



CTC(T&IT), CRPF



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Never stop learning, Because life never stop Teaching

**“The important thing is to not stop questioning.
Curiosity has its own reason for existing.”**

– Albert Einstein

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READER'S CENTER

- 1. Server Cluster**
- 2. Neural Networks**
- 3. Scientists Develop Squashable
Computer**
- 4. Blockchain**



SERVER CLUSTER

A cluster as the term implies has two or more computers working at the same time. Each computer involved in a cluster is called a node and has its own properties like hard drives, RAMs, CPUs etc. Though each server cluster has its own resources, it is displayed in the network under one host name and has only a single IP (Internet Protocol) address.

In order to provide high-quality services for clients, a group of servers run together to form a server cluster. The advantage of a working in a server cluster is that, if one computer in the cluster fails, the work can be switched to a different computer in a cluster. The server clusters assure that clients have round the clock access to all the relevant server related resources.

Importance of a server cluster

A server cluster is proven to be more reliable, scalable and effective than using a single computer. Server clusters are made mainly for the application that updates its data regularly and for those applications that run in a memory state for a long time. Generally, server clusters are used for servers including files, prints, databases, and messages. A server cluster is capable of dealing with failures like:

- Application software failures and its related service failures.
- Failures in hardware systems like CPU's, memory, power supplies, etc.
- Website failures caused by natural setbacks, power disruptions, etc.

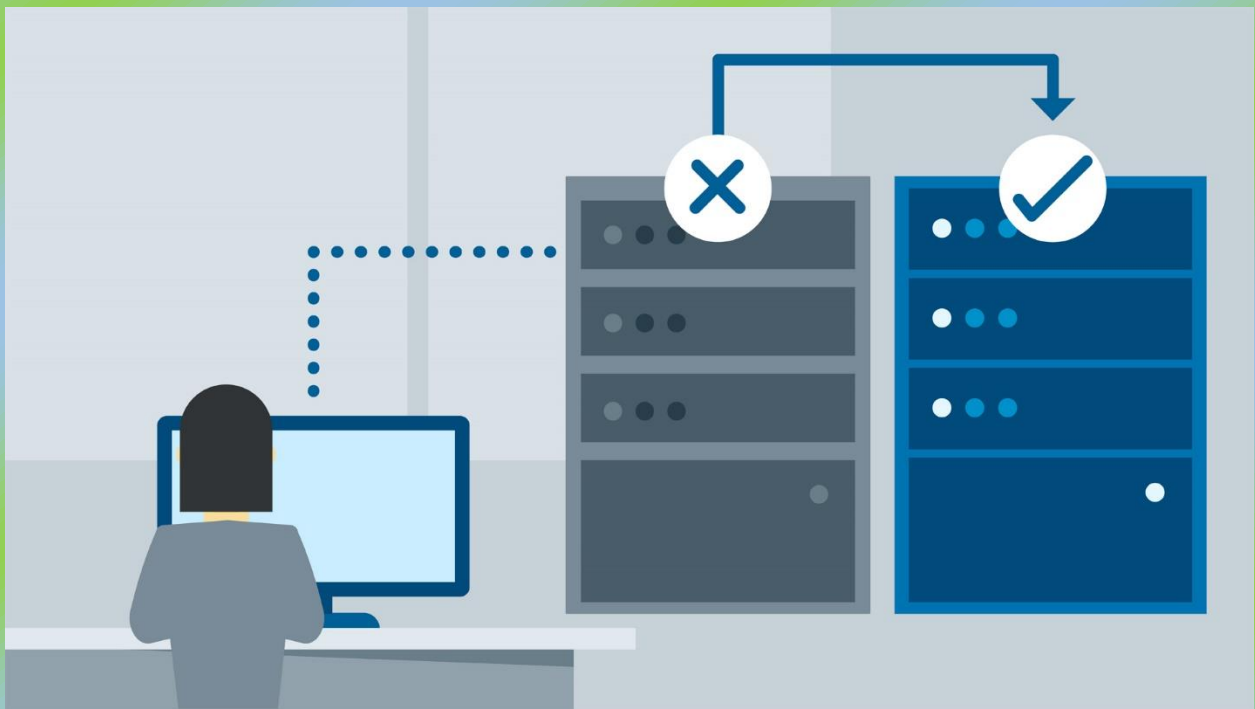
The main advantages of setting up a server cluster in an organization are threefold:

- Availability
- Reliability
- Scalability

Server clusters cater to availability by providing various applications and services to clients in order to meet the uptime goals of their organization. A server cluster can provide reliability by contributing fault tolerance in case of a failure in the system by getting rid of the particular point of failure through redundancy. Scalability is the ability of a network for future growth.

How does server cluster work?

Server clusters work well for applications that cannot be allocated among multiple servers. Each server included in a server cluster is said to own and control its local devices. Each server also maintains a copy of the particular operating system, its applications, and services that are engineered by the cluster. Every cluster has common devices like disks that are in the common disk supply. A connection media that can provide access to these discs, etc. are also possessed and controlled by one server at a time.



In a server cluster, only one node will be operating at a time. The reason is that each node receives its updates separately. The other nodes are usually kept in a stand-by mode. If any active node happens to fail, the other stand by nodes will take over immediately. This process is possible because all nodes in a cluster are attached to a shared storage system. This shared storage system used by the server clusters is called a quorum. It is said to be the data base configuration of the server cluster. The quorum resource usually contains data like information on cluster configuration, and it keeps a record of the current changes done to that configuration.

Types of server clusters

There are three kinds of server clusters. They are:

1. **Single quorum device cluster** – Single quorum device cluster is also known by the name Standard quorum cluster and is the most commonly used type of cluster. It has multiple nodes with either one or more cluster storage (cluster disk arrays) and has a connection mechanism called “a bus”.
2. **Majority node set cluster** – In this type of cluster, each node manages its own copy of the data configured in the cluster. It is the quorum resource that helps keep the configuration data persistent among the nodes. And hence the majority node set clusters are widely preferred for the use of geographically dispersed server clusters.
3. **Local quorum cluster** – is also known as a single node cluster. As the name suggests, it has only one node and is used widely for the purpose of testing.

Many organizations these days are choosing server clustering as a medium of increasing their server's uptime. Server clusters are constructed in such a way that the servers included in the cluster can function together. This helps in protecting data, and other applications and its services running even if a server fails to work on one computer. However, server clusters have to depend on IP based network technologies to function.

Neural Networks

- A Neural Networks is a combination of algorithms to recognize underlying relationships in a set of data which is like a process that mimics the way the human brain operates.
- Neural Networks reflect the behavior of the human brain.
- Allowing computer programs to recognize patterns and solve common problems in the fields of AI, machine learning, and deep learning.
- Neural Networks(NN) is also known as Artificial neural networks (ANN),Neural Networks is inspired by human brain.

Neural networks in everyday life

Social media

The people who are in the social media platforms such as facebook and instagram, people connect themselves with other peoples and make friends online in which people upload their photos or selfies shows to other people, we can also see who else are in their photo and show them their profile names automatically when clicked on the image.

Online shopping

We all know, whenever we are shopping for one thing we end up buying a lot and this happens to all of us most of the time so the technology behind this is recommendations and what we search for.

→ Recommendations

Amazon shows you recommendations depending on the behaviour of the individual interests , Amazon makes use of Artificial Neural Networks(ANN)to train its algorithms to learn the pattern and behaviour of its users. that is why amazon have such a good services and make sure to improve their quality.

→ Search

Yor amazon searches are also use neural network and your amazon return a list of the most relevant products related to your search, It uses past patterns and adapts to what is important for the customer in question.

Online Banking

Online banking has become one of the most common use in everyday daily life, neural networks is used , where you write a cheque you write with your own handwriting and then it is converted into text with the help of neural networks.

Voice-to-text

The voice to text is now a days is very helpful and it is one of the common features on smart phones, in this Technology there is a hand of neural networks.

Smart Personal Assistant

It is one of more common features of voice to text technology , this technology made this new invention of smart personal assistant which is similar as real life personal assistant. for example: Siri, alexa and google are some of the example of smart personal assistants .

Applications of neural networks

Some of the applications of neural networks are :

- Speech recognition
- Character recognition
- Spell checking

Speech recognition

Speech recognition has many applications such as virtual assistance , hands-free computing and video games ,etc neural networks is used widely in this areas .

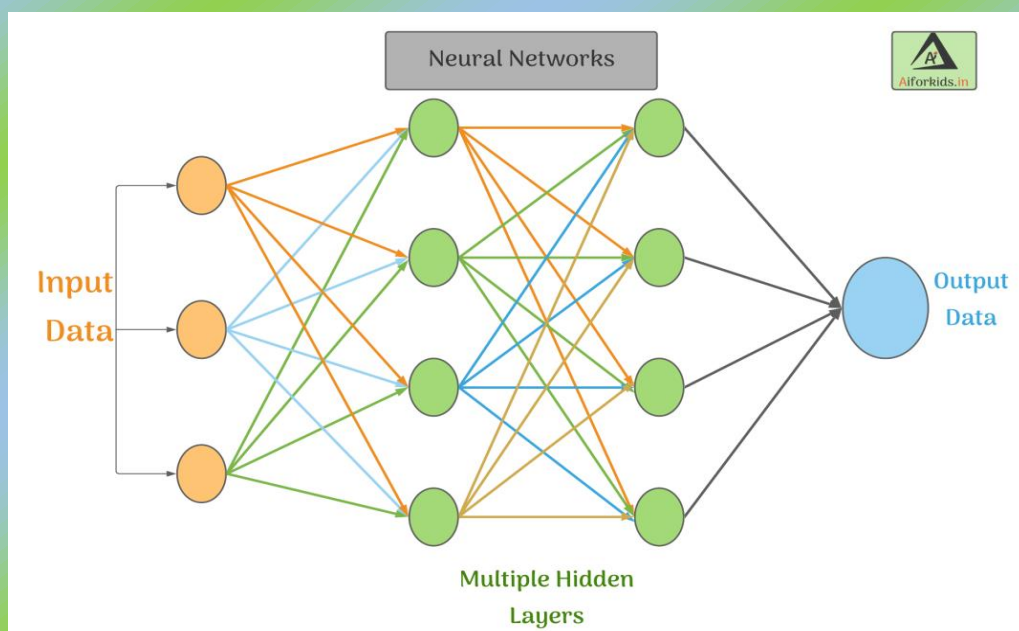
Character recognition

In this Application of AI is also a use of neural networks in character recognition, where this technology is used to recognize a character with the help of this application of AI.

Spell Checking

Personalized Spell Checking using Neural Networks a new system for detecting misspelled words was proposed. this system corrects the mistakes made by typist.

How Neural Network(NN) works?



1. In the first layer of Neural Networks , there is input data in which we inserts data.
2. In the second layer of Neural Networks , there is multiple hidden layers are there which are not visible but all processing occurs in these layers.
3. In the third layer of Neural Networks , there is output data which gives the output of data which was processed in the hidden layers.

There are three ways neural networks work.

1. Supervised Learning is where a computer algorithm is trained on input data that has been labeled for a particular output .
2. Unsupervised Learning is in which a system learn through data-sets created by its own. In unsupervised is not labeled.
3. Reinforcement Learning through feed-back or trial and error method is called Reinforcement learning.

Features of Neural Networks(NN)

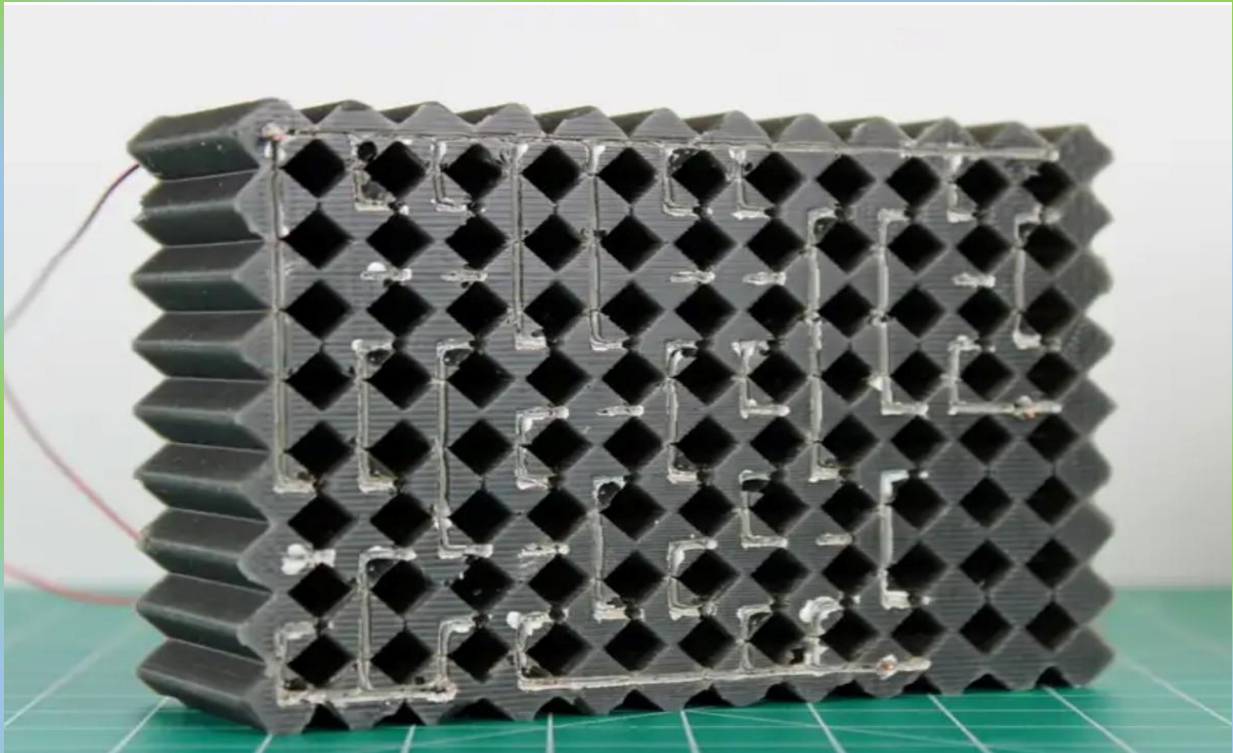
- These are some common features of neural networks.
- Neural Networks(NN) system are modelled on the functioning of human brain.
- They are able to automatically extract features without input from the programmer.
- Every neural network is essentially a machine learning algorithm.
- It is useful when solving problems for which the data set is very large.

Neural networks vs Human Nervous system

- As we know that computers have a complex structure and they also can complete any complex tasks in a short time.
- Humans cant do any complex tasks like computers or AI .
- Computers are very fast and intelligent than humans but there are some easy tasks that computers cannot do it. Example: computers cannot babysit a child.

ASI/T JITENDER KUMAR SHARMA

Scientists Develop Squashable Computer



Ryan Harné at Pennsylvania State University and his colleague have developed a type of soft cube-shaped computer that responds to being squeezed. The computers were built by combining rows of blocks of rubber that have lines of a silver-rubber compound running through them. Different configurations of the blocks act like different circuits, which when combined and connected to electricity allow the device to perform mathematical calculations.

The scientists hope these devices could be used for robots that respond to physical stimuli. One version of the computer was set up to add together two numbers. A user would tell the computer which numbers to add by squishing the component blocks to the left or to the right, connecting some of the silver-rubber lines that didn't touch before in such a way as to encode the numbers in binary. The team connected a (non-squashable) digital display to the computer to show the result of the calculation. The researchers also created squishy computers that could multiply two numbers or compare them to determine which is greater. Although it is unlikely that these types of computers would replace traditional devices, or prove to be faster at doing calculations, Harné's team expects the technology to be used in robotics, where soft robots could make decisions based on what they touch in their environment. Ryan Hayward at the University of Colorado Boulder told the magazine *New Scientist* that he imagined the technology could be applied to integrate a computer into a building. In this scenario, the soft could "decide" to repair it after a crumbling piece of rock applies pressure to it. In order to drive the technology forward, Harné and his colleagues are currently working on fine-tuning the computer's "sense of touch" so that it can take inputs beyond the binary.

BLOCKCHAIN TECHNOLOGY

Block chain is a system of recording information in a way that makes it difficult or impossible to change, hack, or cheat the system.

A blockchain is essentially a digital ledger of transactions that is duplicated and distributed across the entire network of computer systems on the blockchain. Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger. The decentralised database managed by multiple participants is known as Distributed Ledger Technology (DLT).

Blockchain is a type of DLT in which transactions are recorded with an immutable cryptographic signature called a hash.

This means if one block in one chain was changed, it would be immediately apparent it had been tampered with. If hackers wanted

to corrupt a blockchain system, they would have to change every block in the chain, across all of the distributed versions of the chain.

Blockchains such as Bitcoin and Ethereum are constantly and continually growing as blocks are being added to the chain, which significantly adds to the security of the ledger.

Bitcoin and Blockchain: How are They Related?

Although the advent of Blockchain has taken the world by storm, many people still get confused about these two terms. Thus, it is important to understand how these terms differ and how they are interrelated.

Bitcoin is a cryptocurrency, which is an application of Blockchain, whereas Blockchain is simply an underlying technology behind Bitcoin that is implemented through various channels. So if you are working on Blockchain and learning Blockchain, then you are not actually learning cryptocurrency but learning how cryptocurrency works.

Benefits of using Blockchain Technology

We have learned a lot about Blockchain technology. Now let's explore what its benefits are.



The Properties of Distributed Ledger Technology (DLT)

Programmable

A blockchain is programmable (i.e. Smart Contracts)

Distributed

All network participants have a copy of the ledger for complete transparency

Secure

All records are individually encrypted

Immutable

Any validated records are irreversible and cannot be changed

Anonymous

The identity of participants is either anonymous or pseudonymous

Unanimous

All network participants agree to the validity of each of the records

Time-stamped

A transaction timestamp is recorded on a block

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Immutability

In a traditional database, you have to trust a system administrator that he is not going to change the data. But with Blockchain, there is no possibility of changing the data or altering the data; the data present inside the Blockchain is permanent; one cannot delete or undo it.

Transparency

Centralized systems are not transparent, whereas Blockchain (a decentralized system) offers complete transparency. By utilizing blockchain technology, organizations and enterprises can go for a complete decentralized network where there is no need for any centralized authority, thus improving the transparency of the entire system.

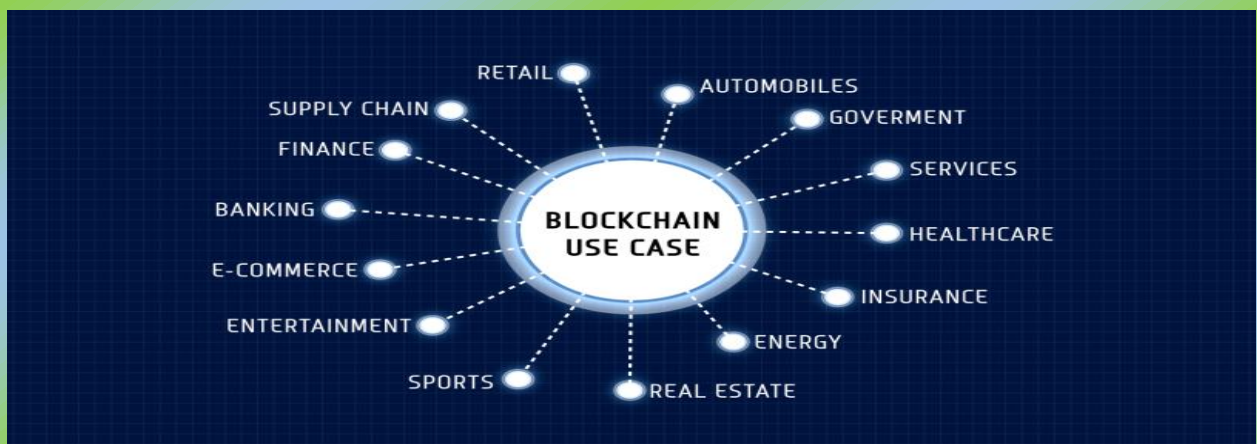
High Availability

Unlike centralized systems, Blockchain is a decentralized system of P2P network which is highly available due to its decentralized nature. Since in the Blockchain network, everyone is on a P2P network, and everyone has a computer running, therefore, even if one peer goes down, the other peers still work.

High Security

This is another major benefit that Blockchain offers. Technology is assumed to offer high security as all the transactions of Blockchain are cryptographically secure and provide integrity.

BLOCKCHAIN USES



Blockchain Applications for Industries

As mentioned, blockchain technology is being used far beyond just its roots in cryptocurrency — almost every modern industry is being morphed by the technology in some way. Alongside banking and finance, blockchain is revolutionizing healthcare, record-keeping, smart contracts, supply chains and even voting.

HC/RO SHIV MURAT DUBEY

Acknowledgement

We are highly thankful for reading out this compilation and hope it will be useful for you in day to day professional and personal life. We would like to hear your interest areas, suggestions from you to make this newsletter more informative and interesting. Your views will definitely help us to create this newsletter as an effective medium to reach you with latest development in the fields of communication and technology.

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