

SRM VALLIAMMAI ENGINEERING COLLEGE

COMPUTER SOCIETY OF INDIA

STUDENT BRANCH

MAGAZINE - 2022

VOLUME - III ISSUE - II



LimeLight



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About SRMVEC CSI-SB :

SRM Valliammai Engineering College Student Branch was started in the year 2007. For the past 15 years, SRMVEC has organised various events and contributed many technical articles to CSI. It is one of the most active student branches of CSI. It has received the 'Best Accredited Student Branch Award' for four consecutive years since 2015 at Annual CSI Convention from Computer Society of India. Currently there are more than 370 Student members in the student branch.

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PREFACE

It gives us great pleasure to release the first issue of volume three 'LimeLight'. The SRMVEC CSI-SB members have been enthusiastic to show their talents. This magazine gives desired opportunity and platform to publish the students' thoughts and creativity. We strongly believe that the purpose of knowledge is fulfilled only when it is transferred to another person. In this manner, this magazine would serve as a collection of knowledge. With technology growing leaps and bounds day by day, people need to be aware of the ongoing development in technology. We appreciate every who stood with us in this venture.

Regards
SRMVEC CSI-SB Team



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EVENTS

CONNECTION GAME

The SRM Valliammai Engineering College Computer Society of India Student Branch organized the 'Connection Game' event. In that, more than 15 staffs registered and participated. We conducted this event on the occasion of Teacher's day on 6th September 2022. We displayed more than 50 technical pictures to the participants and the marks were evaluated based on their correct guesses. The winners of this event:

1. Civil Department –

- Tharini K-Assistant professor
- Vinoth kumar.N-Assistant professor
- Sattainathan Sharna A-Assistant professor

2. English Department –

- Dr.Sheeba Manodh-Assistant professor
- Ms.R.Geetha-Assistant professor
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3. Physics Department –

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- S.Sowmiya-Assistant professor



BENT – A – ZAP

The SRM Valliammai Engineering College, Computer Society of India – Student Branch, organised the 'BENT – A – ZAP' event. At this event, 227 students from various departments registered and 56 students participated. The event was conducted on September 30th, 2022. This event is a technical event with two rounds. The first round is the 'Technical Aptitude Test', in which twenty aptitude-based questions were given to each participant with twenty minutes of time. The top 15 scorers were selected for the next round. The second round was block and tackle. In this round, all the 15 participants were given topic like social media, college life, online classes were given and they had to talk about the specified topic. The participants have been instructed that for every buzzer sound they had to swap their thoughts from positive to negative aspects. The winners of this event:

1. Sabarinathan R – SRM Valliammai Engineering College



EVENTS

2. Dhanush Kumar S – SRM Valliammai Engineering College

3. Sethusridharan S – SRM Valliammai Engineering College

All the events ended in grand success due to the guidance of CSI Student Branch Counsellor Dr. M. Senthil Kumar (Associate Professor, Department of CSE).



INAUGURATION FUNCTION

The SRM Valliammai Engineering College, Computer Society of India Student Branch organized ‘**Tech – O – Tangle**’ event. In this event 242 students from different colleges have registered and more than 90 students have participated the event. The event was conducted on **7th August 2022**. In this event, we have given 30 questions in which each question had 2 subdivisions and the two subdivisions contain the same answer. The answers are given in clustered form in which the participant should select the correct

answer. Each answers carried two marks.

The winners of the event are:

1. Vaishnavi Devi R - SRM Valliammai Engineering College
2. Sri Harshini N - Avinashilingam Institute for Home Science and Higher Education for Women
3. 3.Abdul Athif A -St. Joseph’s Institute of Technology

The event ended in grand success due to the guidance of CSI Student Branch Counsellor **Dr. M. Senthil Kumar** (HOD, Department of CYS), who supported us in coordinating the event.

IDEOGRAMS AND CODOPHILIA

The SRM Valliammai Engineering College Computer Society of India Student Branch organized the ‘**Ideograms and Codophilia**’ event. In that, more than 80 students have registered, and more than 35 students have participated. The event was conducted on 12th October 2022. We displayed more than 50 advertisement images to the participants and the marks were evaluated based on the grammar and the fluency speaking skills of the participants.

The winners are:

1. Harish Raj - Srm Valliammai Engineering College



EVENTS

2. Rakshith.D.H - Srm Valliammai Engineering College
3. Devisri.B - Srm Valliammai Engineering College

The event ended in grand success due to the guidance of CSI Student Branch Counsellor **Dr. M. Senthil Kumar** (Associate Professor, Department of CSE), who supported us in coordinating the event.



Digital Image Processing

Introduction

The digital image processing is simple process which deals with minute articulations of imaging .It is a digitalized way of computing a image it deals with various sub signals and systems as we use many softwares for editing is a prime example for it. These signals are used in various forms it is used in different types of engineering to deal with the substantial equations and for various other uses but it is primarily used in the field of image processing.

Types

- Analog image processing
- Digital image processing

Previously it dealt with the analog image processing before the introduction of the digital embedded systems. But due to the various and important uses in the digital system it is highly preferred over its counter part.

Now moving on to the most important part .

The Process

As we discussed earlier the basic processing deals with providing an signal as a input and the output to be a image which may be digitalized or analog based on the embedded system. And the signal is considered to be a 1D or even two dimensional . The signal is used to pass on some data. The basic example for this signals is the transmission of wave forms from one point to another which is primarily working as a emitter of data.

The conversion of image should be done by firstly converting analog to digital and the capturing of a picture is the first step toward image processing. The image acquisition is done by the sensors in the camera and if the capturing of a picture is done outdoors then sunlight plays a very pivotal role in the processing.



Digital Image Processing

With the received amount of data the amount of reflection from the sensors and the deploy of various substantial formations and different techniques of quantization are used in making the image what we see today.

So, basically the most important thing in capturing a moment is done by the camera then technically speaking is aperture which in turn deviates the light into the camera for bringing out good quality images the larger the aperture of the lens much cleaner the picture will be. The ultimate usage of it is to shed away the darkness from the image. As we talk in detail about the picturing. Professionally, speaking there are way more types of images such as the binary image, the black and white image the binary imaging is all about dealing with the 0's and 1's and the black and white deals with tagling between black and white .

There are sources which provide differentiating colour to the display which are the bits in a display there are various types of bits in a display such as 2,3,4,5,6 and 8 bit displays but the bits like 2,3,4,5,6 are not used in modern times they were used previously in the Old televisions . But 8 bit colours are used everywhere nowadays from mobile phones to televisions. But to better them even more 16 bit colours have been introduced to enhance the advancement of technology the colour division in the 16 bit colours is not easy as compared to the black and white colours.

16 bit colours engages with the RGB which is nothing but (Red,green,blue) format as we everyone know 16 colours is divided between three colours and the remaining one bit is left out to the green colour because it has a long lasting endorsing impact In our eyes. solutions in the enterprise environment.

But, following the 16 bit there is new invention in the house which is the 24 bit colours which is also equally divided between the three colours of (Red ,green, blue) and equal of 8 bits are divided between the three.

The most integral and pivotal role in image processing is done by the pixel processing but there is another thing called spatial resolution which is a one cannot be counted out by the pixel resolution, while pixel resolution is the number of pixels in a particular specifically designed frame but spatial resolution is the one which defines the number of solely dependent pixels per frame.

There is another type of resolution like spatial which is grey level resolution which defines the number of solely dependent grey shades on the screen or the respective PPI (Pixels per inch). These grey shades play a very fine role in determining the blackness of the screen .For eg, In your mobile phones which has a AMOLED screen .The intensity or the differentiating factor is that the how many black pixels or grey shades are present in it, Which is a cruciating factor when it comes to deal with these particular criterions.



Digital Image Processing

Next moving into the important determining factor which is the quantization and the sampling which is the technique that does the majority of work in the conversion of a image processing.

Sampling And Quantization Technique

As we have seen earlier in the previous paragraphs the image processing depends on sampling and quantization techniques. Firstly the sampling is the technique through which the analog image is processed through as a digital image. It determines the spatial resolution of the image and also defines the image from the continuous to discrete or the other way around the size, pixel clarity, the reimage sizing which depends on the sampling ratio and its sampling technique though the technique is highly negotiable and AI Headed.

The next technique is the quantization technique when we are taking over a quantization process it is that you are dividing a varying signal into multiple different quanta in the respective amplitudes . On quantizing we derive a lot of values which is a lot useful in determining the amplitude frequency for the digital image processing .Now after determining the quality of the image if we have to improve the quality of the image there are various bits of imaging 256,128,64,32,16,8,4,2 bits of grey level. Which defines the pixel clarity of the image.

There is a effect called as contouring which when during the decreasing effect of grey scale some false colours or edges that can influence us which would lead to wrong objection about the image .

All these effects have a demeaning effect on the picture which is very sustaining and a demanding effect on it.

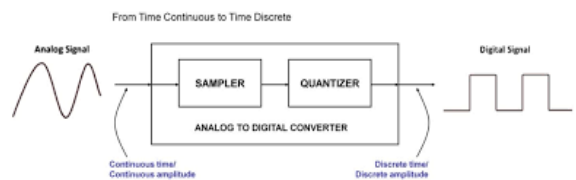


Fig:- 2.1 Sampling and quantization mechanism

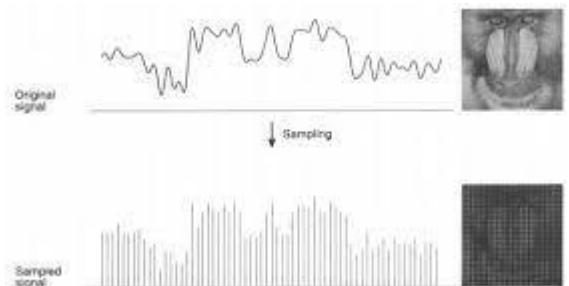


Fig:- 2.2 Graphical representation

Conclusion

As we have seen the process and everything about the image processing which is from the analog to digital image processing the nuances and the antique effect which deals with making the picture in the form of digital for us is the way going forward



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Tesla's Time

I think you'll agree with me when I say:

"Nikola Tesla is everywhere around us" meaning AC- Alternating Current. Let's explore some his inventions.

all though He had more than 300 patents for his inventions. He was too busy to apply patents on most of his inventions . Here are the most specific invention that made an ERA

- Tesla Coil
- Induction Motor
- Tesla Turbine
- Shadowgraphs

Tesla Coil

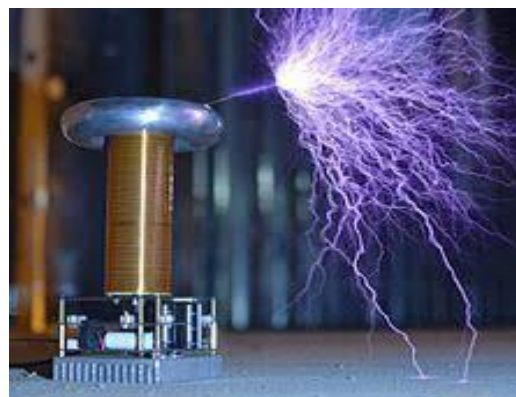


Fig:- 2.1 Tesla coil

I'm not going with lectures, let me explain you simply. it's a simple transformer with two parts (primary and secondary). It can produce high voltage and high frequency alternating current .



Tesla's Time

Tesla's objective was to supply current wirelessly through his inventions, People got scared by the lightning shape of the electricity when Tesla demonstrated Tesla Coil but nobody was aware of its potential.

Through some funding Tesla built a massive tower in Long Island called Warden Clyffe tower (TESLA TOWER), Funders refused to fund though Tesla built an energy supplying tower instead of a communication tower which was expected by the funders. later, the tower was demolished without any financial source. Today's Scientists are not accepting the fact that Tesla tower would have the potential to supply free energy, if it was completely built. But only Tesla know his vision on it, Maybe it can work in his way.

By adding magnifying transmitter in the Tesla Coil, Tesla was able to produce high electro- magnetic energy. It is possible by breaking the magnetic flux from the electromagnetic energy that exists which assisted him to make wireless current possible from 1 km. Interesting right !

Its mechanism is simple as that, As the electric energy was not discharged to the ground, instead, He created a standard wave and a tuned circuit that can possibly receive the wave created. And the history was made !!

I can't even imagine the perspective of his perplexed thoughts. Reason for being the father of modern electricity. People portrayed him as a magician after this discovery.

But sadly THE GREAT TESLA COIL was just a fair and fun now a days. But the seeds are sown by Tesla for today's advancement.

Induction Motor

This could be your 10th grade physics chapter. Tesla raised a base for the conversion of electrical energy to mechanical energy in 1880s. The principles of induction motor was never modified till now, it was followed as it is as Tesla discovered, even though the designs were changed several times.

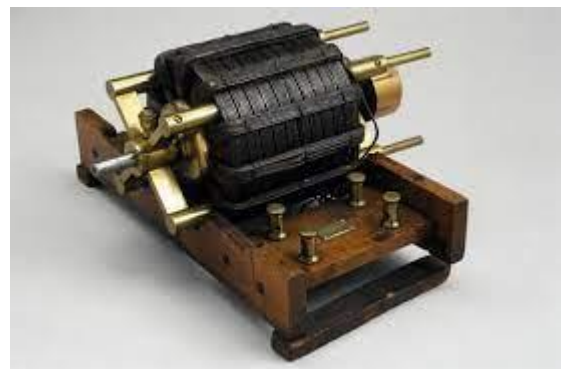


Fig:- 2.2 Tesla's induction motor

The main objective of this invention is to reduce efficiency loss due to the presence of commutator present in the DC motor, so Tesla built a Induction motor without commutator, luckily Tesla applied patent for it, so that other scientists like Galileo Ferraris failed to take over when their model was presented, many influenced Entrepreneur believed and appreciated the work of Induction motor, they came forward to make partnership with Tesla, especially George Westinghouse, which was a greatest turning point in Tesla's life.



Tesla's Time

Tesla used rotating magnetic flux without any mechanical friction to rotate a motor, so that, it could run for years without any efficient loss, its appliances are everywhere around us like fan, AC Etc.

Tesla Turbine

Tesla had a desire to fly since his childhood and he also tried for it by exploring some Aircraft Patents in 1920s, which had three wheels mutually and dimensionally perpendicular, the reason behind his choice of wheel alignment was to take off the aircraft horizontally and vertically like flight and helicopter respectively, but it was not feasible till now. The first helicopter introduced in 1931, but Tesla was the base from 1920s

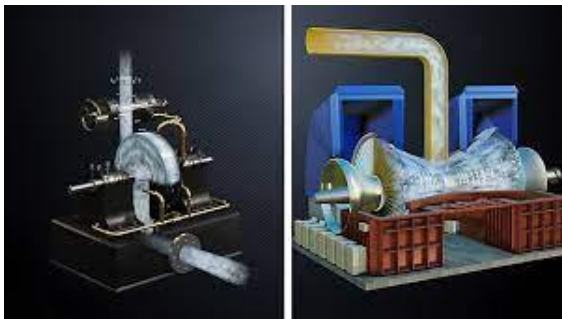


Fig:- 2.3 Tesla turbine

Finally, He moved towards mechanical side to invent a Engine that could help him to fly. the main reason behind his focus on mechanical side is to attract investors, so that He can compensate the demolished Warden Clyffe tower and to make further research.

At his time Internal combustion engine (Piston engines) were the best seller.

So Tesla built an alternate called Tesla Turbine. It has numerous disc plates instead of Piston. Unlike piston engine (combustion of fuel doesn't take place inside the engine, where a fuel enters the turbine after combustion in Tesla Turbine), which rotates the disc and produces enormous power. Nikola Tesla anticipated that his turbine would give 90% of fuel efficiency, rather we live with 40-50% of fuel efficiency, It is a simple and ingenious, but it wasn't used though it has some limitations; Disc expands when the turbine rotate at high RPM, which damages the disc, Tesla's turbine generated 600 horse power with 50000 RPM.

But the main reason to neglect Tesla turbine was; It fabricates more fuel efficiency, so people would switch over it and fuel consumption leads to be less which in turn creates economical crisis, And during world war 1, Piston engine dominated Tesla turbine in production.

Shadowgraphs (X-ray)

Wait a minute!! X-ray was discovered by WC Rontgen and why is he bothering Tesla. Lets see.

Rontgen invented X-ray accidentally while working in his lab, but he didn't name this ray at first. The first X-ray taken by Rontgen was his wife's hand, He mentioned it as a Shadowgraph, But the name Shadowgraph was already coined by Tesla in 1888, where as Rontgen discovered it in 1895.



Tesla's Time

When Tesla was involved with the invention of Tesla Coil, He noticed some tiny spots on his photographic films, He also noticed that the photo wasn't displayed in the photographic plate when Tesla captured his friend, He used Crookes Tube for it, but later Tesla himself created a vacuum tube where he used single electrode to emit electron, though the target electrode was absent, it forms an X-ray type ray, Tesla was unaware of the X-ray he found, so he named it as 'Shadowgraph'. He was ready to begin a research on X-ray in 1894, but then unfortunately Tesla's lab went under a severe fire accident and most of his records, inventions were burnt, after this sad incident, In 1895 Rontgen published his first X-ray photo and received Noble prize for his discovery on X-ray. Tesla felt happy for Rontgen and wrote a letter wishing him success with an X-ray attachment of his own leg. Tesla's X-ray of his leg was more clear and understandable than Rontgen's X-ray photograph, Mr. Rontgen replied that He is a great fan of Tesla with a reply letter to Sir Tesla, furthermore, Tesla found the properties of X-ray, He also found that X-ray can be harmful to Human beings. Tesla's research was so precise that nobody can raise a question against him.

As Nikola Tesla rightly said:

"One must be sane to think clearly, but one can think deeply and be quite insane".

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Search Engine Optimization

Introduction:

Seo is a globalized one. Everyone uses Google and now digital marketing, online business, and online learning platform are becoming more popular. After the lockdown everywhere everyone prefers online educational platforms or businesses whatever they used some strategy to develop and become popular. Seo plays a major role cause learning online means learning through websites. Learners access the site and learn. How the SEO plays in these categories. Why it's so important, I'll give you the answer to these questions from this article.

What is SEO



Fig:-3.1 SEO

SEO stands for Search engine optimization. It optimizes your content through search engines' organic search results. It helps you to increase the quality and quantity of traffic to your websites.

Types Of SEO

- Google SEO - the process of optimizing your website to rank on google.

- Instagram SEO - get the target audience
- YouTube SEO - for organic search results
- Amazon SEO - optimizing your product to get free traffic.

SEO Benefits

- It gives free and more organic traffic to your website
- Your traffic will be consistent once your ranking high
- Can Earn money and develop your own business by getting a target audience.
- Improve your business digitally

How Google SEO does work

There are two main things is there that is:

- Crawling
- Indexing

Crawling and indexing: It gathers information that is publicly available from all over the web. It is also called a spider. It has a list of URLs that they may have previously crawled on sitemaps. They follow hyperlinks and crawl newly discovered pages. This happens continuously, the massive index of information is built and this information is stored in Google's servers and they called it a 'search index'.



Search Engine Optimization

All know that if we search one thing it shows that or is relevant to that in a fraction of seconds and this is Google's main work, it sorts hundreds of trillion of web pages from their search index and shows you the most relevant results.

Google's ranking factors

- **Based on a search query**

If you query about some restaurant shows a result that is close to your location. Or you search any tutorial it results in you tube like that Google shows you a result based on what type of query you asked and the location nearby you.

- **Fresh content and old content**

If your query is about one place, Google results in the old popular webpage but the query is about some person sore technology it results in freshly published content. Cause Google thinks people want to see what recently happened. Based on these the website results top the search.

- **Search intent**

Google will analyze your intent from your query so it gives you relevant information. For example, if someone is searching for skincare it results in a website that tells about steps to be followed for skincare and also shows skincare products that you will see on the top of the page. Showing products comes under digital marketing.

- **Keyword**

The keyword is almost

mandatory and Important in SEO. If someone writing something like a blog, 2 most important things are the quality of your content and the keywords that are used in your article? Cause People Search using keywords. we will see this in detail later.

SEO Backlinks

Link build up a page's authoritativeness. When people link to your page, they are essentially vouching for your content. And your readers should check out your page for further information. Link about your post on top sites it will driven organic traffic to your website.

The most essential factors in Off Page SEO are:

- Bookmarking
- Directory
- Listing
- Blog content
- Profile creation

Usability

Mostly people prefer mobile for browsing. So, your website will be a mobile usability is essential to improve your ranking and traffic.

Page speed

Website page speed is to be fast. if the page is slow it takes more time to load, it results in a bad impression among users. The reader will exit without reading your page. For this reason, Google established page speed as a factor in the search ranking algorithm in 2018.



Search Engine Optimization

On-page SEO

On the page, SEO means it's only about your website. It helps to get a high rank in search engines.

SEO Optimize

- Title tag
- Content
- Page speed
- Heading
- Internal linking
- Core websites
- Page experience

Title tag

Try to add related and highly-traffic keywords to your title of the content. Don't stuff more keywords.

Content

The quality and quantity of your content are a must. Why is the quality of content important? Cause your primary responsibility is you have to provide information that wants by your readers. They looking for something they search for that's why they visit the site so once answer their queries your visitors came back to your site again otherwise they won't so, your site ranking gets down. Try to write quality and don't copy from other websites it gives you a plagiarism problem.

Heading

Heading (h1) makes your heading a more attractive and competitive keyword. Don't give unrelated keywords to your page. It affects search ranking. Don't use more than one h1 on a page, can add h2,h3,.etc.

Internal linking

Link other websites link to your site internally. It slightly gives more target customers. And the link must be relevant to your content. Give at least 1-4 internal links.

Core web vitals

It's about user experience with the site. It includes page speed, engagement, and layout visuals. Before publishing your content just check your insights for load time, and ensure that the speed is within 2.5 seconds. Avoid the third party running backside of the site. Gives a decent and attractive layout to the page.

Page experience

The signal measures how many visitors visit your site and how interactive and potential they are the signals collect this information and send it to Google then Google will rank your page in a search engine. It consists of mobile-friendliness, core web vitals, the browser that they used, and HTTPS security. It just measures how readers are engaged with your website.

Off-page SEO

Get other links to your websites. More links take up you to the top ranking in search results. If Quality websites links to your website Google consider the website to be an authoritative site and considered as a trusted site. So, approach a company or website and try to get work with them for getting their links for your site. Make collaborative content.



Search Engine Optimization

Drive traffic to your site from another platform/website

Offline marketing is also important to your site traffic. Both on-page and off-page SEO are like a weighting scale you have to balance both. You did all the things to get traffic in an on-page SEO but still, the traffic is not enough good why do such situations happen cause Google drives more traffic to your site only when your site gets a higher rank on the website otherwise it won't give you more traffic. In the initial state we have to work to get traffic by sharing your site link to other platforms example WhatsApp, Instagram, Facebook, Pinterest, Twitter, etc.. for example, you can share your link to your friends through WhatsApp then they click and visit your site it counts as traffic and adds a link to Instagram bio so your followers and people who see your profile just they click and see to check what is this likewise promote your site and drive traffic.

Keywords

Google algorithm works based on keywords and content quality and heading of your article. According to keyword Search volume, your article shows in the top rank in google search results. From the above information, we know how keyword plays a major role in search engine optimization. The keyword is not only for SEO it's important for youtube, Instagram, and other platforms. The searching keyword is the second priority in content writing. Don't stuff more keywords and also avoid irrelevant keywords.

Conclusion

By using this we can develop our start-up or create a new startup. In this modern world, most people are not focused on their marks or academic performance. Not frustrated about interviews cause we can earn by ourselves. We can earn online with or without investment and can create opportunities through websites, and blogging.

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Encryption – The Need & Deed

Abstract

Protection is the first and foremost thing that comes to our mind whenever we initiate or create. In a virtual world, the core element that sustains the cyber environment is called DATA. It is the base of all the processes, analysis, and research that are done in the cyber world. Hence, the protection of such an important entity is our first concern. Encryption is one of the processes of protecting data from the public in plain sight. A formula or process is used to convert plain data into encoded messages which can be read only by the sender and receiver.

Introduction

Encryption is defined as the process of converting information or data into a secret code where the true message or meaning is hidden. The process of turning a piece of readable information into an encrypted format is called encryption or cyphering and the reverse process of changing the encrypted format to readable information is called deciphering or decryption.

Encryption Key

The process of encryption and decryption can only be effective if it includes a variable as a part of the formula or algorithm. The variable part is called the KEY. It makes the messages unique from the other ciphered data. There are two types of keys used for encryption: The Public key and the Private key.

Public Key – Available for both sender and receiver and sometimes available to everyone on a certain network for accessing a common document.

Private key – Available only with a receiver and used along with a public key to have access to decrypt the message.

Types Of Encryption

There are two types of encryption processes based on the usage of keys. They are Symmetric encryption and Asymmetric encryption. Symmetric encryption uses the same public key for both encryption and decryption and a secure method is used to transfer the key from receiver to sender. Asymmetric Encryption uses a public and private key for encryption and decryption where the owner or administrator holds the private key and a public key is available to the receiver or the public at large.

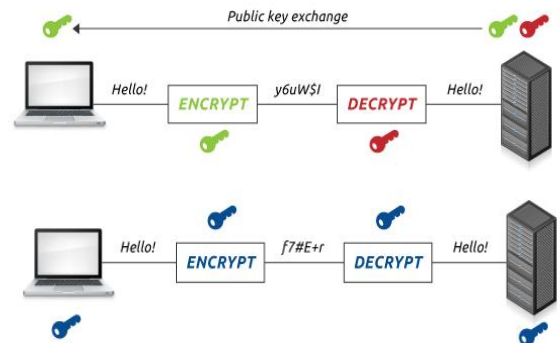


Fig 4.1 : Encryption and Decryption



Encryption – The Need & Deed

Benefits of Encryption:

- Confidentiality of digital data is maintained.
- Secured transmission of data is possible.
- Regulations by the government are achieved.
- Increases the data integrity.

Drawbacks Of Encryption

- Key management is one of the biggest concerns.
- Backup and restoration are affected.
- Not suitable for large amounts of data transfer

Examples Of Encryption:

E2EE – End-to-End Encryption is used in transport layer security between the client(receiver) and server(sender). It is used on Facebook and WhatsApp

HTTPS – It is a mode of website encryption running over Hyper Text Transfer Protocol (HTTP) where all the content is secured by keys

Need For Encryption:

Data Stored in systems are vulnerable to hacking attacks and encryption acts as a barrier to accessing the data stored. It also protects the data from unauthorized users. Sensitive

a certain network for accessing a common information is protected from a Third parties. Interception of data is useless unless they have a key to decrypt. It also protects the reputation of the owner or the administrator and helps to build trust with clients or authorized people. Creating unique copies of a single data is done with the help of encryption.

Conclusion:

As digital transactions are increasing at an enormous rate, the only way to protect is by strengthening digital security, and encryption lies at the core of digital security. Hence encryption is the first and foremost thing that stands between the victim and cyber criminals. For a better and safer environment, we will always ensure that we are ENCRYPTED.



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Virtual Reality Development Using Python

Abstract

Virtual Reality (VR), sometimes called Virtual Environments (VE) has drawn much attention in the last few years. The Virtual Reality uses a huge number of technologies to produce a Virtual world so that a user can interact and manipulate with the virtual objects in the so produced Virtual Worlds. With the aid of some specially developed gadgets like a Head Mounted Display, Electronic Glove and Mechanical armatures that fit the human organs we can immerse the human into the Virtual world. The simulation technique is combined with the motion of the human to produce the output that what human expects for. For example, the person in a Virtual world looks at a particular object then he has to get the feeling that he is actually looking at that object and he should also get the feeling of the sounds that come from that object. In this paper a historical overview of virtual reality is presented, types, architecture of VR systems are listed, followed by applications of this technology in science, work, and entertainment areas. Finally, the future of VR is considered.

Introduction

The definition of virtual reality comes, naturally, from the definitions for both 'virtual' and 'reality'. The definition of virtual is near and reality is what we experience as human beings. So, the term "virtual reality basically means near-reality. This could, of course, mean anything but it usually refers to a specific type of reality emulation.

We know the world through our senses and perception systems. In school we all learned that we have five senses: taste, touch, smell, sight and hearing. These are however only our most obvious sense organs. The truth is that humans have many more senses than this, such as a sense of balance for example. These other sensory inputs, plus some special processing of sensory information by our brains ensures that we have a rich flow of information from the environment to our minds.

Everything that we know about our reality comes by way of our senses. In other words, our entire experience of reality is simply a combination of sensory information and our brains sense-making mechanisms for that information. It stands to reason then, that if you can present your senses with made-up information, your perception of reality would also change in response to it. You would be presented with a version of reality that isn't really there, but from your perspective it would be perceived as real. Something we would refer to as a virtual reality.

Answering what is virtual reality" in technical terms is straight-forward.



Virtual Reality Development Using Python

Virtual reality is the term used to describe a three-dimensional, computer-generated environment which can be explored and interacted with by a person. That person becomes part of this virtual world or is immersed within this environment and whilst there, is able to manipulate objects or perform a series of actions.

The concepts behind virtual reality are based upon theories about a long held human desire to escape the boundaries of the real world' by embracing cyberspace.

Types Of Virtual Reality

Windows on World (WoW): With this kind of system, also known as "desktop VR" the user sees the 3-D world through the window of the computer screen and navigates through the space with a control device such as a mouse. Like immersive virtual reality, this provides a first-person experience. One low-cost example of a "Through the window virtual reality system is the 3-D architectural design planning tool Virtus Walk Through that makes à possible to explore virtual reality on a Macintosh or IBM computer. Developed as a computer visualization tool to help plan complex high- tech filmmaking for the movie The Abyss.

Virtus Walk Through is now used as a set design and planning tool for many Hollywood movies and advertisements as well as architectural planning and educational applications. A similar, less expensive and less sophisticated program that is starting to find use in elementary and secondary schools is Virtus VR (Law, 1994; Pantelidis, nd).

Immersive VR: Usually when we think of virtual reality, we think of immersive systems involving computer interface devices such as a head-mounted display (HMD), fiber-optic wired gloves, position tracking devices, and audio systems providing 3-D (binaural) sound. Immersive virtual reality provides an immediate, first-person experience. With some applications, there is a treadmill interface to simulate the experience of walking through virtual space. And in place of the head-mounted display, there is the BOOM viewer from Fake Space Labs which hangs suspended in front of the viewer's face, not on it, so it is not as heavy and tiring to wear as the head-mounted display. In immersive VR, the user is placed inside the image: the generated image is assigned properties which make it look and act real in terms of visual perception and in some cases aural and tactile perception. There is even research on creating virtual smells; an application to patent such a product has been submitted by researchers at the Southwest Research Institute (Varner, 1993).



Virtual Reality Development Using Python

Telepresence: The concept of cyberspace is linked to the notion of telepresence, the feeling of being in a location other than where you actually are. Related to this. Teleoperation means that you can control a robot or another device at a distance. In the Jason Project, children at different sites across the U.S. have the opportunity to teleoperate the unmanned submarine Jason, the namesake for this innovative science education project directed by Robert Ballard, a scientist at the Woods Hole Oceanographic Institute (EDS. 1991; Ulman, 1993; McLellan, 1995).

Augmented VR: A variation of immersive virtual reality is Augmented Reality where a see-through layer of computer graphics is superimposed over the real world to highlight certain features and enhance understanding. One application of augmented reality is in aviation, where certain controls can be highlighted, for example the controls needed to land an airplane. And many medical applications are under development (Taubes, 1994b). Recently, for the first time, a surgeon conducted surgery to remove a brain tumor using an augmented reality system a video image superimposed with 3-D graphics helped the doctor to see the site of the operation more effectively (Satava, 1993).

Architecture Of VR System

Architecture of virtual system consists of input processor, simulation processor, rendering processor and world database.

Architecture of VR System

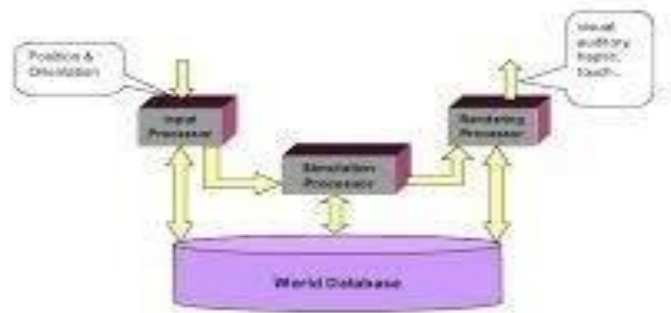


Fig:-4.1 Architecture of VR system

Input Processor: It controls the devices used to input information to the computer. The main objective of input processor is to get the coordinate data to the rest of the system with minimal lag time. The main components of input processor include keyboard, mouse, 3D position trackers, a voice recognition system, etc.

Simulation Processor: The process of imitating real things virtually is called simulation. This is the core of the virtual reality system. It takes the user inputs along with any tasks programmed into the world and determine the actions that will take place in the virtual world.

Rendering Processor: Simulation processor imitates the real things but sensation is not produced to produce this sensation we use rendering processor. It creates the sensation that are output to the user. Separate rendering processes are used



Virtual Reality Development Using Python

for visual auditory. haptic and other sensory systems. Each renderer takes a description of the world state from the simulation process or derive it directly from the world database for each time step.

World Database: This is also known as World Description Files. It stores the object that inhabit the world, scripts that describes actions of those objects. This database contains all the objects which we are going to experience virtually. For instance, if we want to experience the space virtually then the world database must have all the objects that are in space like the sun, the moon, stars, planets, etc.

Applications Of Virtual Reality



Fig:-4.2 Application of VR

Virtual Reality and Education:

Education is another area which has adopted virtual reality for teaching and learning situations.

The advantage of this is that it enables large groups of students to interact with each other as well as within a three-dimensional environment.

It is able to present complex data in an accessible way to students which is both fun and easy to learn. Plus, these students can interact with the objects in that environment in order to discover more about them.

Virtual Reality in Engineering:

Virtual reality engineering includes the use of 3D modelling tools and visualization techniques as part of the design process. This technology enables engineers to view their project in 3D and gain a greater understanding of how it works. Plus, they can spot any flaws or potential risks before implementation

This also allows the design team to observe their project within a safe environment and make changes as and where necessary. This saves both time and money. What is important is the ability of virtual reality to depict fine grained details of an engineering product to maintain the illusion. This means high end graphics, video with a fast refresh rate and realistic sound and movement.



Virtual Reality Development Using Python

Technologies Of VR

Head-Mounted Display (HMD): Head-mounted displays or HMDs are probably the most instantly recognizable objects associated with virtual reality. They are sometimes referred to as Virtual Reality headsets or VR glasses. As we might have guessed from the name, these are display devices that are attached to our head and present visuals directly to our eyes. At a minimum, if a device conforms to those two criteria, we may consider it an HMD in the broadest sense. HMDs are not the sole purview of virtual reality, they have been used in military, medical and engineering contexts to name but a few. Some HMDs allow the user to see through them allowing digital information to be projected onto the real world. Something which is commonly referred to as augmented reality. When we look at the diversity of HMDs that exist today within the context of virtual reality, it becomes apparent that there's much more to these devices than strapping two screens to our eyes.



Fig:-4.3 Head-mounted display

In order to allow for an immersive experience either as a personal media device or as a full-on virtual reality interface, there are a number of technologies that can be incorporated in an HMD.

Data Glove: A data glove is an interactive device, resembling a glove worn on the hand, which facilitates tactile sensing and fine-motion control in robotics and virtual reality. Data gloves are one of several types of electromechanical devices used in haptics applications.



Fig:-4.4 Data glove

Tactile sensing involves simulation of the sense of human touch and includes the ability to perceive pressure, linear force, torque, temperature, and surface texture. Fine-motion control involves the use of sensors to detect the movements of the user's hand and fingers, and the translation of these motions into signals that can be used by a virtual hand (for example, in gaming) or a robotic hand (for example, in remote-control surgery).



Virtual Reality Development Using Python

VRML: VRML stands for virtual reality modeling language. It is a standard language for interactive simulation within the World Wide Web. This allows to create virtual works network via the internet and hyperlinked with the World Wide Web.

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Save Water



We need
lot of **BLUE**
to remain
GREEN

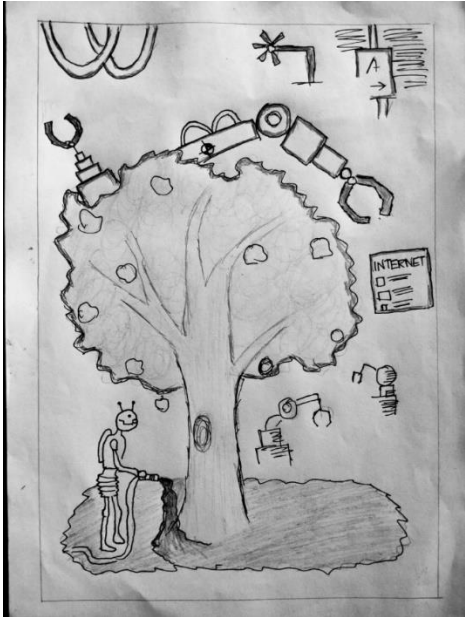
Save Water



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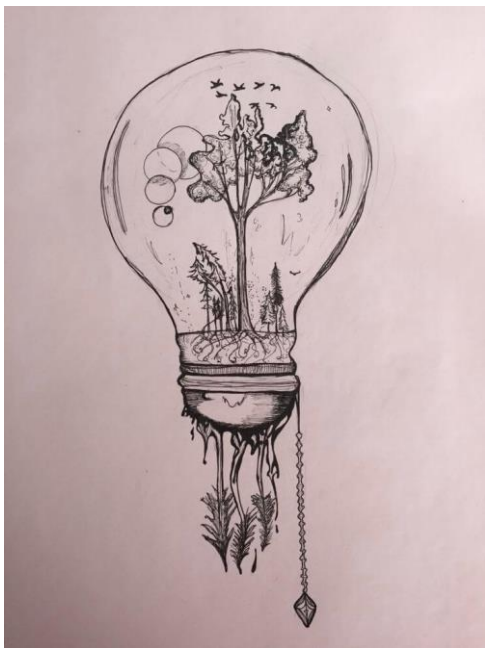
The Age Of Robots



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Global Tech Effect

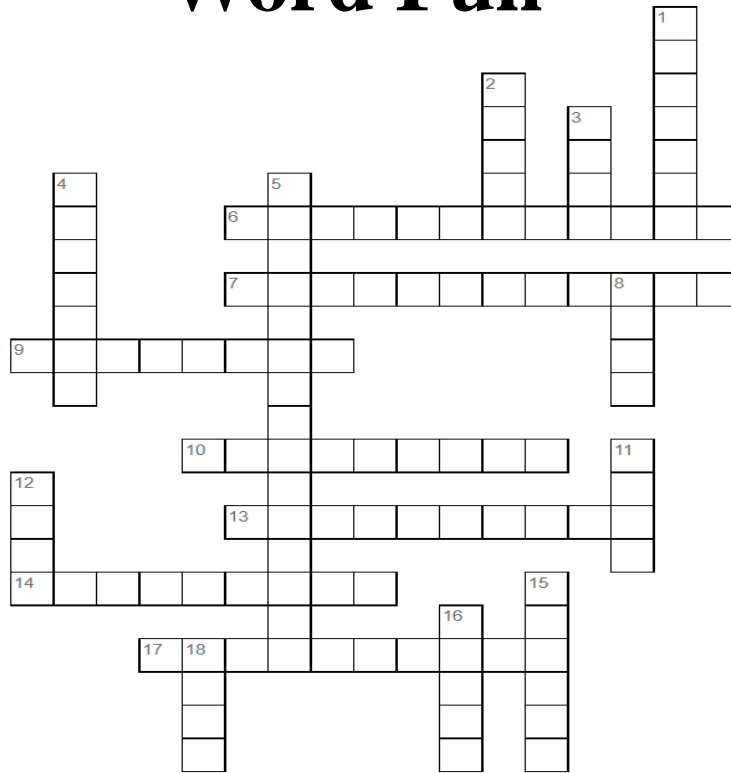


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Word Fun



*Answer will revealed in the next issue.

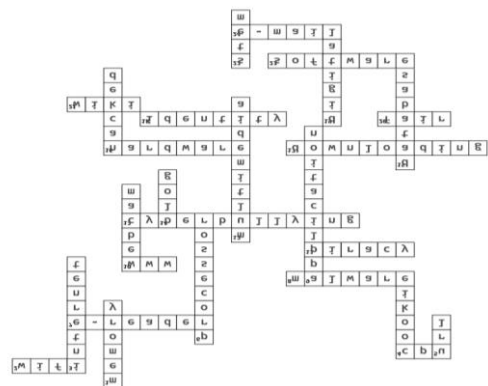
Across:

- 6. Online application used to make spreadsheets and graphs to display data
- 7. Online application used to make presentations and slideshows
- 9. This type of question in a Google Form allows you to pick more than one answer for a question
- 10. Control + U is used to _____ the selected text in a document
- 13. You can view responses in Google Forms by summary, by question, and by _____
- 14. This company swapped the R and Period keys on the keyboard to their current positions
- 17. The first form on data storage (used in the 18th century)

Down:

- 1. This should be written first in an email
- 2. Google _____ has a purple logo
- 3. The colors that make up the Google logo are red, yellow, green, and _____
- 4. Vint Cerf and _____ are credited with inventing the internet

- 5. The first mobile phone (invented in 1983)
HINT: starts with M
- 8. Google _____ has a blue logo
- 11. This tab is used to find keyboard shortcuts
- 12. How many different types of charts can you insert into Google Docs or Slides?
- 15. This tab is used to add a table to a document
- 16. Google Sheets has a _____ logo
- 18. Control + Z is used to _____ something in a document



Answers for previous issue:



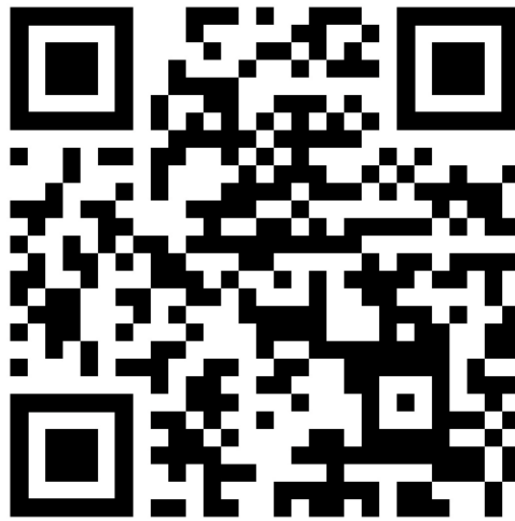
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