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E-Newsletter

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- To strive for academic excellence and professional competence among students and staff.
- To encourage innovative ideas among students to enhance their entrepreneurship skills.
- To provide high tech educational resources and supportive infrastructure.

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VISUAL CRYPTOGRAPHY

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Cryptography is the enciphering and deciphering of data and information with secret code. Visual Cryptography uses the same concept except that it is applied to images. Visual Cryptography can also be somewhat deceiving to the inexperienced eye, in such a way that, if an image share were to fall into the wrong hands, it would look like an image of random noise or bad art depending on the individual's experience [2].

Visual Cryptography is a cryptographic technique which allows visual information (pictures, text, etc.) to be encrypted in such a way that decryption becomes a mechanical operation that does not require a computer. One of the best-known techniques has been credited to Naor and Shamir, who developed in 1994 [1]. They demonstrated a visual secret sharing scheme, where an image was broken up into n shares so that only someone with all n shares could decrypt the image, while any n − 1 shares revealed no knowledge about the original image. Each share was printed on a separate transparency, and decryption was performed by superimposing the shares of the image. When all n shares were stacked, the original image would emerge [4].

Visual Cryptography is another way of sharing hidden data, except that it is limited to image formats. In its basic concepts, Visual Cryptography works in such a way that an image is split up into shares which look like white noise, but when those shares are overlaid they reveal the hidden image. Many studies have been performed in the area of Visual Cryptography and several algorithms have been developed. One interesting Visual Cryptography method is the (t,n) Threshold Image Hiding Scheme [2]. This method hides a secret image into 'n' number of cover images, and can be recovered if't' number of cover images are available. The hidden image can be up to 512 colors with a size as big as that of the cover images. This method uses Lagrange interpolating polynomial, MD5 hashing, and RSA signature to encrypt the image to be hidden. The interesting thing about this algorithm is that during extraction of the hidden image from the cover images, it implements a cheat attack check where it checks whether these cover images are the same as the ones used to hide the data. If that check fails then the extraction of data is aborted. The authors of this method do not mention anything about the quality of the hidden image after extraction and how similar it is to the original image, although they do mention that the cover images used in their experiment are of relatively good quality with an average PSNR (Peaks of the signal-to-noise ratio) value of 31.34.

Another Visual Cryptography algorithm is the Image Size Invariant Visual Cryptography [2]. This method hides two-tone secret image and splits it into binary transparencies which look like random noise images. Once those transparencies are stacked on top of each other, the secret image is revealed. The secret image can also be reconstructed by XOR computations of the transparencies. This algorithm is based on the conventional VSS (Visual Secret Sharing) method. Correlation to the original image, which makes them resistant to brute force attacks that attempt to decrypt them. With this method, overlaying of shares doesn't reveal any data; the decryption module has to decrypt the shares for the data to be revealed. This is good for added security since only those with software which implements this algorithm are capable of revealing the secret image. Two advantages of this method are that it decrypts the image shares without altering the secret image or effecting its quality or dimensions, and that the

decryption satisfies the perfect reconstruction property. This means that after decryption, one would obtain a revealed image that is identical in look and content to the original secret image.

In 1995, Naor and Shamir [1] proposed the concept of (k, n) Visual Secret Sharing (VSS) scheme. This scheme splits an image into n different shares. The image can be recovered with k (k<=n) shares but any k-1 shares does not reveal any of the information about the image. Depending on the applications, there are many implementations of the (k, n) VSS scheme. The (n, n) VSS scheme is most secure and least convenient in key management. In this paper (2, 2) VSS scheme is used. A secret image with size M x N can be divided into two shares with size 2M x 2N in which, every pixel of the image is represented by a block of 2x2 pixels. In the encryption process, every secret pixel is turned into two blocks, and each block belongs to the corresponding share image. Finally, two share images are generated. During decryption, two share images are superimposed to recover the original image. The share blocks of a black secret pixel are complementary while the share blocks of a white secret pixel are similar. Table 1 shows the concept of 2x2 VSS scheme. An example of (2, 2) VSS scheme is shown in Fig. 1.

Table1: (2, 2) VSS Scheme

Pixel Color	White Pixel	Black Pixel
Share 1		
Share 2		
Stacked Result		

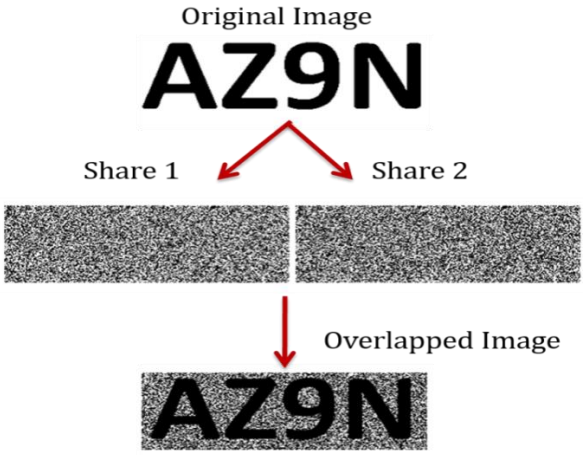

Fig 1: An example of (2,2) VSS Scheme

References:

1 M.Naor, A.Shamir, "Visual Cryptography," Advances inCryptology-EUROCRYPT'94, pp.1–12, 1995.

2 G. Abboud, J. Marean and R.V. Yampolskiy, "Steganography and Visual Cryptography in Computer Forensics," 5th International Workshop on Systematic Approaches to Digital Forensic Engineering, IEEE, 2010.

3 S. Rawat and B. Raman, "A blind watermarking algorithm based on fractional Fourier transform and Visual Cryptography, " Signal Processing, Elsevier, 2012

4 Wikipedia. "Visual Cryptography" [Online]. Available: http://en.wikipedia.org/wiki/Visual_cryptography

About Swift

Swift is a fantastic way to write software, whether it's for phones, desktops, servers, or anything else that runs code. It's a safe, fast, and interactive programming language that combines the best in modern language thinking with wisdom from the wider Apple engineering culture and the diverse contributions from its open-source community. The compiler is optimized for performance and the language is optimized for development, without compromising on either.

Swift is friendly to new programmers. It's an industrial-quality programming language that's as expressive and enjoyable as a scripting language. Writing Swift code in a playground lets you experiment with code and see the results immediately, without the overhead of building and running an app.

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Swift defines away large classes of common programming errors by adopting modern programming patterns:

- Variables are always initialized before use.
- Array indices are checked for out-of-bounds errors.
- Integers are checked for overflow.
- Optionals ensure that nil values are handled explicitly.
- Memory is managed automatically.
- Error handling allows controlled recovery from unexpected failures.

Swift code is compiled and optimized to get the most out of modern hardware. The syntax and standard library have been designed based on the guiding principle that the obvious way to write your code should also perform the best. Its combination of safety and speed make Swift an excellent choice for everything from "Hello, world!" to an entire operating system.

Features to make your code more expressive:

- Generics that are powerful and simple to use
- Protocol extensions that make writing generic code even easier
- First class functions and a lightweight closure syntax
- Fast and concise iteration over a range or collection
- Tuples and multiple return values
- Structs that support methods, extensions, and protocols
- Enums can have payloads and support pattern matching
- Functional programming patterns, e.g., map and filter
- Native error handling using `try` / `catch` / `throw`

Programming in Swift

```
// Basic Swift Program
importUIKit

var str1 = "Hello geeks!"
var str2 = "How are you?"
print (str1)
print (str2)
```

Output:

Hello geeks!

How are you?

Advantages:

- Swift is open sourced and easy to learn.
- Swift is fast, safe and expressive.
- Swift is approachable and familiar (C and C++ code can be added by Swift programmers into Swift applications.)
- Swift is the future of Apple development.
- Swift is enterprise ready.

Disadvantages:

- The language is still quite young and talent pool is limited.
- Swift is considered a “moving target” as it is a new language and number of swift programmers are few.
- Poor interoperability with third-party tools and IDEs
- Lack of support for earlier iOS versions.

References:

[1] About Swift — The Swift Programming Language (Swift 5.6)

[2] Learn Swift Programming (programiz.com)

[3]https://developer.apple.com/swift/

Virtual Reality Technology

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When people talk about Virtual reality, many of them think of science fiction films. But nowadays, Virtual Reality is growing, apart from entertainment, it plays an important role in education, manufacturing, medicine and more. VR is one of the fastest-growing technologies in the world.

What is Virtual Reality?

Virtual reality is an artificial environment that is created with software and presented to the user in such a way that the user suspends belief and accepts it as a real environment. On a computer, virtual reality is primarily experienced through two of the five senses: sight and sound.

Virtual reality places the user inside three-dimensional experience. Instead of viewing a screen in front of them, users are immersed in and interact with 3D worlds.

How Virtual Reality Technology works?

The primary aim of Virtual Reality is to stimulate the vision. Every VR device place one or two screens in front of users eyes and thus eliminates any possible real-world interaction.

Two lenses that are auto-focused, are placed in between the eyes and the screen. These adjust depending on the positioning and eye movement of the user. On screen visuals are rendered through HDMI cables or mobile phones.

These are certain criteria for creating a true immersive experience.

What technology does Virtual Reality Technology use?

The virtual technology combines hardware and software to create immersive experiences.

- ### Virtual Reality Hardware

  VR hardware is used to produce stimuli to manipulate the VR user's sensors. These can be worn on the body or used separately away from the user. Virtual reality hardware includes sensory accessories such as controllers, as well as headsets, hand trackers, treadmills and, for creators, 3D cameras.

- ### Virtual Reality Software

  Developers use various software to build VR. They includeVR software development kits, visualization software, content management, game engines, social platforms, training simulators.

It manages the VR input/output devices, analyses the incoming data and generates proper feedback. The inputs to the VR software must be on time and the output response from it should be prompt.

A VR developer can build own Virtual World Generator using a software development kit from a VR headset vendor. SDK provides basic drivers as an interface to access tracking data and call graphic rendering libraries.

VR software relays the content from the cloud and other places via the internet and helps to manage the content.

The future of Virtual Reality Technology :

Evolving technological progress has bright aspects for VR. There has been a shift of interest towards it and many organizations are investing heavily to develop and optimize this technology. Evolving technological progress has bright aspects for VR.

Conclusion :

This is basic of Virtual Reality, commonly known in short as VR. Here, its divided into how it works, what technology it uses. Latest advances in processing power and reduction in cost of quality hardware promises a bright future for VR technology.

Emerging Global Trends in IoT (Internet of things)

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Introduction – what is IoT?

- The Internet of things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction - *IoTAgenda*
- A *thing* in the IoT can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low or any other natural or man-made object that can be assigned an IP address and is able to transfer data over a network.

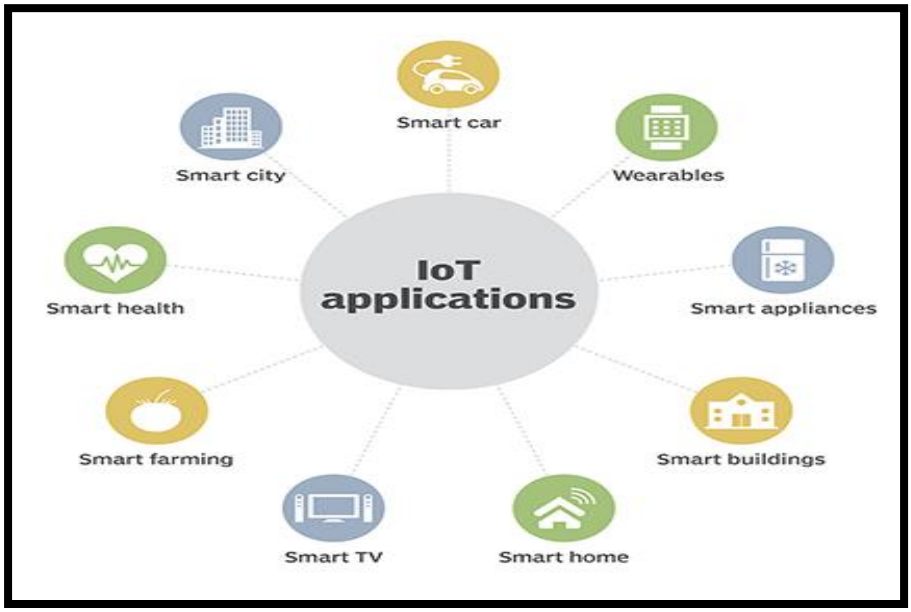
- IoT is a sensor network of billions of *smart devices* that connect people, systems and other applications to collect and share data.
- IoT is a concept of connecting any device with an on and off switch to the Internet (and/or to each other). This includes everything from cellphones, coffee makers, washing machines, headphones, lamps, wearable devices and almost anything else you can think of. This also applies to components of machines, for example a jet engine of an airplane or the drill of an oil rig – ***Forbes***.

Benefits of IoT

IoT offers a number of benefits to organizations, enabling them to:

1. Monitor their overall business processes
2. Improve the customer experience
3. Save time and money
4. Enhance employee productivity
5. Integrate and adapt business models
6. Make better business decisions
7. Generate more revenue

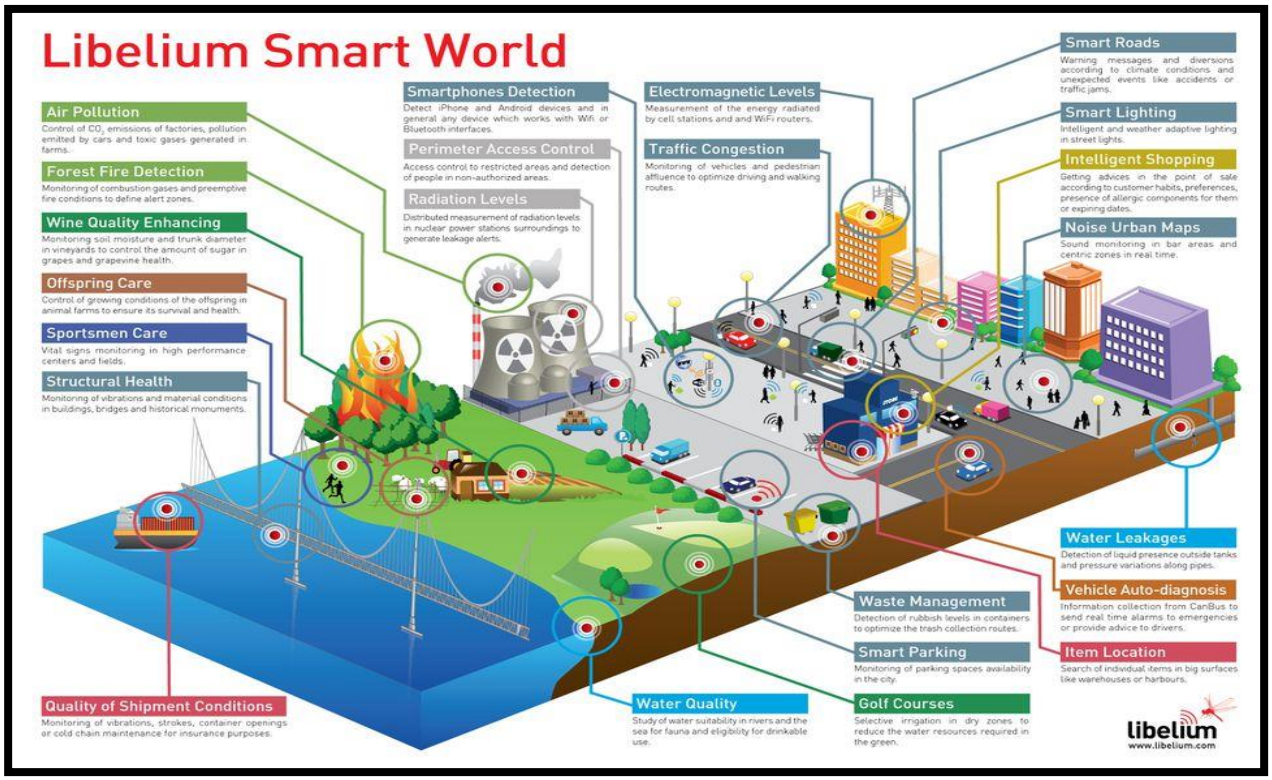
Consumer and enterprise IoT applications



Consumer IOT products & Services

1. Helmet Concussion Sensor
2. Medical Alert Watch
3. Smart Fitness Clothing and Smart Running Shoes
4. One-Button Product Purchases: “Order at the click of a button!” Amazon has taken that phrase literally and produced physical branded buttons called *Amazon Dash* that link to products in your home. Say you run out of laundry powder. You can press your Dash button for Tide and Amazon will reorder your Tide Powder product for you. No need to sign onto the Web, fumble with payment methods, or retype credit card numbers.
5. Garden Sensors
6. Smart Televisions

The smart world of the future – using IOT



The future of IOT

- Bain & Company expects annual IoT revenue of hardware and software to exceed $450 billion by 2020.
- McKinsey & Company estimates IoT will have an $11.1 trillion impact by 2025.
- IHS Market believes the number of connected IoT devices will increase 12% annually to reach 125 billion in 2030.
- Gartner assesses that 20.8 billion connected things will be in use by 2020, with total spend on IoT devices and services to reach $3.7 trillion in 2021.
- By 2023, the average CIO will be responsible for more than three times as many endpoints as this year – Gartner
- Garter forecasts that worldwide IoT Security Spending will be 3.11 billion by 2021 largely driven by regulatory compliance.
- Global manufacturers will use analytics data recorded from connected devices to analyze processes and identify optimization possibilities, according to IDC and SAP.
- Business Insider forecasts that by 2020, 75 percent of new cars will come with built-in IoT connectivity.

ARTIFICIAL INTELLIGENCE

Introduction to Artificial Intelligence(AI)

What is AI? How it is playing significant role in our life,have you thought about?

Firstly,have you ever experienced certain things or have heard About things like the self-driving cars, automatic recommendation on social media or while shopping online of your favorites, email and message system spam filtering,fraud detection and prevention for financial system, AIChabot's, virtual assistant (Alexa and Siri),robots etc. probably you guessed it right this is what artificial intelligence is, almost all around us.

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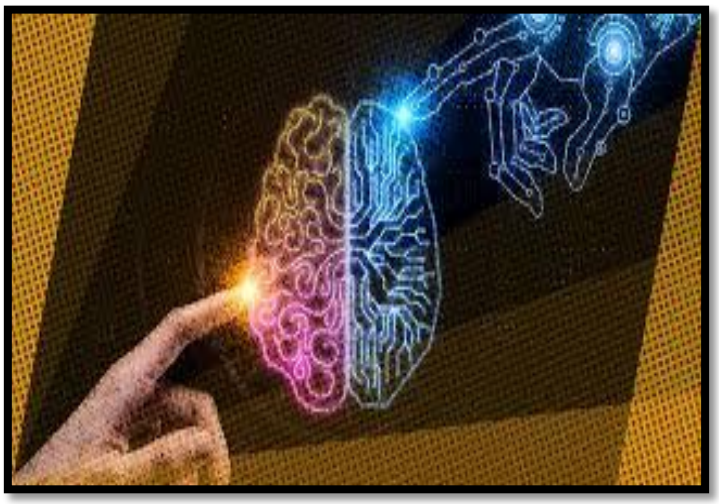
Artificial intelligence (AI) refers to the simulation or embedding of human intelligence in machines that are programmed to think like humans and mimic their actions. Artificial Intelligence Is An Interesting Combination Of Machine Learning,Deep Learning,IOT And Robotics. John McCarthy, the father of AI defined AI as 'The science and Engineering of making intelligent machines. This system can do reasoning,knowledge representation,planning,natural language processing, motion and manipulation and many other things.



It is a field which combines computer science and robust datasets that basically enables problem solving.AI is working to break the barrier between humans and machines/systems using various components such as learning,reasoning,problem solving and perception.

Stages Of AI:

As we have various stages in our life AI also has several stages in its period of evolution.

These are three stages through which AI can evolve:

- Artificial Narrow Intelligence→ AI involving machines that can perform only a narrowly defined set of specific task. Examples:Alexa, Sophia the humanoid and so on.
- Artificial General Intelligence→AI involving machines that have ability to think and make decision just like us.Currently there are no existing examples of AGI.
- Artificial Super Intelligence→This is a stage of AI when capability of computers will suppress human beings,it is currently a hypothetical situation as depicted in movies and science fiction books where machines have taken over the world.

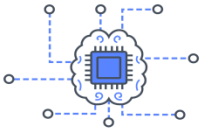
Branches Of AI:

Which techniques AI use to solve real-world problems?

AI has several techniques/processes such as:

- Machine Learning
- Deep Learning/Neural Network
- Expert Systems
- Robotics
- Natural Language Processing(NLP)
- Fuzzy Logic

*(you can explore out these branches more and can focus on as an individual)


Machine Learning


Neural Networks


Robotics


Expert Systems


Fuzzy Logic


Natural Language Processing

Pros And Cons Of AI:

Scope Of AI:

The ultimate goal of AI is to solve the real world problems by making computer program to perform burdensome tasks and making work easier.It has been predicted that in coming decades many innovation will inhabit the real space we have never seen and greatly benefit human lives in various sector with the help of Artificial Intelligence(AI).

Pros	Cons
Less room for errors	Costly Implementation
Always available	Unemployment to certain field
Improved efficiency	Lack of creativity
Automates repetition	Restricted work

The Scope Of AI In Our Country Is Still In Adoption Stage But Slowly It Is Being Used to Find Smart Solution To Modern Problems In Almost All Major Sectors Such As Agriculture,Healthcare,Education And Infrastructure,Transport,Cyber Security,Banking, Entertainment Etc.AI Has Immense Potential To Change Each Sector Of The Economy For Benefit Of Society.

Conclusion:

Utilization of AI makes human life more convenient and breezy.Some believe that AI will take over human being and will take away their jobs,this will even force humans to evolve their skill sets.AI is expected to replace 85 million jobs worldwide by 2025 scary right! But a report also suggests that it will also create 97 million new jobs in that same timeframe.It is not possible to replace human being completely,this automation is just going to reduce workload, repetitive and mundane tasks of daily basis at a same time some believe that more care should be taken in development of Artificial intelligence (AI).

QUIZ (20)

Quiz : 1 What will be the maximum sum of 44, 42, 40, ... ?

A.502 B.504 C.506 D.500

Quiz : 2 For instance, if 20 workers are working on 8 hours to finish a particular work process in 21 days, then how many hours are going to take for 48 workers to finish the same task in 7 days?

A.12 B. 20 C. 10 D. 15

Quiz : 3 If a wholesaler is earning a profit amount of 12% in selling books with 10% of discount to the printed price. What would be the ratio of cost price which is printed in the book?

A. 45:56 B. 50: 61 C. 99:125 D. None of these

Quiz : 4ELFA, GLHA, ILJA, _____, MLNA

A. OLPA B. KLMA C. LLMA D. KLLA

Quiz :5All the trees in the park are flowering trees. Some of the trees in the park are dogwoods. All dogwoodsin the park are flowering trees. If the first two statements are true, the third statement is

A. True B. False C. Uncertain

Answer of Last Quiz (19)

Q. 1 Answer: A

Explanation: Let the number be x.

Then, $x + 17 = \frac{60}{x}$

$\Rightarrow x^2 + 17x - 60 = 0$

$\Rightarrow (x + 20)(x - 3) = 0$

$\Rightarrow x = 3.$

Q. 2 Answer: 39 Explanation: Working from top to bottom, double each number and subtract 1, then 2, then 3 etc.

Q. 3 Answer: 16 Explanation: Starting with the top left number, and working down one row at a time, alternating between left and right, double the number each time. Repeat this sequence, starting with the top right number.

Q. 4 Answer: D Explanation: The number of black dots in each grid increases by 1 each time, starting with the top left grid and working to the right, top row then bottom row