through this app users can pay for utilities like electricity, DTH, and phone bills. The app is already available on the Android platform through blockchain technology.

Wipro, India's third largest software services company, has joined the Blockchain in Transport Alliance (BiTA) to drive blockchain technology adoption in the transportation Industry. The company that it intends to use this platform to help ideate platform-agnostic blockchain standards for the logistics and transportation industry.

With the right amount of industry and government participation, India could be in leadership ranks in adoption of blockchain technology in the next five years, says a survey by global consultancy firm PwC.

What is concerning is that while technologists and businesses have been exploring the blockchain technology and its applications, many governments seem skeptical and not taking it seriously. Governments of today should realize that it is better to learn and embrace positive aspects of new technologies. They should not ignore them. Embracing new technologies can ensure effective economic development for their countries and the world at large.

# BLOCK CHAIN TECHNOLOGY



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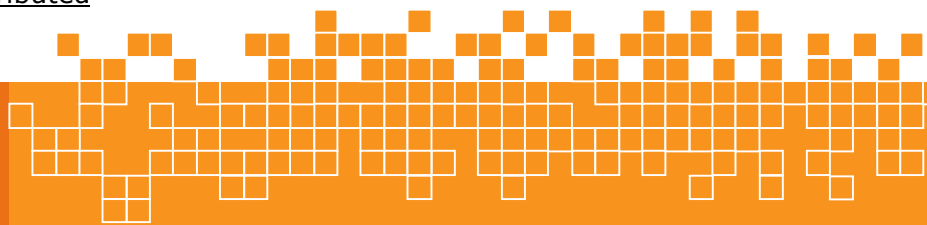
Blockchain was invented by Satoshi Nakamoto in 2008 to serve as the public transaction ledger of the cryptocurrency bitcoin. The invention of the blockchain for bitcoin made it the first digital currency to solve the double-spending problem without the need of a trusted authority or central server. By allowing digital information to be distributed but not copied, block-chain technology created the backbone of a new type of internet.

"The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value." A **blockchain**, originally **block chain**, is a growing list of records, called *blocks*, which are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. By design, a blockchain is resistant to modification of the data. It is "an open, distributed

ledger that can record transactions between two parties efficiently and in a verifiable and permanent way".

### **Advantages of blockchain:**

- 1) Resistance to failures, since the vulnerable point of failure, is distributed within numerous nodes, making the system more failure-resistant.
- 2) Invulnerability to network censorship, since there is no central authority that any party could address and demand the removal of data.
- 3) Users are more likely to trust an application that is not controlled by one governing body capable of deceiving them for their own benefit.

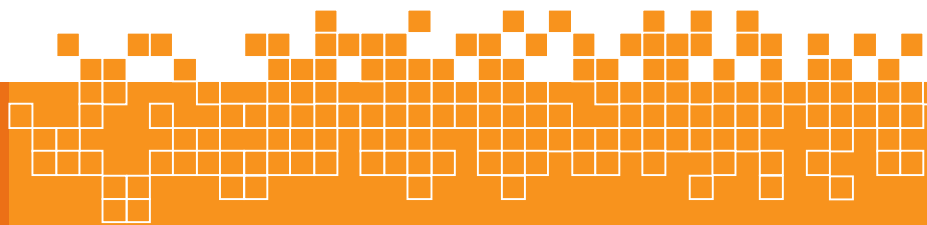


**Disadvantages of blockchain:**

- 1) Difficulties with updating and eliminating errors. The application must be updated on each node of the peer-to peer network or forked if parts of nodes don't accept amendments.
- 2) Robustness of network for dedicated purposes.
- 3) Sometimes, applications need to verify the identity of the user. Since there is no central

authority that assures the identity of the user, the development of certain decentralized apps can become a serious problem.

- 4) Difficulty of development. It is necessary to apply very complex protocols for achieving consensus and allow for scaling from the very beginning. One cannot hastily implement an idea, hoping sometime later to add new features and expand the application without forking or redeployment of the network.



# Deep Learning for Medical Image Processing



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**Deep learning** (also known as **deep structured learning** or **hierarchical learning**) is part of a broader family of machine learning methods based on learning data representations, as opposed to task-specific algorithms. Learning can be supervised, semi-supervised or unsupervised.

Deep learning architectures such as deep neural networks, deep belief networks and recurrent neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases superior to human experts.

Healthcare sector is totally different from other industry. It is on high priority sector and people expect highest level of care and services regardless of cost. It did not achieve social expectation even though it consume huge percentage of budget. Mostly the interpretations of medical data is being done by medical expert. In terms of image interpretation by human expert, it is quite limited due to its subjectivity, complexity of the image, extensive variations exist across different interpreters, and fatigue.

After the success of deep learning in other real world application, it is also providing exciting solutions with good accuracy for medical imaging and is seen as a key method for future applications in health sector. Due to the tremendous advancement in image acquisition devices, the data is quite large (moving to big data), that makes it challenging and interesting for image analysis. This rapid growth in medical images and modalities requires extensive and tedious efforts by medical expert that is subjective, prone to human error and may have large variations across different expert.

Alternative solution is using machine learning techniques to automate diagnosis process however, traditional machine learning methods are not sufficient to deal with complex problem.

## Deep Learning in Medical Imaging

Many image diagnosis task requires initial search to identify abnormalities, quantify measurement and changes over time. Automated image analysis tool based on machine learning algorithms are the key enablers to improve the quality of image diagnosis and interpretation by facilitating through efficient identification of finding.

Deep learning is one extensively applied techniques that provides state of the art accuracy. It opened new doors in medical image analysis that have not been before.

#### Applications:

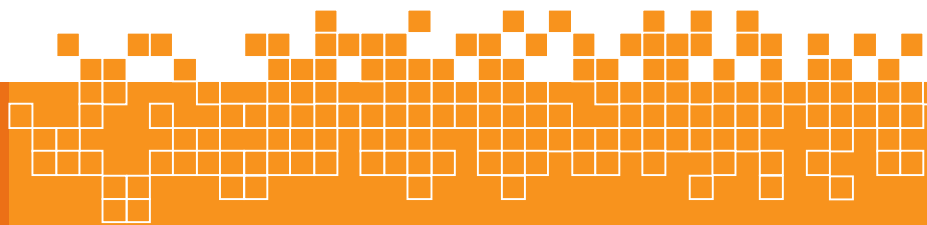
Applications of deep learning in healthcare covers a broad range of problems ranging from cancer screening and disease monitoring to personalized treatment suggestions. Various sources of data today - radiological imaging (X-Ray, CT and MRI scans), pathology imaging and recently, genomic sequences have brought an immense amount of data at the physicians disposal. However, we are still short of tools to convert all this data to useful information.

- Diabetic Retinopathy
- Histological and Microscopical Elements Detection

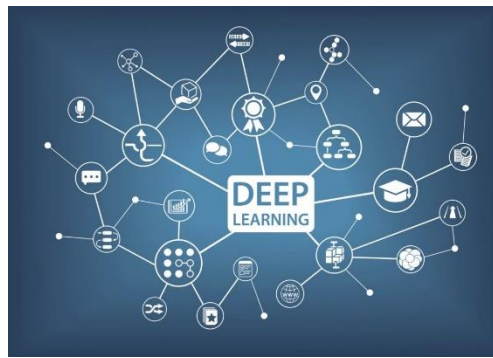
- Gastrointestinal (GI) Diseases Detection
- Cardiac Imaging
- Tumor Detection
- Alzheimer's and Parkinsons Diseases Detection

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- [2] Francesco Ciompi, Kaman Chung, Sarah J van Riel, Arnaud Arindra Adiyoso Setio, Paul K Gerke, Colin Jacobs, Ernst Th Scholten, Cornelia Schaefer-Prokop, Mathilde MW Wille, Alfonso Marchiano, et al. Towards automatic pulmonary nodule management in lung cancer screening with deep learning. arXiv preprint arXiv:1610.09157, 2016.



# Deep Learning



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## Sub topic: Advantages and disadvantages of deep learning

Deep learning techniques have given a new dimension to the era of computing. *Ever wondered how Siri is able to understand what you say?* The answer is Deep Neural Networks. They are in hype from recent years primarily because of the huge amount of data available. Deep learning has made it possible for a machine to identify a human through image processing.

Using DL techniques it is also possible to process videos, speech and text. This feature of being able to work in multiple domains is making it more popular among data enthusiasts. Neural networks models are used for training of data in DL. These networks outperform when large datasets are fed into them.

Deep learning methods give better performance analysis than the other algorithms available because the 'Big Data' available worldwide. It enables the networks to learn from huge datasets which increases the accuracy of the neural network model.

One of the many advantages of using deep learning methods is its exponentially increasing Computational Power. Computational Power depends upon each unit of time multiplied with a constant which almost doubles every year. Hence, Computational power is increasing exponentially. Another factor responsible for interest in deep learning field is the advancement in the

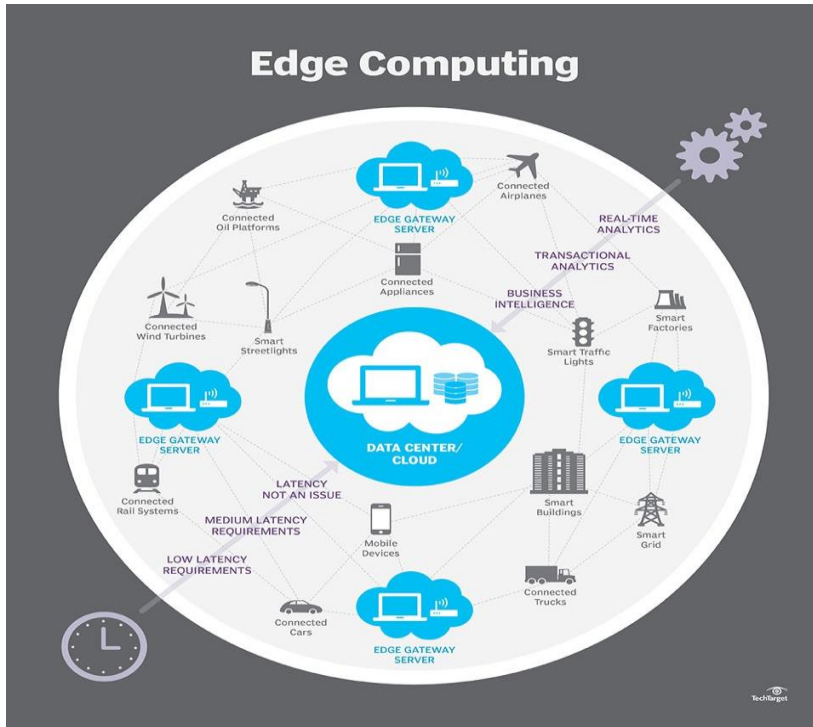
algorithms. Smaller and faster algorithms aid in computing huge amounts of data.

With its amazing abilities to outshine in some areas, there are some factors which need to be worked out. A major setback in Deep Learning is the black box nature of the Model. There is no justification of why a neural network model came up with a certain output. For example, if you have given a picture of a cat as input and the predicted output is a car, then it is very hard to understand why it came up with that output.

Time taken in training and developing a network model cannot be neglected. There are multiple resources available for collecting data sets, but if the specifications required are varied, it takes a while to develop a model. All the factors combined, the computational complexity increases.

It is predicted that in coming years, most customer service jobs would be replaced by automation. Innovation in the field of artificial intelligence is rapidly increasing. Deep learning techniques are all around us. In coming years, deep learning will further transform automation.

# EDGE COMPUTING



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17251A1214

Edge Computing is a process of improvising the computing methods by performing effective data processing in the vicinity of the data source. With the advancements in the technology and processing techniques, several smart ways of doing things have increase which increase standard of living of people. Edge Computing techniques are one such unique way which allow the data computing resources to store, retrieve, modify and share the computed information. The main of adopting edge computing when compared to other computing methods is the need for mobile computing, processing data which takes longer time within the network and to cut down the cost of purchasing system components. Edge Computing analyses and processes the data at its source without having to transfer it to the cloud.

1.

In the recent years several advancements have been made in the field of Edge Computing which include:

- Schneider Electric Micro DC Xpress
  - Vapor Edge for Telecom
  - EdgeConneX Edge Data Centre
  - Schneider Electric EcoStruxure
  - Nutanix Enterprise Cloud Platform
- The above mentioned new updates in Edge Technology and how it can be efficiently used to process data within the available resources can be analysed by understanding the concepts of Internet of Things (IoT).

## 2. Schneider Electric Micro DC Xpress

Schneider Electric's Micro Data Centre Xpress is a link of products that make it speedier, easier and more economical with its low cost and deploy micro data centres at the network edge.

Basically useful for edge and IoT applications that require speed, reliability and security. StuxureWare for data centres. This provides strong designs and unique packaging by allowing IT equipment to be pre-installed by the user, partner or integrator before shipment. Edge computing has different sets of resources spread between compute, storage and processing information that are applied in the data centres for an efficient and simplified method of storing, retrieving data and meeting business requirements.

## 2. Vapor Edge for Telecom:

Vapor IO newly updated Vapor Edge, is an end-to-end platform for edge computing and increase in demand from users looking to construct out edge processing.

Vapor Edge provides hyper-local data and compute for the majority of main data centres that are unable to deliver applications such as IoT, virtual and augmented reality. So, Vapor Edge was designed to transfer cloud information to the edge of the network, speeding up interactions and compute back to the data centre.

It offers an intelligence platform for modern data centre workloads and offers a selection of hardware designs such as Vapor Chamber, Vapor OpenDCRE, Vapor CORE and Vapor Compass for various operation and work management.

## 3. EdgeConneX:

This provides purpose-built micro data centres that provide Tier 2 and capacities to deliver low latency to local market costumers.

It coordinates with network and cable operators to make sure information is delivered at faster rate, which is ideal for

users that require a high speed performance rate.

This depends on the decision of data centre providers to take up edge computing, which also involves location optimisation and security, but most importantly is the requirement for speed processing.

## 4. Schneider Electric EcoStruxure:

Schneider Electric's EcoStruxure platform provides enhancements in IoT, mobility, sensing, cloud, analytics and cybersecurity technologies to deliver data centre innovation across all areas of its network.

This enables a system to connect, collect, analyse and take action on data from every level from sensor to the cloud and further computing it into appropriate data.

As edge computing involves a wide area of variations, it can be employed across numerous locations, one being the micro data centre.

## 5. Nutanix Enterprise Cloud Platform:

Nutanix provides its Enterprise Cloud Platform as a means to provide simplicity and incremental scalability for its micro data centres.

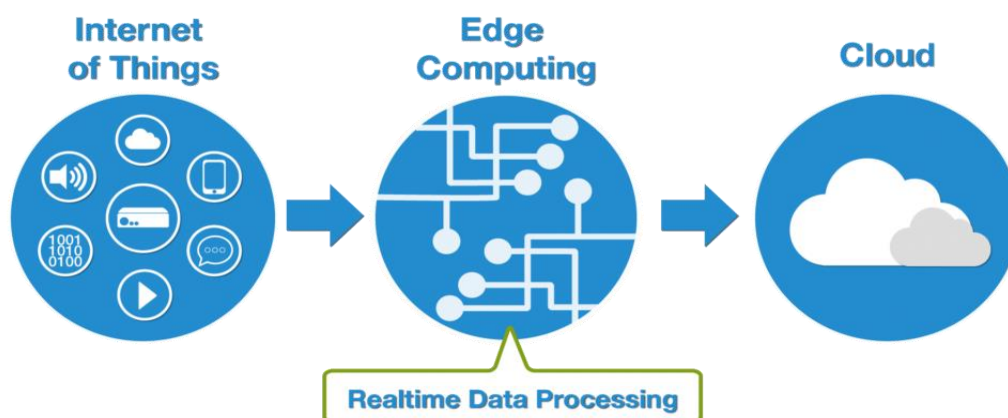
The cloud platform simplifies data centre infrastructure with the involvement of integrated server, storage, networking and virtualisation resources, which form a turnkey hyper complete solution that will execute application at any scale.

As edge computing makes its way to the core of the data centre, it is as important to have the correct scalability transferred.

This is what makes clouding it simpler for edge computing to transfer all data in the data centre away from any centralised areas to the logical extremes of network.

Therefore Edge Computing has made drastic updates in the recent years and will continue to flourish over the next coming decades due to its faster computational processing and limited platform for information transfer.

# EDGE COMPUTING



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## HISTORY

Cloud Computing revolutionized the field of shared data by making the process economical especially after “Elastic Compute Cloud” by Amazon. However, the placement of servers in the data centers, proximity and packets delays have always been a drawback for cloud computing. This scenario lead to the development of edge computing. Edge computing is an improvised version of cloud computing. It reduces the volume and travelling time of the data by moving the computer services closer to the data source by decentralizing the services. Edge computing can be traced back to the 1990s, when Akamai launched its content delivery network (CDN), which introduced nodes at locations geographically closer to the end user. These nodes store cached static content such as images and videos. Edge computing takes this concept further by allowing nodes to perform

basic computational tasks. In 1997, computer scientist Brian Noble demonstrated how mobile technology could use edge computing for speech recognition. Two years later, this method was also used to extend the battery life of mobile phones. At the time, this process was termed “cyber foraging,” which is basically how both Apple’s Siri and Google’s speech recognition services work.

## FUTURE

Over the next few years, we will see an explosion in this technology as more and more end-user devices use it to improve performance, functionality, and battery life. Where once edge devices were limited to smartphones, tablets, Laptops, PCs, and game consoles, we are now seeing it employed in virtual reality headsets, autonomous vehicles, drones, wearable tech, augmented reality devices, and more.

