SVCE

SRI VENKATESWARA COLLEGE OF ENGINEERING
SRIPERUMBUDUR-602 117
(AUTONOMOUS-AFFILIATED TO ANNA UNIVERSITY)

THE FUTURE OF OUR FUTURE

HORIZON

25th anniversary edition

A Comprehensive
research and tech magazine

2019

VISION

To be a leader in Higher Technical Education and Research by providing the state of the art facilities to transform the learners into global contributors and achievers.

MISSION

To develop SVCE as a "CENTRE OF EXCELLENCE" offering Engineering Education to men and women at undergraduate and postgraduate degree levels, bringing out their total personality, emphasising ethical values and preparing them to meet the growing challenges of the industry and diverse societal needs of our nation.

DEPARTMENT OF INFORMATION TECHNOLOGY

VISION

To produce higher calibre technologists and scientists for helping the country to attain new heights in Information Technology research and industrial needs to provide leadership in the field of technical education.

MISSION

1. To develop the department into a “Centre of Excellence in Information Technology” offering engineering education to the students at Undergraduate, Postgraduate and Doctoral degree levels.
2. To build students' total personality emphasizing ethical values, and nurture them to meet the growing challenges in the InformationTechnology industry.
3. To examine the research challenges and cater diverse societal needs of the Nation.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The B.Tech Information Technology programme has the following Programme Educational Objectives(PEOs):

1. The graduates of Information Technology program will demonstrate themselves as leading professionals.

2. The graduates of Information Technology program will be equipped with the necessary skills to become proficient researchers.

3. The graduates of Information Technology program will demonstrate their abilities as successful entrepreneurs.

4. The graduates of Information Technology program will excel in higher studies or modern administrative services.

PROGRAMME OUTCOMES (POs)

1. Engineering Knowledge: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

2. Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1. Exhibit proficiency in examining standard business operations in order to create and implement suitable Information Technology solutions.

2.Demonstrate the ability to establish an IT infrastructure, effectively manage resources, and ensure data security.

ABOUT THE DEPARTMENT

——————In 1996, Sri Venkateswara College of Engineering pioneered the introduction of the B.Tech degree programme in Information Technology under the affiliation of University of Madras . This is the first of its kind in Indian Universities . The department fulfills the requirements for the award of B.Tech Degree of Anna University .

——————The Venture was initiated under the guidance of our patron Dr.A. C.Muthiah and with the blessings of the Kanchi Paramacharya .When we started, the batch size was 30. This increased to 60 in 1998 and scaled up to 120 by the year 2000.Our growing numbers is indicative of the highly qualified and extremely dedicated teaching faculty of the department who strive for excellence in every sphere of their expertise.

——————It is the constant endeavor of the department to be in touch with changing needs of the IT Industry so as to be responsive in terms of modifications and introduction of new courses to adapt to these technological changes.

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A SVCE Publication for Students

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தோன்றின்புகழொடுதோன்றுகஅஃதிலார்

தோன்றலின்தோன்றாமைநன்று.”

- குறள்236 (புகழ் அதிகாரம்)

It gives us immense pleasure in presenting you the 25th anniversary edition of Horizon , the official magazine of the Department of Information Technology , SVCE . The department which serves as a pioneer in the field of information technology was established in the year 1996. As you flip through the next few pages, you will be able to visualize the depth in which the topics of the preferred domains are covered. The range covered by our authors are fantastic ,there by making this one of the widely covered magazines in terms of research. A huge thank you to the support put forth by the faculties and our fellow students without which, this marvelous feat would not have been possible.

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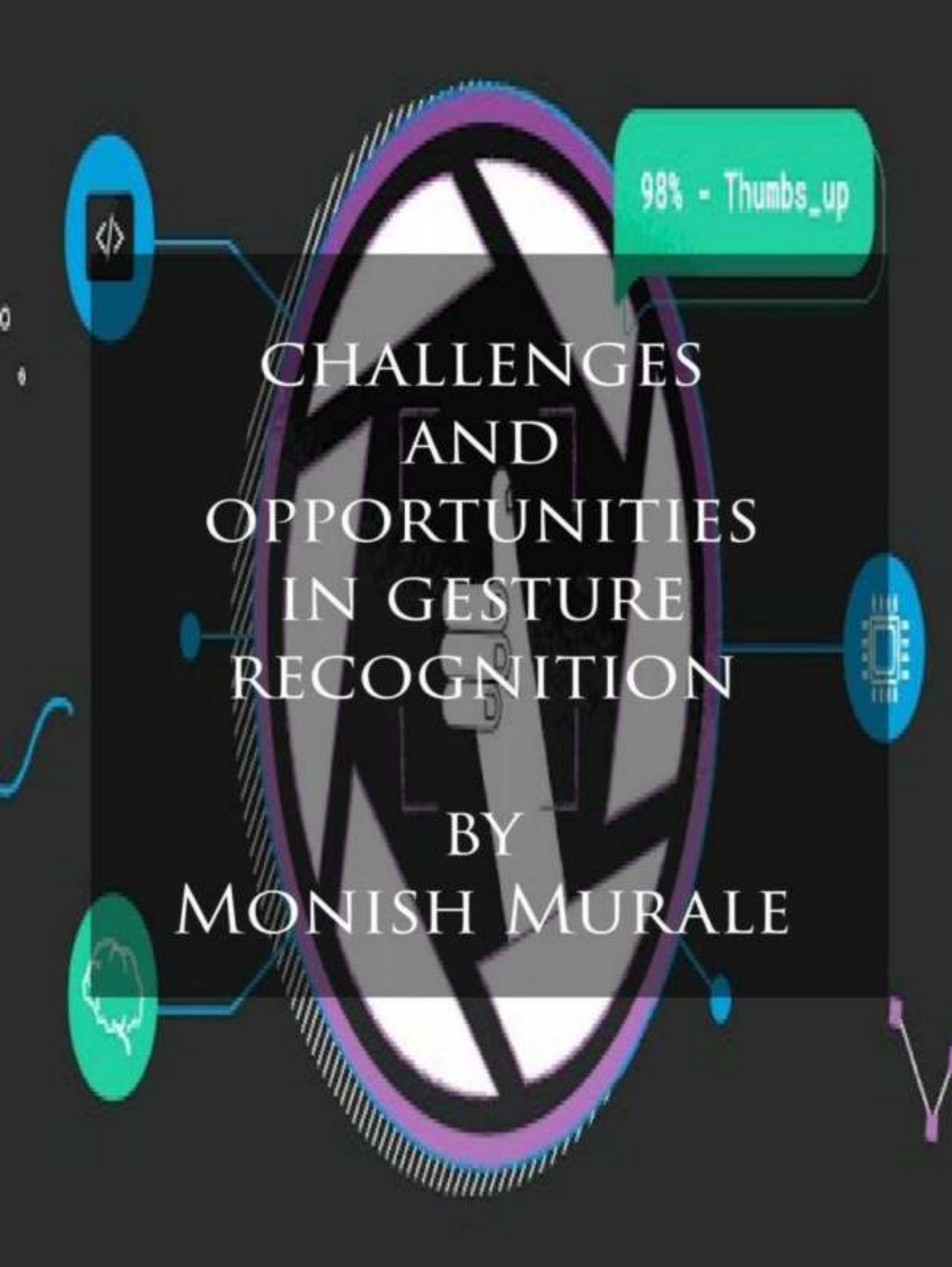


CHALLENGES AND OPPORTUNITIES IN GESTURE RECOGNITION

BY

MONISH MURALE

If you 've ever watched action movies , you would probably remember the scene where our favorite celebrity interacts with a massive transparent computer screen using their hands . He / She navigates through the interface , zooms in and out of images , selects individual elements appearing on the screen and moves them around the interface . Should we be skeptical about it? Well, the answer is yes if the movie was from the time when people used to send letters for communication but it's totally plausible with today 's technology called gesture recognition.

The process of reading gestures involves the recognition of images or recordings captured by the camera . Each gesture will be recognized and translated into corresponding command in the application . Theoretically , gesture recognition should be based on a photo of a still hand showing only a single gesture against a clear background . But in reality, it's hard time to capture the gestures . We don't always get the clear backgrounds when presenting gestures.

In such scenarios , gesture recognition utilizes machine learning to its fullest . The role of machine learning in gesture recognition is to overcome the technical issues affiliated with proper identification of gesture images.

There are many challenges linked with the preciseness and usefulness of gesture recognition software . For image -based gesture recognition there are limitations on the equipment used. Images or video may not be under proper lighting, or in the same location. Items in the background or distinct features of the users may make recognition more difficult.

Gestures involve both fixed and combination of movements . Therefore , gesture recognition should be able to recognize the patterns . Instead of recognizing a static image , we should be able to recognize movements and identify it.

The Most common challenges in applying machine learning in gesture recognition projects is the lack of meaningful data set. For machine learning to work, we will need to feed it with data to train our models. The data set has to be adjusted as per the user needs.

Although there are many challenges faced, there are equal number of opportunities for gesture recognition . Gesture recognition market has been blooming recently , contributing new use cases and practical applications. For example: In the field of Automobile , company like Audi have introduced a fully gesture control system to command the infotainment system in the cars.

In future, developers could come up with new tools and programs which will be irresistible for the users. Imagine lying on your bed and controlling the whole operations in your room with your hand gestures, wouldn't it be awesome?

Blue Brain

by
V.Suvadha
C.sujithra

BLUE BRAIN

-V.Suvadha,C.Sujithra

The human brain is unique. Our remarkable cognitive capacity has allowed us to invent the wheel, build the pyramids and land on the moon.

In fact, scientists sometimes refer to the human brain as the " crowning achievement of evolution ". What if we can create a brain? Blue brain is the world 's first virtual brain . It can think , take decision and store anything in memory , just as the human brain does. One of the main advantages of this technology is brain uploading—even after a person dies, his knowledge will not be lost. Blue Brain can function exactly the same way as a human brain . The virtual brain is a machine that can function as brain , can take decision , can think , can response , can keep things in memory , and also has feelings and emotions . The virtual brain receives input such as sound , image , etc. through sensory cell and the interpretation of the received input by the brain by defining states of neurons in the brain , it receives the electric responses from the brain to perform any action . The difference between the natural and the simulated brain:

Input: The natural brain takes thee input through the natural neurons . The simulated brain takes input through the silicon chip or from the artificial neurons.

Interpretation : The natural brain interprets by different states of the neurons in the brain . The simulation interprets by a set of bits in the set of register.

Output : The natural brain gives the output through the natural neurons

The simulation brain gives the output through the silicon chip.

Processing : The natural brain process through arithmetic and logical calculations . The simulation brain process through arithmetic and logical calculation and artificial intelligence.

Memory : The natural brain stores through permanent states of neurons . The simulation brain stores through the secondary memory.

The several steps involved in building the virtual brain , In the initial step is the team will start by modeling the electrical structure of neural circuits repeated throughout the brain and then map and model their behavior Once the initial step is completed, they will move onto creating a molecular model of the neurons involved and a complete neocortex (the largest and most complex part of the human brain) before modeling the rest of the brain The uploading human brain is possible by the use of small robots known as the nanobots. These robots are small enough to travel throughout our circulatory system . Traveling into the spine and brain, they will be able to monitor the activity and structure of our central nervous system. They will be able to provide an interface with computer while we still reside in our biological form

IBM , in partnership with scientists at Switzerland 's Ecole Polytechnique Federal DE Lausanne 's (EPFL) Brain and Mind Institute will begin simulating the brain 's biological systems . The advantages of the blue brain, remembering things without any effort , making decision without the presence of the person, using intelligence of a person after the death, understanding the activities of animals ,allowing the deaf to hear via direct nerve, and stimulation.

fundfocusingonAI.AccordingtoMcKinsey, a total of $26 billion to $39 billion was spent on AI in 2016 alone. I am confident that the number for 2017 at least isn't much lower.

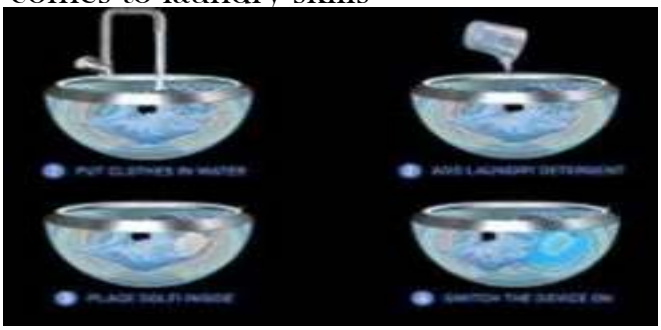
But, in the midst of all of this, I see a grain of truth. This time around, we have a lot more tangible evidence of progress. In Gartner's list for top 10 strategic trends for 2018, A.I is at the very top.Computers can augment professional expertise by automating repetitive, complex analyses and identifying patterns in large amounts of data. AI works best when it has been designed to use the right data to solve a specific problem. In the hands of skilled professionals, AI can support better clinical care, predict early signs of disease and reduce fraud and waste. Where AI is most successful is in cases where it has access to broad data about individuals and situations and experts have given it a defined goal. For example, when you shop online, AI makes connections about your prior purchases, sites you have browsed and other individualized data to make suggestions about what you might like to buy. In the same way, AI can tie disparate pieces of healthcare information together and offer it up to people working in the field, who decide how to act on the information.

I truly do believe that a careful study and diligent expenditure is required. The rate of progress is indicative of incredible potential. The field has borne enough fruit to warrant extensive exploration.

Next Generation Washing Device-Dolfi

BY
N.R Gayathri

Hi , delicates the bane of every person's laundry life. You either have to wash garments by hand, which is rarely a good time, or you run the risk of harming your items by throwing them in the washing machine Fear not . A new , portable device called Dolfi has got you covered. At least that's what the creators of the ultrasonic laundry device claim All you have to do is put your clothing in a sink, fill it with water and detergent , add the Dolfi and turn it on. In 30 minutes, your delicates will be clean . This should definitely help out Millennial , who , according to one study , have the least knowledge of any generation when it comes to laundry skills



According to my study , Dolfi uses ultrasonic technology to create sound waves that move through the water and create "microscopic high -pressure bubbles ." These bubbles then implode to create "millions of micro -jet liquid streams" that wash away dirt. Apparently Dolfi 's technology has been developed and tested by engineers at MPI Ultrasonic in Switzerland . This Is very useful in the current on-going pandemic conditions.

Great if you are a frequent traveller and want to lighten your load; equally, if you have items that are hand wash-only, you could replace standing at a sink with the Dolfi and its automatic cleaning function. And thus the Dolfi was born

Advantages Of Dolfi

I. Next gen cleaning : Gentle on clothes but tough on dirt. Say goodbye to hand washing and machine damaged clothes.

II. Plug & Play : Just switch the Dolfi device on and enjoy your free time ! It really is that simple.

III. Perfectly Portable : Easy fit for any bathroom , luggage or even your pocket. Wherever you go - Dolfi can too!

IV. Save Time & Money : Forget about costly laundry services and the hassle of hand washing . Dolfi saves you money on every wash

There are numerous gadgets like this and I demand everybody to explore out about the gadgets which has the primary application as data innovation . "It is not that we use technology , we live technology " this statement of godfrey reggio propelled me to know more about the devices

Review on Design of E-Water Application using GSM

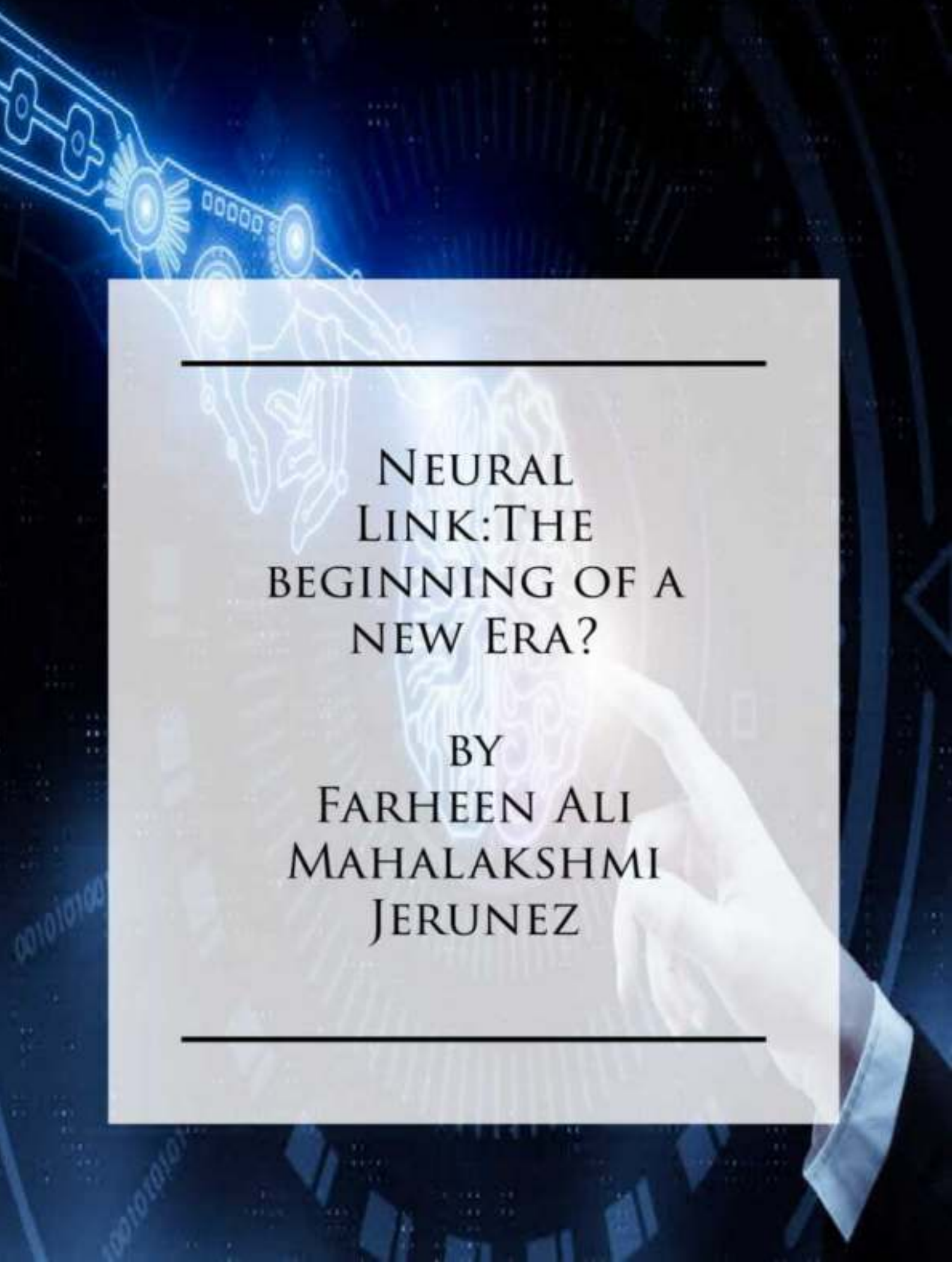
BY
Shalini G.S

While doing research on water control management , I came across the paper entitled " Design of E-Water Application to Maintain the Flow of Water from Common Faucets by Enabling GSM " authored by P. Baskaran , Kaaviya Baskaran , and V. Rajaram .The desired approach on this paper is saving water using IoT technologies . While I have read about various water -saving measures, this paper provided me better insights on how it can be achieved using IoT applications where the overall process involves user registering and logging into the portal designed to regulate and monitor water usage. Once the user starts off the timer , the water flow through the valve will also be initiated . As soon as the user switches off the timer , the water flow will be stopped . The application will calculate the water consumption and balance for that day and send the data as an SMS to the user . It also helped me to learn about Relay an electrically operated switch that can be turned on or off , letting the current go through or not , and can be controlled with low voltages , like the 5 V provided by the Arduino pins.

Furthermore , the paper casts limelight on how this uses GSM to facilitate communication between a mobile device or a computing machine . The flow of water is controlled using a solenoidal valve where the water flow is stopped when the fast -on conductors receive 12 V supply, The use of arduino and its IDE establishes connection between the electronic components and a computer where the implementation of interactive environments is accessible using an individual microcontroller.

Going through the explanation given on the above instance provided me more backing to the theoretical concepts of microcontrollers which I came across in the Internet of things Lectures.

In addition , the paper also drew my attention to how the set limit can help the users to reduce water -wastage by being mindful of their water usage and to use it wisely. It will also ensure orderliness in the collection of water since only if the phone number is provided access will they be able to collect water from the common faucets/ water lorries.



Neural Link:The beginning of a new Era?

BY

Farheen Ali

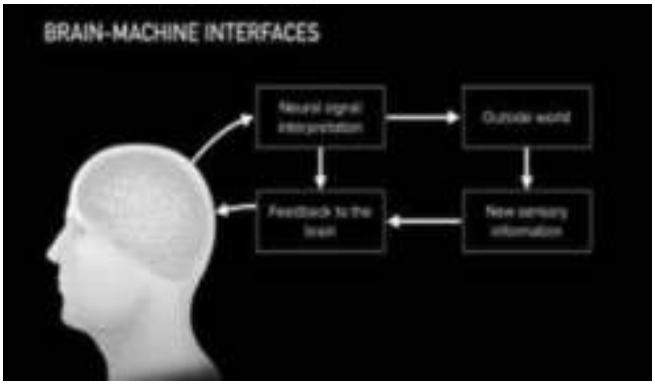
Mahalakshmi Jerunez

What if we told you that One day you could have a superhuman vision, play your favorite albums in your head and download your brain to a computer or even another body! This may sound like an episode from your favorite science fiction. But Elon Musk and his team at the neural tech start-up Neuralink , are working to make this possible . Musk describes the Neuralink as a fit-bit in your skull with tiny wires . The Neuralink is a small, easy-to-install brain -computer interface . Simply put Neuralink is a technology that can help humans interact with machines using their brains.

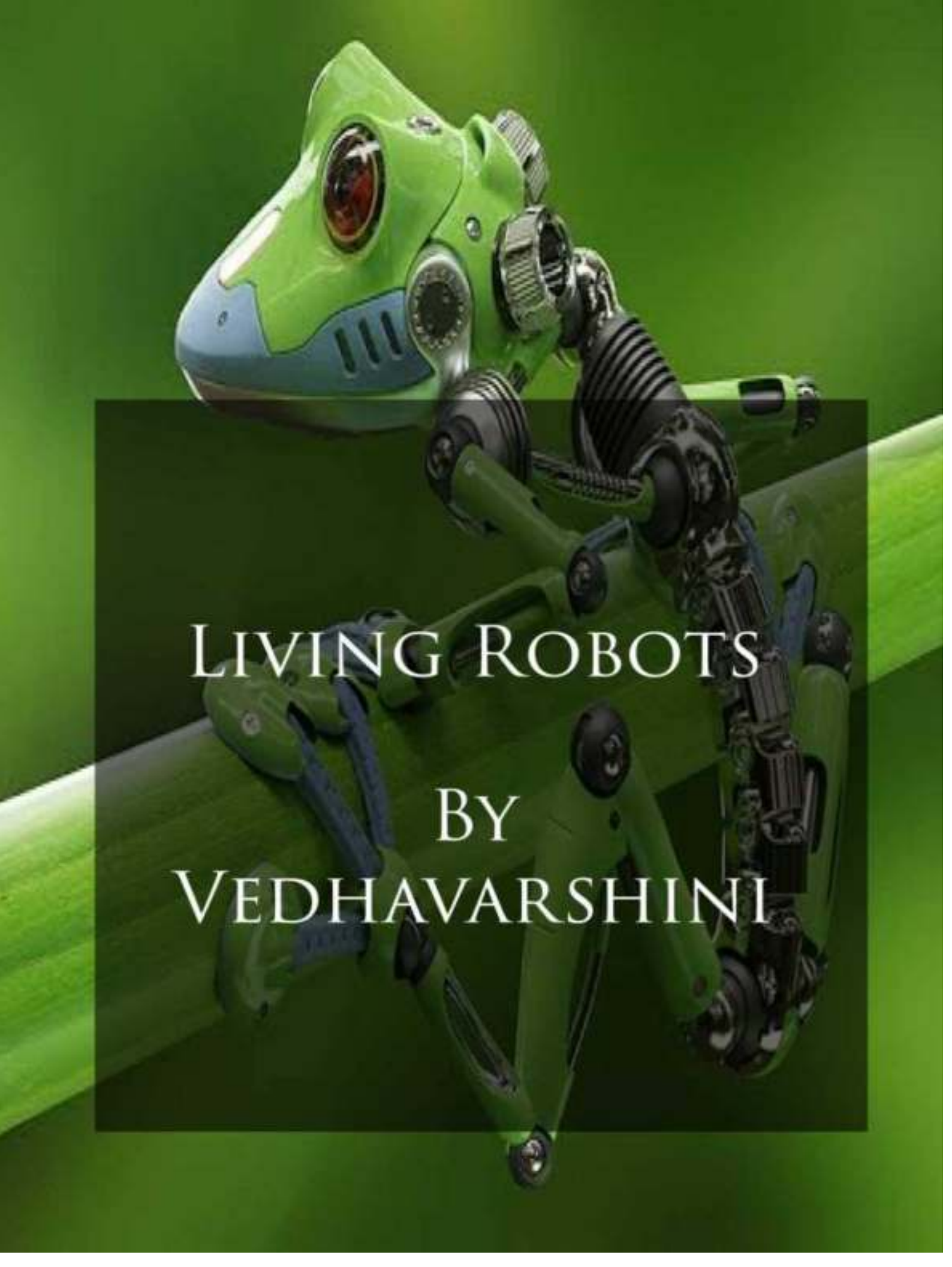
Installing a chip inside your brain, that isn't something most of us would agree to. But the Neuralink team wants to make this painless, quick, and as easy as a LASEK surgery . To install the Neuralink , a tiny piece of skull is removed and the device is slotted in. To ensure precision, the team has created a robot specifically for this procedure . The design resembles a small coin around 8mm in diameter which houses electrodes that are one-twentieth the thickness of a strand of hair.

But how does it work? Your brain sends information to different parts of your body using neurons . Neurons in your brain connect to form a network and communicate using neurotransmitters . This reaction generates an electric field.

By placing electrodes nearby you record these reactions and translate these signals into an algorithm that a computer can read . However , Neuralink 's team still has a long way to go. Before the emergence of AI-human hybrids , the tech company has a lot of bureaucratic , ethical , and technological hurdles to cross . Currently , the main concern for Neuralink is its chip 's vulnerability to hacks and malicious attacks. And also they touched upon the need for regular upgrades, which means brain surgery every couple of years ! Now if that isn't scary, what is?



Down the road, Elon Musk claims that the device could be used to operate robots , cure paralysis and treat mental illness . If Musk 's company accomplishes half of what they claim, we could see the emergence of one of the most significant technologies in human history . . Just like Neo in the Matrix , you would be able to download skills into your brain! The possibilities would be endless



Living Robots

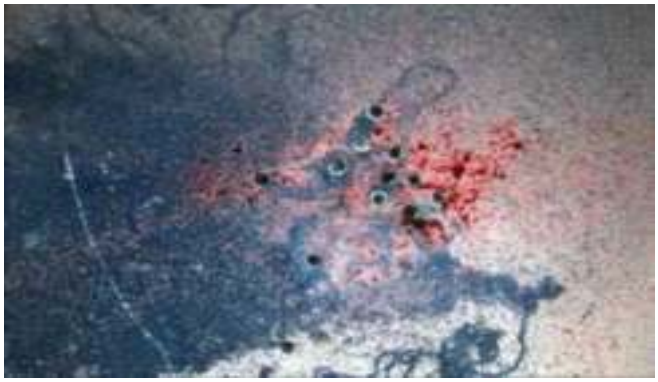
By

Vedhavarshini

LIVING ROBOTS

What happens when you take cells from frog embryos and grow them into new organisms that were "evolved" by algorithms? You get something that researchers are calling the world's first "living machine." Though the original stem cells came from frogs — the African clawed frog, Xenopus laevis — these so-called xenobots don't resemble any known amphibians. The tiny blobs measure only 0.04 inches (1 millimeter) wide and are made of living tissue that biologists assembled into bodies designed by computer models, according to a new study. These mobile organisms can move independently and collectively, can self-heal wounds and survive for weeks at a time, and could potentially be used to transport medicines inside a patient's body.

"They're neither a traditional robot nor a known species of animal, It's a new class of artifact: a living, programmable organism."



"Algorithms shaped the evolution of the xenobots. They grew from skin and heart stem cells into tissue clumps of several hundred cells that moved in pulses generated by heart muscle tissue", said lead study author Sam Kriegman, a doctoral candidate studying evolutionary robotics in the University of Vermont's Department of Computer Science, in Burlington

"There's no external control from a remote control or bioelectricity. This is an autonomous agent — it's almost like a wind-up toy."

Biologists fed a computer constraint for the autonomous xenobots, such as the maximum muscle power of their tissues, and how they might move through a watery environment. Then, the algorithm produced generations of the tiny organisms. The best-performing bots would "reproduce" inside the algorithm. And just as evolution works in the natural world, the least successful forms would be deleted by the computer program "Eventually, a breakthrough that it was able to give us designs that actually were transferable to real cells."

The study authors then brought these designs to life, piecing stem cells together to form self-powered 3D shapes designed by the evolution algorithm. Skin cells held the xenobots together, and the beating of heart tissues in specific parts of their "bodies" propelled the 'bots through water in a petri dish for days, and even weeks at a stretch, without needing additional nutrients. The bots were even able to repair significant damage.

"We cut the living robot almost in half, and its cells automatically zippered its body back up."

These might include targeting toxic spills or radioactive contamination, collecting marine microplastics or even excavating plaque from human arteries, Levin said in a statement. Creations that blur the line between robots and living organisms are popular subjects in science fiction; think of the killer machines in the "Terminator"

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movies or the replicants from the world of "Blade Runner." The prospect of so-called living robots and using technology to create living organisms understandably raises concerns for people.

"When we start to mess around with complex systems that we don't understand, we're going to get unintended consequences ." Nevertheless , building on simple organic forms like the xenobots could also lead to beneficial discoveries.

"If humanity is going to survive into the future , we need to better understand how complex properties, somehow, emerge from simple rules."

Digital Twins

by

Bharathy R

Digital twins are virtual replicas of physical devices that data scientist and IT pros can use to run simulations before actual devices are built and deployed. They are also changing as like the technologies such as IoT, AI and analytics.

What is a digital twin?

A digital twin is a digital of a physical object or system . The technology representation behind digital twins has expanded to include large items such as buildings , factories and even cities , and some have said people and processes can have digital twins, expanding the concept even further.

In essence , a digital twin is a computer program that takes real-world data about a physical object or system as inputs and produces as output predications or simulations of how that physical object or system will be affected by those input

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In essence , a digital twin is a computer program that takes real-world data about a physical object or system as inputs and produces as output predications or simulations of how that physical object or system will be affected by those input.

How does a digital twin work?

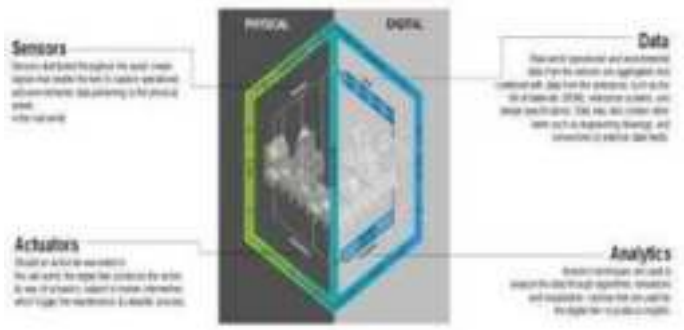
A digital twin begins its life being built by specialists, often experts in data science or applied mathematics.

The twin is constructed so that it can receive input from sensors gathering data from a real-world counterpart. This allows the twin to simulate the physical object in real time, in the process offering insights into performance and potential problems . The twin could also be designed based on a prototype of its physical counterpart , in which case the twin can provide feedback as the product is refined ; a twin could even serve as a prototype itself before any physical version is built.

Models + data = insights and real value

Benefits of digital twin

Digital twins can help to optimize supply chains , distribution and fulfillment operations , and even the individual performance of the workers involved. As an example of this action , global consumer products manufacturer Unilever has launched a digital twin project that aims to create virtual models for dozens of its factories . At each location , IoT sensors embedded in factory machines feed performance data to AI and machine learning applications for analysis . The analyzed operational information is to be fed into the digital twin simulations , which can identify opportunities for workers to perform predictive maintenance , optimize output , and limit waste from substandard products



Smart city initiatives are also using digital twins for applications addressing traffic congestion remediation , urban planning , and much more . Singapore 's ambitious Virtual Singapore initiative enables everything from planning for cell towers and solar cells to simulate traffic patterns and foot traffic. One potential use may be to enable emergency evacuation planning and routing during the city's annual street closures for Formula 1 racing.What's new ?Over the course of the last decade , deployment of digital twin capabilities has accelerated due to a number of factors : • Simulation . The tools for building digital twins are growing in power and sophistication . It is now possible to design complex what-if simulations, backtrack from detecting real-world conditions, and perform millions of simulation processes without overwhelming systems . Further , with the number of vendors increasing , the range of options continues to grow and expand . Finally , machine learning functionality is enhancing the depth and usefulness of insights . • New sources of data. Data from real-time asset monitoring technologies such as LIDAR (light detection and ranging) and FLIR (forward-looking infrared) can now be incorporated into digital twin simulations . Likewise , IoT sensors embedded in machinery or throughout supply chains can feed operational data directly into simulations , enabling continuous real-time monitoring. • Interoperability. Over the past decade , the ability to integrate digital technology with the real world has improved dramatically. Much of this improvement can be attributed to enhanced industry standards for communications between IoT sensors , operational technology hardware , and vendor efforts to integrate with diverse platforms

. • Visualization. The sheer volume of data required to create digital twin simulations can complicate analysis and make efforts to gain meaningful insights challenging . Advanced data visualization which can help to meet this challenge by filtering and distilling information in real time. The latest data visualization tools go far beyond basic dashboards and standard visualization capabilities to include interactive 3D , VR and AR -based visualizations , AI-enabled visualizations , and real-time streaming. • Instrumentation. IoT sensors, both embedded and external, are becoming smaller , more accurate , cheaper , and more powerful . With improvements in networking technology and security, traditional control systems can be leveraged to have more granular, timely, and accurate information on real -world conditions to integrate with the virtual models . • Platform . Increased availability and access to powerful and inexpensive computing power, network, and storage are key enablers of digital twins. Some software companies are making significant investments in cloud-based platforms, IoT, and analytics capabilities that will enable them to capitalize on the digital twins trend. Some of these investments are part of an ongoing effort to streamline the development of industry-specific digital twin use casesConclusionAs digital twin technology integrates with IoT and AI, its disruptive power grows . In the current business times , any potential technology - driven disruption has material risk implications for the entire organization . Digital twin – driven process efficiencies might not increase risk significantly. But as reliance on digital twin technology grows , companies will be aggregating massive stores of data from sensor networks and other sources , which may, in turn, increase privacy or cyber risk . Likewise , if digital twin systems enable a new business model featuring several as -a-service offerings , organizations should understand what material impact these new revenue streams may have on finance , technology , and existing business models . If the potential risks are significant , companies will likely need to develop strategies for measuring and managing them before IT and the business proceeds further with the digital twin project

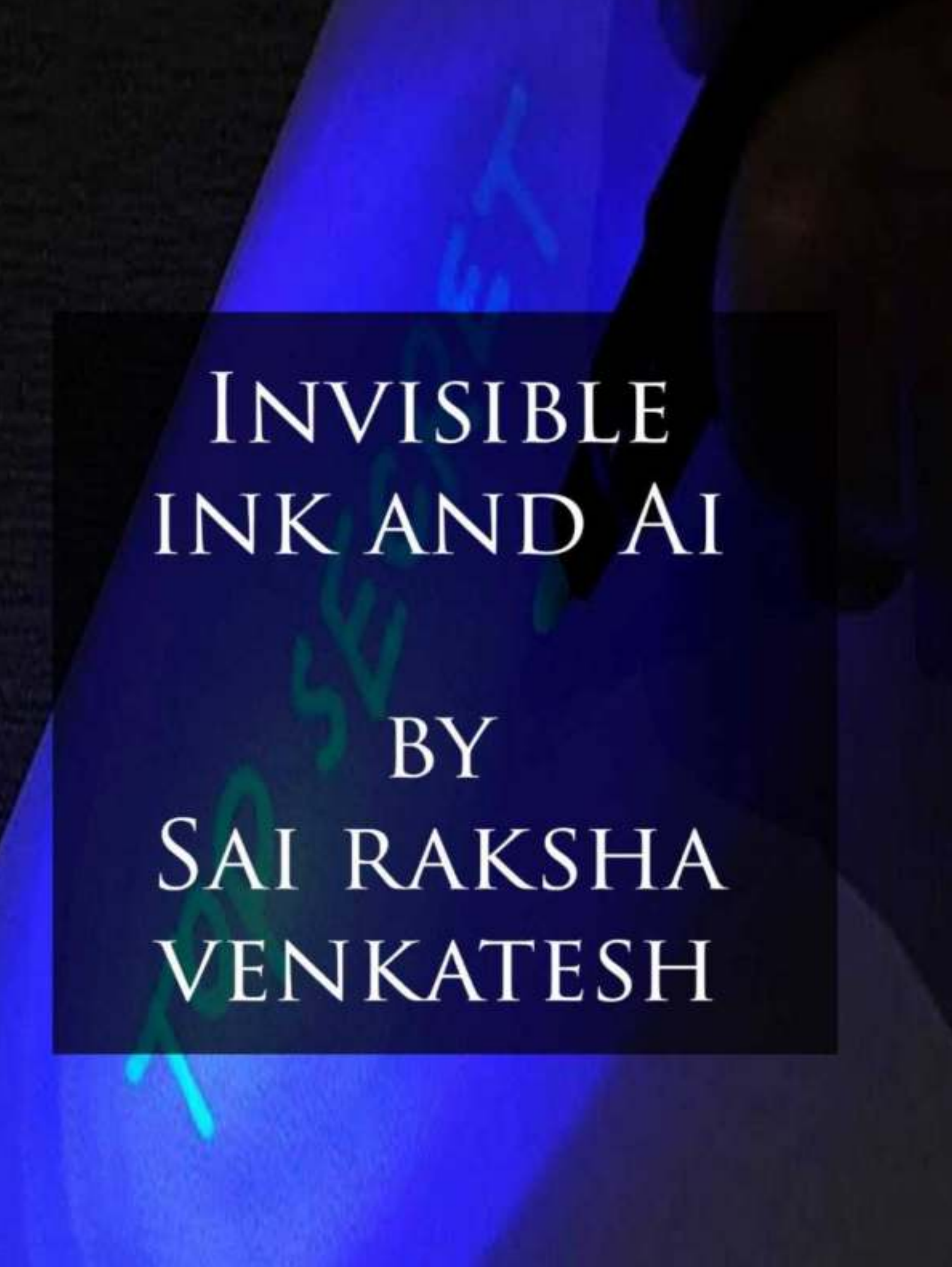
Review on Failure Detection and loss Recovery Technique in Wireless sensor network

BY
SUVADHA VENKATESAN

Article on CTU FTS titled "An Optimal Data Aggregation Scheme For Wireless Sensor Network Using QOS Parameters With Efficient Failure Detection And Loss Recovery Technique".

While doing research on wireless sensor network I came across this paper "An Optimal Data Aggregation Scheme For Wireless Sensor Network Using QOS Parameters With Efficient Failure Detection And Loss Recovery Technique ". Authored by Adam Raja Basha and C Yaashuwanth . This paper is brought in the concept of "Optimal Data Aggregation ". This paper gave me better insight on How to build a solid wireless sensor system which concentrate on efficient optimal data aggregation along with additional QOS metrics such as failure detection and loss recovery.

This paper explains how, the clustering process includes an efficient cluster formation like, Cluster Head (CH), and Sub Head (SH) selection. The former is developed based on Multi -criteria Moths-Flame Decision making (MMFD) model and the latter is achieved through SH . SH node will act as the backup node for cluster head when failure instances are detection . CH recovers the lost data through SH , which minimize the additional delay of backup node selection process and save much more energy. Implementation of efficient aggregation scheme based on the Improved Pair Detection (IPD) algorithm which becomes the energy efficient clustering process with cluster head (H) and sub head (SH) selection in that the SH would act as backup node to recovers the lost data and the multi-criteria moths -flame decision-making (MMFD) model is utilized to detects failure in the network.


Invisible
ink and Ai
by
Sai raksha
venkatesh

If you cannot do great things, do small things in a great way.

Most of us grew up listening to this saying, and also applied it in our own lives. Surprisingly, our world of technology also follows the saying religiously. Ever wondered how small things make a bigger difference? Here's the proof for all the thoughts we put in.

Coded messages in invisible ink sounds like something that is only found in espionage books, but in real life, they can have important security purposes. Yet, they can be cracked if their encryption is predictable. Now, researchers who have reported in ACS Applied Materials & Interfaces have printed complexly encoded data with normal ink and a carbon nanoparticle-based invisible ink, requiring both UV light and a computer that has been developed to reveal the correct messages.

Digital invisible ink is based on the same concept as the generic meaning of the term. Guess what, the classic 4th grade science experiment which is to hide a message via lemon juice on a blank sheet of paper is like transforming the world's view on tech now. Not only we could share secret messages to our friends at the science expo but now, digital methods can be used to accomplish the same thing.

THANKS to the science teacher!

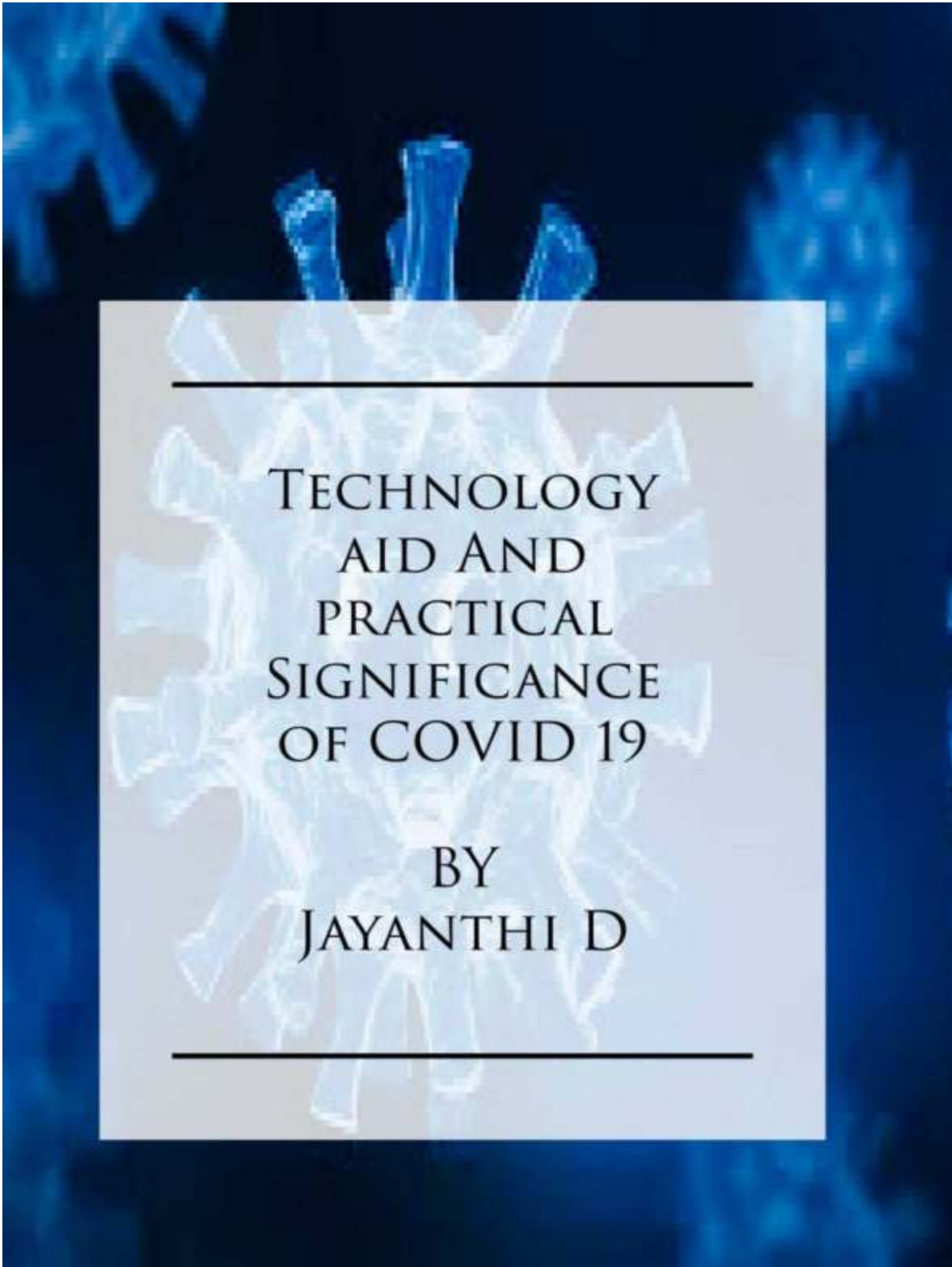
Yeah! You read it right. A team of researchers from the Harbin Institute of Technology in China have developed a system by which invisible ink and a basic cipher can be combined with relatively simple AI to create an 'uncrackable' offline encryption method.

Even as electronic records seems to be advanced, paper is still a common way to preserve data. Invisible ink can hide classified economic, commercial, or military information from prying eyes, but many popular inks contain toxic compounds or can be seen with predictable methods, such as light, heat, or chemicals. Carbon nanoparticles, which have low toxicity, can be essentially invisible under ambient lighting but can create vibrant images when exposed to ultraviolet (UV) light — a modern take on invisible ink.

The researchers made carbon nanoparticles from citric acid (LEMON JUICE IN 4TH GRADE) and cysteine, when they dilute it with water leads to the creation of invisible ink that appeared blue when exposed to UV light. The team loaded the solution into an ink cartridge and printed a series of simple symbols onto the paper with an inkjet printer. Then, they developed an AI model, composed of multiple algorithms, to recognize symbols illuminated by UV light and decode them using a special codebook. Finally, they tested the AI model's ability to decode messages printed using a combination of both regular red ink and the UV fluorescent ink (Does the sunlight ring a bell?)

With 100% accuracy, the AI model read the regular ink symbols as "STOP," but when a UV light was shown on the writing, the invisible ink illustrated the desired message "BEGIN." Because these algorithms can notice minute modifications in symbols, this approach has the potential to encrypt messages securely using hundreds of different unpredictable symbols.

This research showcases how basic technologies can be combined to produce something greater than the sum of their parts. Artificial intelligence is a backbone technology for modern encryption. Let's find out what skills a real-world secret service agent needs and see if the 'James Bond' legend matches the reality. Perhaps a pen containing invisible ink will become standard issue in future.



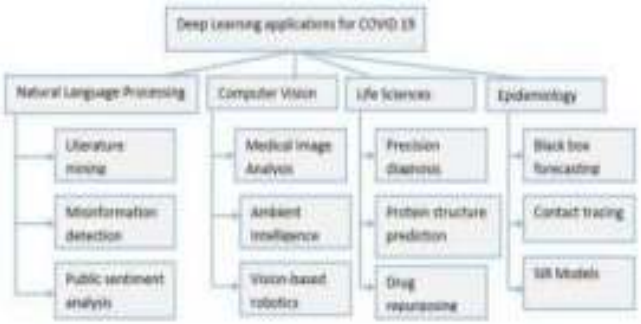
Technology aid And practical Significance of COVID 19

BY
Jayanthi D

COVID 19 pandemic is a social problem which causes a big threat all over the world . Research is being carried out to save loss of human lives by predicting the spread of pandemic and to control with the support of vaccines . Accurate prediction of COVID 19 using deep learning has gained more attention in the current scenario . Deep learning methods are more significant in handling non-linear problems effectively . Deep learning techniques can be used for predicting the future cases by considering the long- term dependencies and adaptive learning. Research is being done on various aspects to control the transmission of virus and to analyze the existing state of spread . The existing research studies can be classified into different categories . First category is based on the various clinical characteristics of COVID 19 . Commonly reported cases with diseases like Cardiovascular , digestive and endocrine disease and fever symptom was analyzed . Low risk and highrisk factors are identified and the mortality rate was determined . Deep learning - based model was used to predict the drugs to treat the COVID 19 patients that acts on viral proteins . But the efficiency of the model should be tested in various clinical and security aspects . The second category is based on the technology aspects to control the spread of pandemic . The major areas where the technology can be applied are like early diagnosis of disease, contact tracing , development of drugs , vaccines , predicting the future likely cases etc . Third category is based on the environmental impact. There is a strong relationship between the corona virus fatality and Nitrogen Oxide (NO 2) concentration . The increase in NO 2 concentration leads to severe health hazards such as diabetes, cardiovascular disease, heart disease, hypertension and may even lead to death. The diffusion of air pollution is prevented by combining the atmospheric and topographic structures . It was found from the spatial analysis that 78% of people died in the areas which has got more NO 2 concentration.

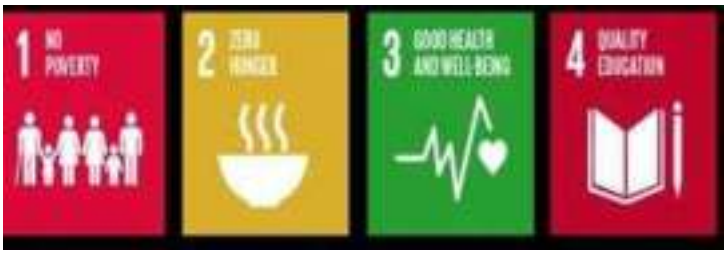
COVID 19 Deep Learning Applications

Several deep learning applications for COVID 19 have created insights about many new problems to solve for the research community which is depicted below



Progress towards Sustainable Development Goals (SDGs)

SDGs are the roadmap for the humanity. The sustainable development emphasizes the accomplishment of three interconnected objectives , i.e., economic development, social inclusion , and environmental sustainability which are necessary for the well being of individuals and society . COVID 19 pandemic imposes enormous challenges and opportunities for attaining the following goalsSDGs and the COVID 19 pandemic response are entwined and cannot be tackled by piecemeal approach . SDG integrators are helping the countries to address all the public and private challenges connected to COVID 19. Scenario planning can be done by expanding the facilities , effective treatment and management of hospitals, directing and implementing



the government measures at the right time, resource planning and management, ordering necessary goods in prior, testing and tracing management , effective risk communication and creating awareness to the people.

Other challenges

• Lack of testing, vaccination, warning and alerts

Depending on the population of the country, the testing threshold should vary and early warning alerts with more preventive measures can be initiated by the government to control the pandemic. The vaccines availability for the public must be ensured.

• COVID 19 incubation area monitoring and social control

Rules should be followed for continuous monitoring of COVID incubation area to reduce the spread rate. The transmission of virus can be controlled by strictly following the rules such as lockdown and by avoiding social gathering and other initiatives taken by the government.

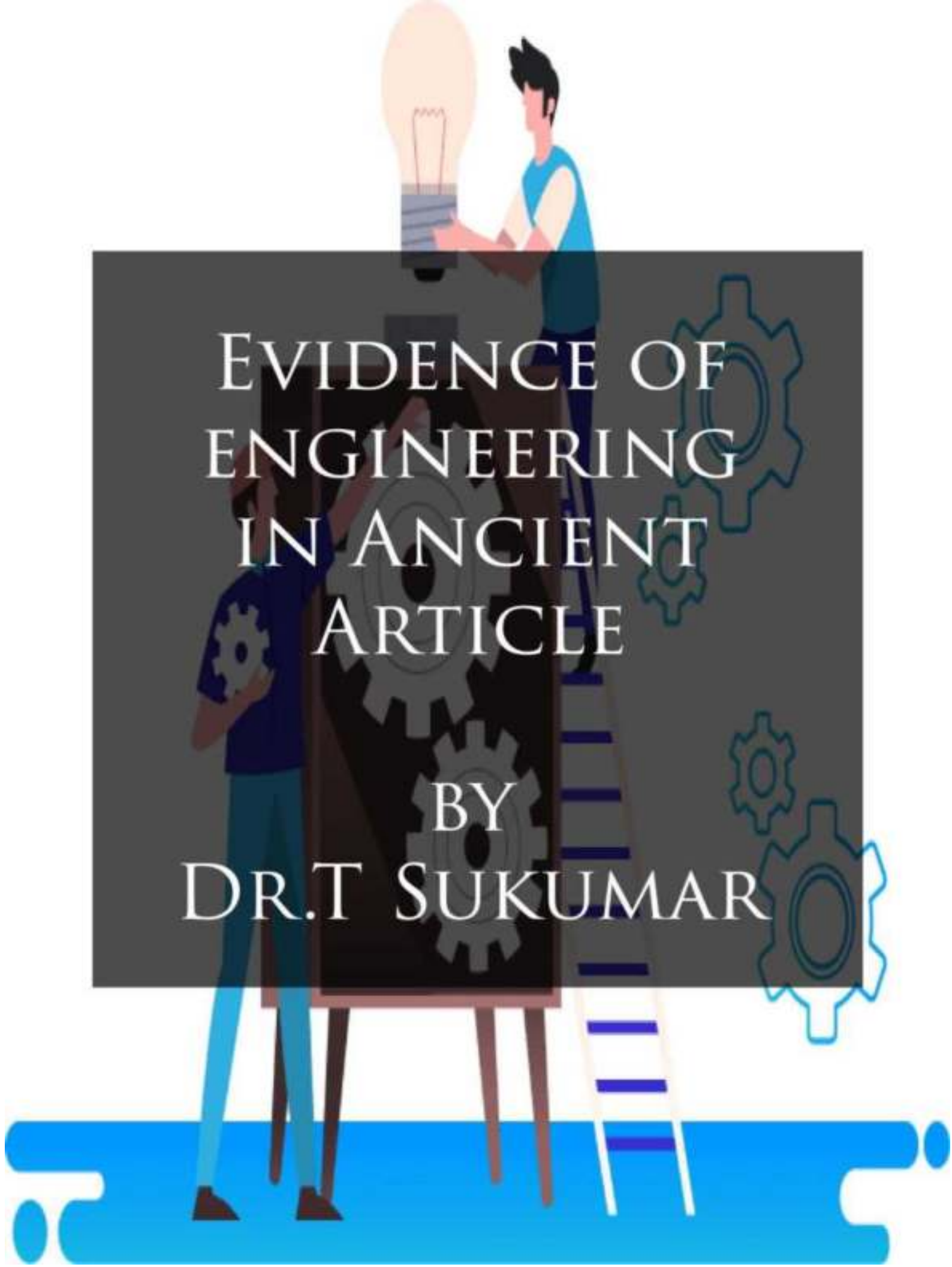
• Tracking and future prediction using AI

All the technology aids should be combined together to extract meaningful data and knowledge , AI is a powerful tool which can improve the ability of accurate prediction of COVID 19 and fight against the pandemic.

• Risks involved in satisfying the basic needs of the people

One of the main challenge is how people are able to fulfill their daily basic needs in the present lockdown situation. Also, the villages that are not affected by the pandemic can be fully isolated and agricultural areas can be identified to meet the demand of basic needs of the people.

Let us all pray to the Almighty to give power and strength to the people to fight against this second wave of pandemic and to restore the communities to wholeness and health. JAIHIND!!



Evidence of engineering in Ancient Article

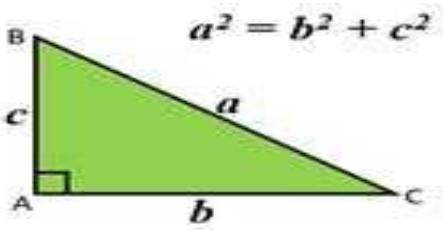
BY

Dr.T Sukumar

Thirukkural
The Engineer (minister) is one who can make an excellent choice of means, time, manner of execution , and the difficult undertaking

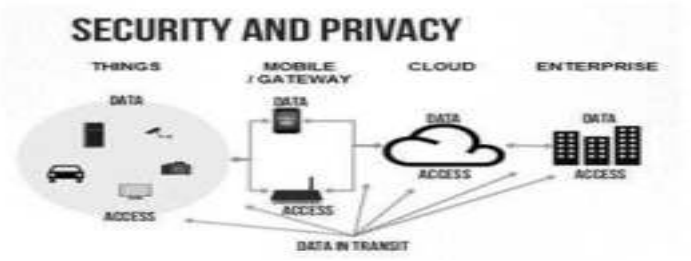
Tamil Poetry - before the invention of Pythagoras theorem (10th Century A.D)

Pothayanar is an Indian mathematical genius who lived in the eighth century BC. He is said to have known for the value of bag and also for the method of finding right side of a right triangle without square root.



Example:
Length b= 4, Height c = 3As per theorem 42+32 = 16+9= 25 = square root of 25 = 5
As per tamil poetry Length -Length /8+ Height/2(4 - 4/8)+ (3/2) = 28/8+3/2=28 +12/8=40/8=5
Ramayan & Mahabharatam

• Aliens - Pandavas and KarnaArtificial (Intelligence) precipitation - usage of Astra and respective slogans to shake • clouds (Password) • Astra - Missile • Brahmastra - Nuclear Bomb • Chant and Mantra - Login Id and password to operate the launcher • Dhanush - Launcher • Firewall - self defence mesh set by Astra • Pashupatastra - RADAR • Pushpaka Vimanam - Flight • Video conference - Set by Viyasar to watch Mahabharatha War
How to keep the objects safe in future?



IoT

IoT (Internet of Things) is the idea of connecting (linking) things (objects) and devices of all types over the internet. Now a days each device can be connected and controlled by smart phones with cloud technology. This shows the integration of all objects together with the idea of computer network , embedded system , and cloud computing.

IoT usage in various sectors • Smart Homes • Smart City • Self-driven Cars • IoT Retail Shops • Farming • Wearables • Smart Grids • Industrial Internet • Telehealth • Smart Supply-chain ManagementEg : Healthcare - Patient details could be collected through wearable and the same information could be updated in a cloud data base. As a result of this the doctor can prescribe the medicines which will be forwarded to pharmaceutical and necessary medicines will be delivered to home.

Each device in a home talks to you in future !

Each device can be identified through unique ID and can possibly be controlled from remote places. Of course , it's a great bliss to human life . However , life is miserable if the attackers hack and take the privilege of devices from the remote place. Hence the Immediate predicament and elucidation comes to our mind which urges the need of counter attacks to keep the data or device in a safe manner.

Always a tremendous way is available in universe . The Engineer is one who can make an excellent choice of means , time , manner of execution , and the difficult undertaking (itself) to provide the solution to the real world problems.

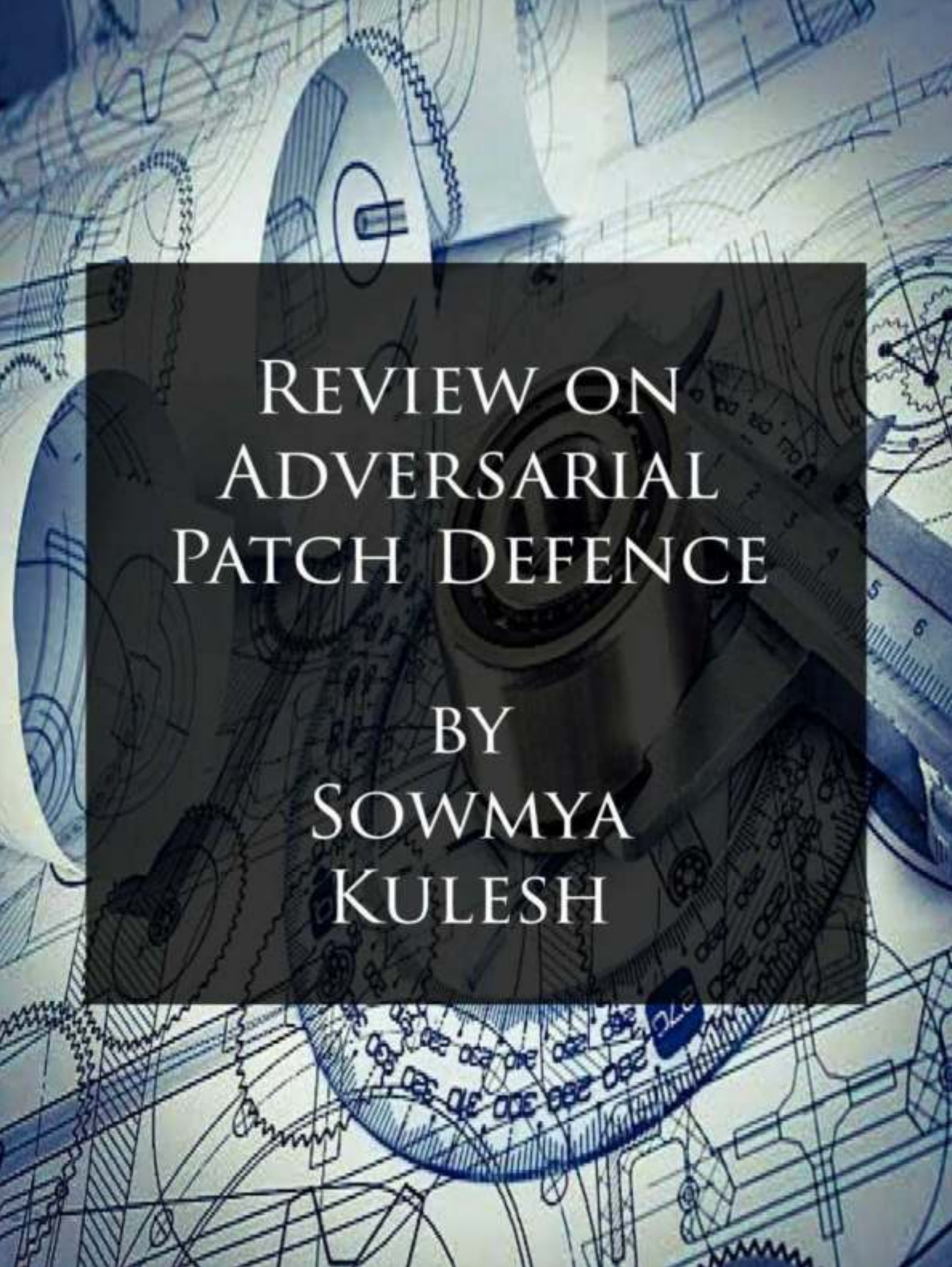
Are we going to provide the security to all devices?

What is IoT Cybersecurity?

Of course , this technology helps to bridge all devices together with human . Naturally , the million dollar question bangs our mind when devices are identified and controlled from remote places through technology , then what type of cyberattacks (Agni Astra/Nagastra !) are possible ? How to do counter attacks Varuna (Astra /Eagle Astra!) to eliminate such types of attack?

Attackers learn the ways of gathering information about all devices and explore the possibility of vulnerabilities and make use of it to take privilege on all devices . As a result , attackers may go for ransom of money . Engineers should plan , focus and update their knowledge to keep the data and device very safe like how Arjuna meditated and safegaurded numerous Astra . There are ample of job opportunities available in the cyber security domain.

It's a great pleasure to pen my thoughts for Silver Jubilee celebrations of IT department . I wish everyone to be successful (Counter Attack) and to shine in future (Cloud).


Review on
Adversarial
Patch Defence
by
Sowmya
Kulesh

Article on the Journal paper titled 'Adversarial Patch Defense for Optical Flow Networks in Video Action Recognition'

As a security analyst, I have often come across various roadblocks in the patching process of network and application layer devices and technologies . The global clientele is currently looking for and researching the most optimal way in automating the patching process with Artificial Intelligence . In doing so, I came across the journal Adversarial Patch Defense for Optical Flow Networks in Video Action Recognition put forth by Adithya Prem Anand , Gokul H ,, Harish Srinivasan , Pranav Vijay , Vineeth Vijayaraghavan

All throughout the world , deep neural networks (DNN) are being integrated into production -level systems . The resilience of DNN models has become a problem due to their vulnerability to adversarial attacks that decrease their performance.

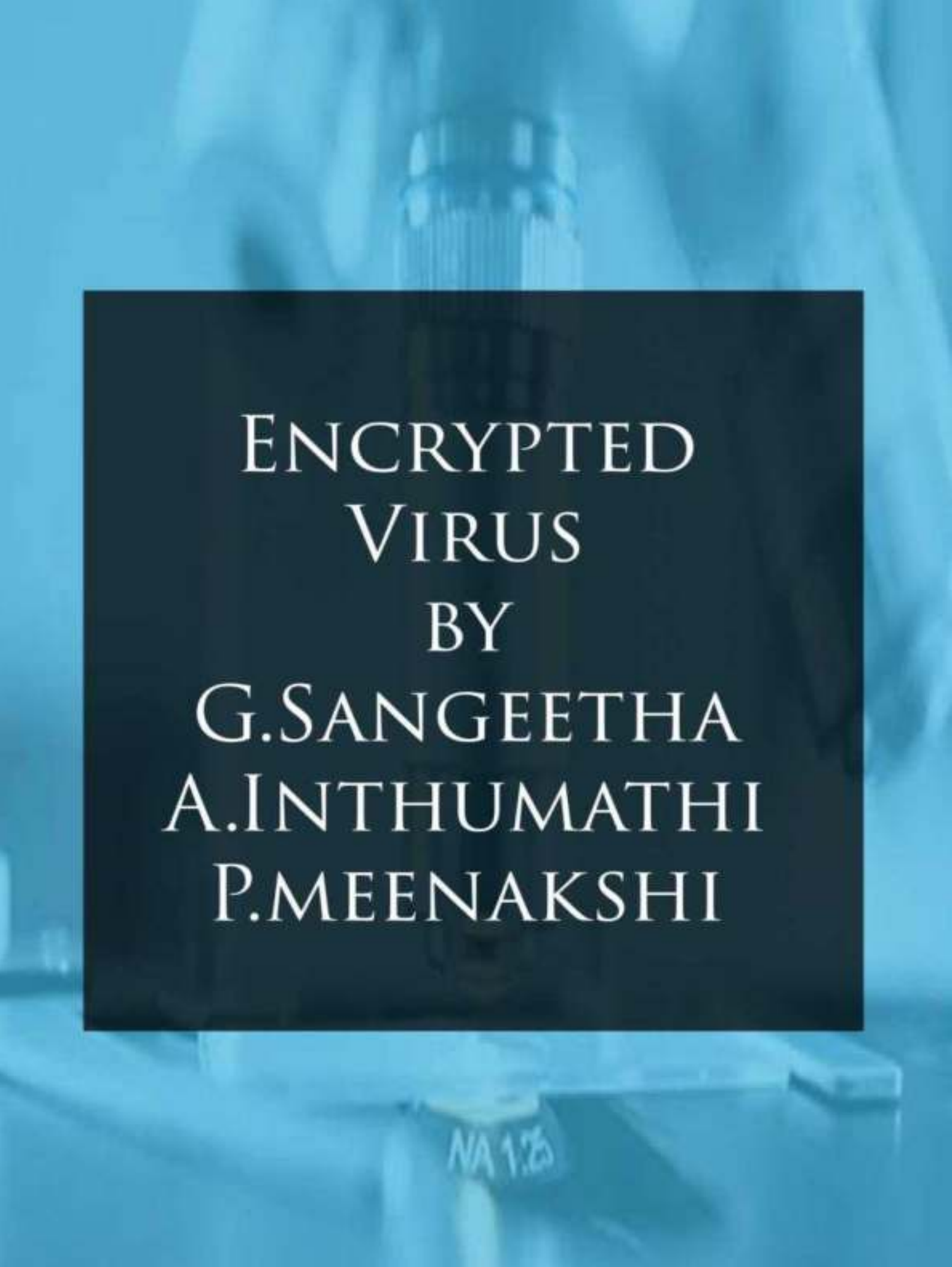
Recent advancements in the field of physical printing adversarial patches demonstrate their practical utility in the Real-time deception of DNNs

Thus , expanding research into video classification systems. For such localized patch -based attacks in video classification systems , the authors implement an existing defense termed Local Gradient Smoothing (LGS). To address the flaws in LGS the authors further develop a method called Inpainting with Laplacian Prior (ILP) that gives a 37 % better accuracy than the LGS.

The authors examine the effectiveness of both the defenses and the architecture by testing their performance on both benign and attacked samples . The insight I gather from this paper is that the shortcomings are caused due to the "Optical Flow " which is the distribution of apparent velocities of movement , of brightness patterns in an image.

The work of the authors demonstrates that attacking the optical flow network is possible even with a patch size of 0.6 percent , with adversarial patches , the image resolution is sufficient to significantly reduce the model 's performance . They confirm that FlowNetC is compatible with an encoder-decoder design is more prone to adversarial attacks compared to SpyNet, a spatial pyramid network.

This paper has equipped me with an in-depth understanding of Adversarial Patches and provided insights on tackling adversarial attacks on DNNs.



Encrypted Virus

by

G.Sangeetha

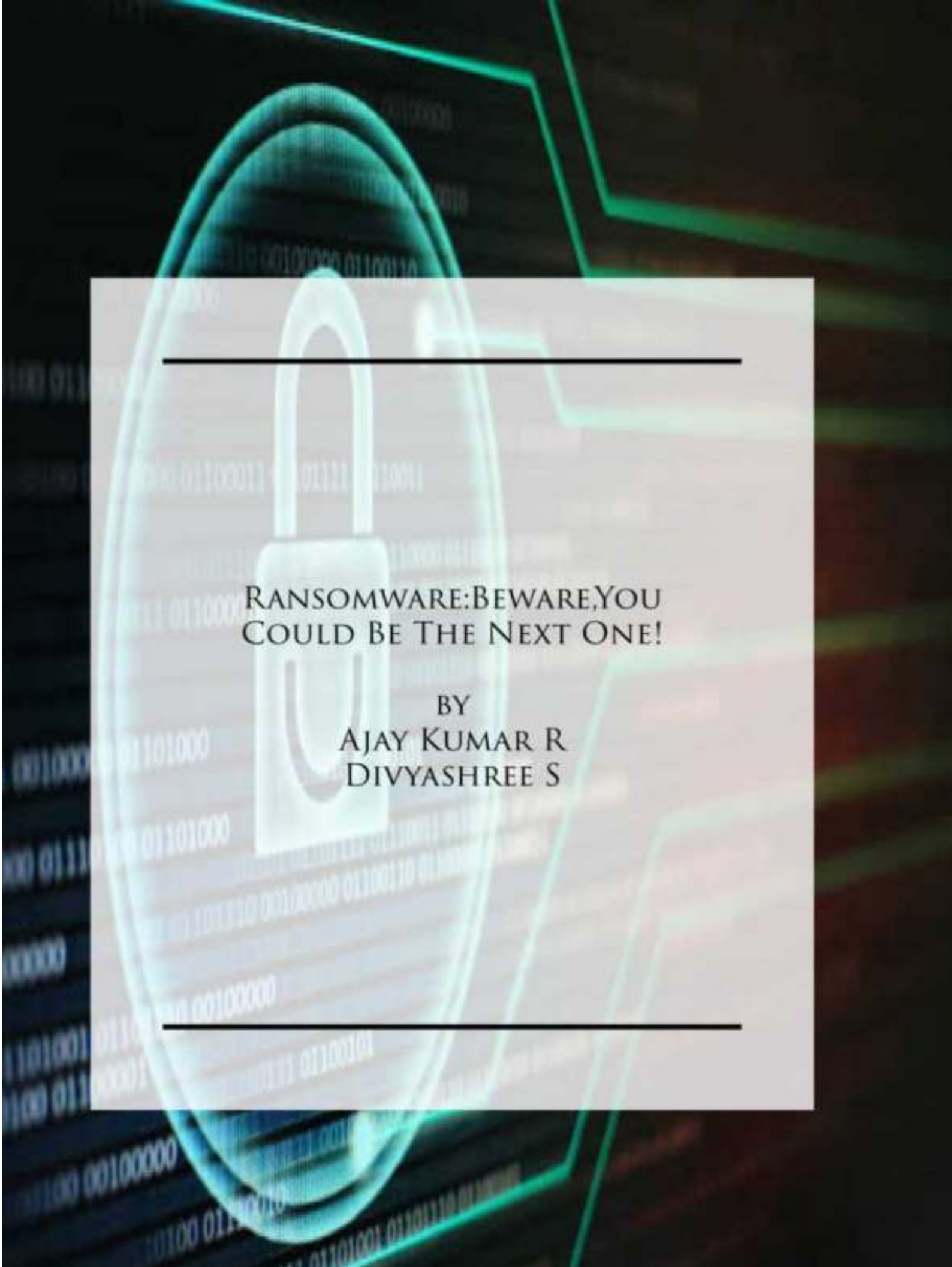
A.Inthumathi

P.Meenakshi

An encrypted virus is a computer malware that has become a serious threat to global businesses in the last half-decade. An encrypted virus is defined as a computer virus/malware that is capable of encrypting its payload to make the detection hard . Ransomware and Crypren are examples of the encrypted virus which encrypts the victim's file. An encrypted virus uses an encryption method to hide – It shuffles its code to frustrate the detection – from malware scanners (antivirus). Nevertheless , since all the encrypted files in a computer system require a decryptor , an antimalware integrated with a decryptor can be used to detect the virus Variants associated with the encrypted virus are characterized by the encryption of files on infected computer systems and network, although some variants are said to delete files or even block access to computer networks /systems . Upon infection , encrypted virus will cause changes to the existing registry and destroys the system process that might hinder their encryption . To perform encryption on the computer system/ network, the encrypted virus may start to execute numerous activities on the host computer , firstly to start with confirming whether the virus is thriving in a virtual environment . If the confirmation is positive , the virus may self-delete such that no files will be encrypted. But if it is an actual operating system , then the encryption of the files will begin soon as the encrypted virus enters the system.The increasingly growing digital world is probably the main cause for the development of sophisticated encrypted virus . Cyber -attackers who buy and disseminate uses the most popular methods such as dangerous redirects , spam campaigns, software installers, et al. Whereas most encrypted virus infections are opportunistic and are disseminated via casual infection ways like the ones mentioned above, in some incidents, the perpetrators of these cyber -attacks act specifically by targeting a particular victim or computer system/networkThis event might occur when cyber-criminals infect particular sensitive system to extort money from the victim(s). In the last half-decade , encrypted virus variants have grown to include exfiltration of information , involvement in distributed denial of service (DDoS) cyber-attacks as well as anti-identification elements.

In the case of ransomware , for example , one variant is known for deleting files notwithstanding a payment . Other variants feature the ability to lock cloud-powered backup regardless of whether the system automatically backup their files in real-time.

Other variants purport to be the property of law enforcement institutions and the victim must pay some penalty for committing an offense or conducting unethical operations like viewing a obscene content on their computers . In order to appear legit to the victim , these notorious variants can determine the physical location of the victim , so that they (variants) can quote the name of the nearby law-enforcement institution which is familiar to that victim . Hurriedly and without asking themselves if there is any law enforcement agency that will remotely disable someone's computer or demand for penalty in order to unlock it, users are provoked to send money to the fraudsters . Most of the researches are working to detect the encrypted virus and ways to recover from the virus.



Ransomware:Beware,You Could Be The Next One!

BY

Ajay Kumar R

Divyashree S

Ransomware - Introduction

Ransomware is considered to be the biggest threat to Cyber Security. This aggressive attack can gain access to the files and blocks the user in accessing those unless a huge ransom is paid.

Evolution of the Ransomware

This attack is said to have originated in 1989, when a floppy was distributed at an event hosted by World Health Organization (WHO). This attack asked the targeted victim to pay $189 to a bank account. From 1989-2000, there were very little ransomware programs which used simple symmetric key encryption but it was easy to crack. In 2005, it started becoming complex. By using RSA encryption. The victims were unable to decrypt unless some ransom was paid. In 2013, Crypto-locker came into play. This made victims to do payments in bitcoin. By 2016, 17 and upcoming years, it has increased severely infecting as many as computers it can in many countries within a single day

Few Major Ransomware Attacks

The Ryuk (2019 & 2020), WannaCry (2017), Petya (2016) and so on are the few ransomware attacks that had occurred which made hackers gain huge amount of ransom.

Spotlight on WannaCry Ransomware (2017)

The most disastrous ransomware attacks in worldwide, which resulted in loss of voluminous data. This took place in May 2017 which spread through computers. Targeted files were held hostage and a huge bitcoin ransom was expected in return. This whole attack occurred due to the weakness in Windows OS by using an attack which was developed by United States National Security Agency. WannaCry can also spread via email scams, or phishing. More than 200 thousand people and companies were affected, Such as Nissan, Renault etc. Pay attention to the phishing always!

Few Measures to avoid being the next Victim

The main motive of this attack is to find the loopholes in the targeted network thereby making it susceptible. So, to prevent this kind of vulnerability in the network following practices can be followed:

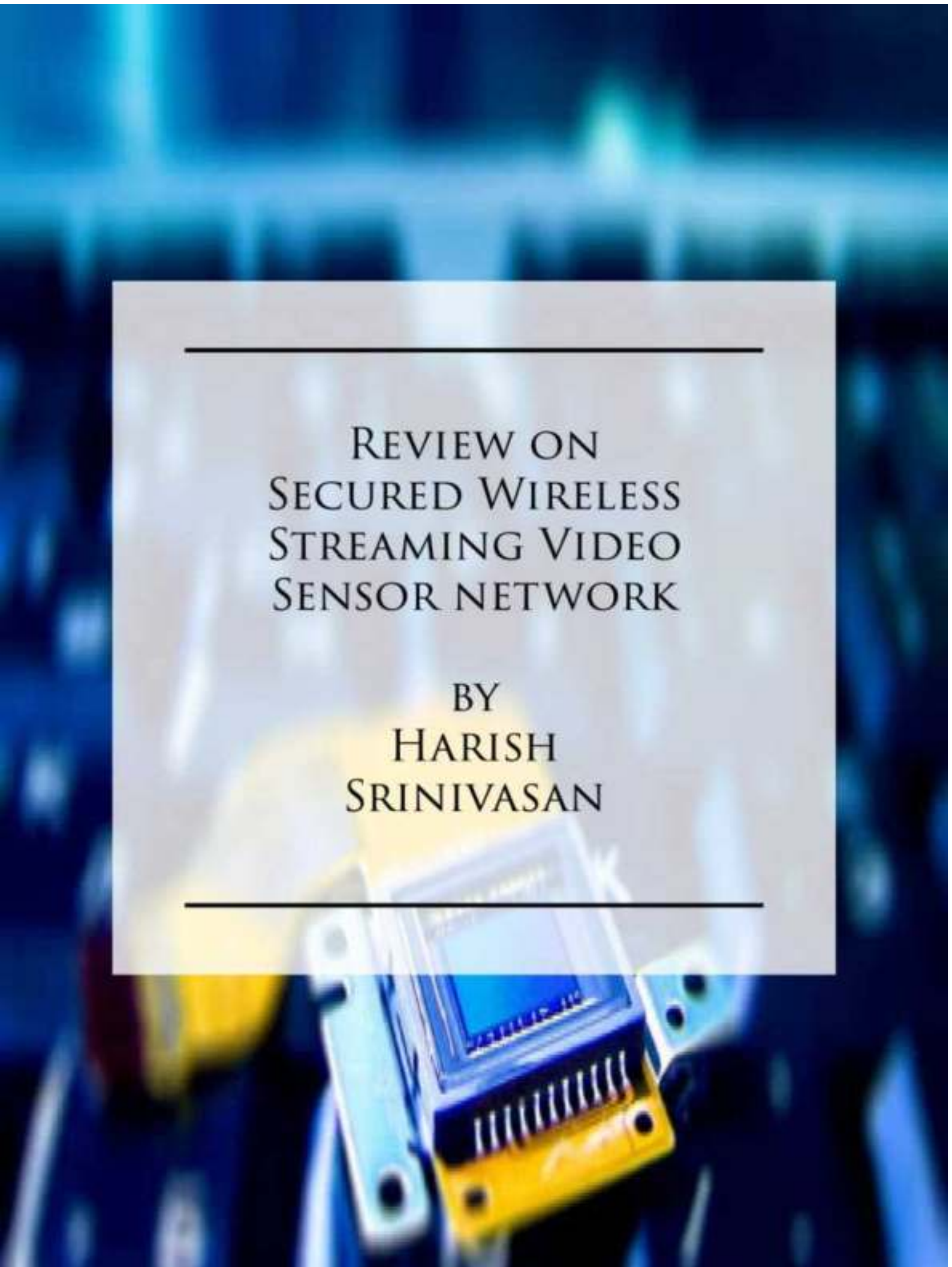
- Ensuring that the software present in the system is updated frequently.
- Firewalls play a major role when it comes in protecting data. By using Next Generation Firewalls, it becomes one more step easier.
- Updating credentials must be followed in frequent intervals.
- Restoring files is most important, and to make sure that backup files should not be corrupted.

One's Segain(second+Again) in life

by
Mohammad Safi.A
Ajay Kaarthi.J
Kishore.S
Nerosha.S
Jayashree.S
Aravintharaj

In 2015 , an estimation of about 3,60,000 people died from drowning, which made drowning a major public health problem worldwide . In 2018 , injuries accounted for over 9% of total global mortality . Drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury -related deaths . India holds 6th place worldwide and 2nd in Asia . The data on ocean deaths hit at some trends. People who die in local waters tend to be men and boys, typically under the age of 30

The footage from the HD camera with long focal length fixed in huge poles (similar to an night lamp post) in ocean checks the footage frame by frame for detecting the drowning people with the help of pre - trained weights (we personally collected from lifeguards and created our own lifeguard in our college swimming pool). When a person is detected his/her location is plotted on a map and it is converted to an electric pulse , as fast as thunder the signal flashes to the autonomous lifebuoy thrower gun , Lifeguards /Rescue team , Ambulance and police at the same time . The autonomous lifebuoy thrower gun which has lifebuoy in form of bullet is fixed on the same pole as that of the camera. The gun is tilted in correct position and lifebuoy (airbag) is fired at them. The lifebuoy is fixed with an automatic air filling mechanism which fills the air in bag suddenly when it senses water . Again the air bag is rotated in anticlockwise direction to pull the person back to the shore which helps to hold his life until the rescue team reaches him . All these data and time stamp are stored in database for future access and improving accuracy.



Review on Secured Wireless Streaming Video Sensor network

BY
Harish Srinivasan

Review on Enhanced approach using trust-based decision making for secured wireless streaming video sensor networks

A Article on the Multimedia Tools and Application journal paper titled " Enhanced approach using trust based decision making for secured wireless streaming video sensor networks"

While reading up on the topic of Video Sensor networks , I came across the paper titled "Enhanced approach using trust based decision making for secured wireless streaming video sensor networks " authored by S. Ramesh and C. Yashwanth . This paper proposes a novel lightweight trust decision -making framework for secure routing in inter and intra cluster communication. While many previous works on this topic focuses more reducing power consumption and increasing transmission power , this work focuses also on the data reliability aspect which is of more importance in military surveillance areas , cyber agencies and banking sectors. Trust based LEACH ((Low Energy Adaptive Clustering Hierarchy) reduces resource consumption and provides security from network creation itself.

While passive attacks such as tampering, radio jamming can be detected and prevented by security mechanisms , active attacks such as black hole and sink hole attacks are not prevented easily . All the nodes in network will exchange packets during network creation allowing the calculation of the number of successful and unsuccessful interactions . Thus , the trust belief is computed for all nodes and stored in the Cluster Head (CH), a high batter power node. In this way, a trusted path is established , as the malevolent nodes have low trust scores due to ambiguous and delayed transmissions and the trust decision making framework will avoid the data transmission in the LOW trust path (where the black hole node and sink hole resides)

The performance evaluation results in the paper show that the proposed Trust Management System (TMS) shows the elevation in Packet Successful Delivery Ratio and contraction in Loss of Aggregated data , energy consumption , resilience , end to end delay when compared with existing Group-Based Trust Management Scheme for wireless sensor networks (GTMS)

End of Shoplifting?

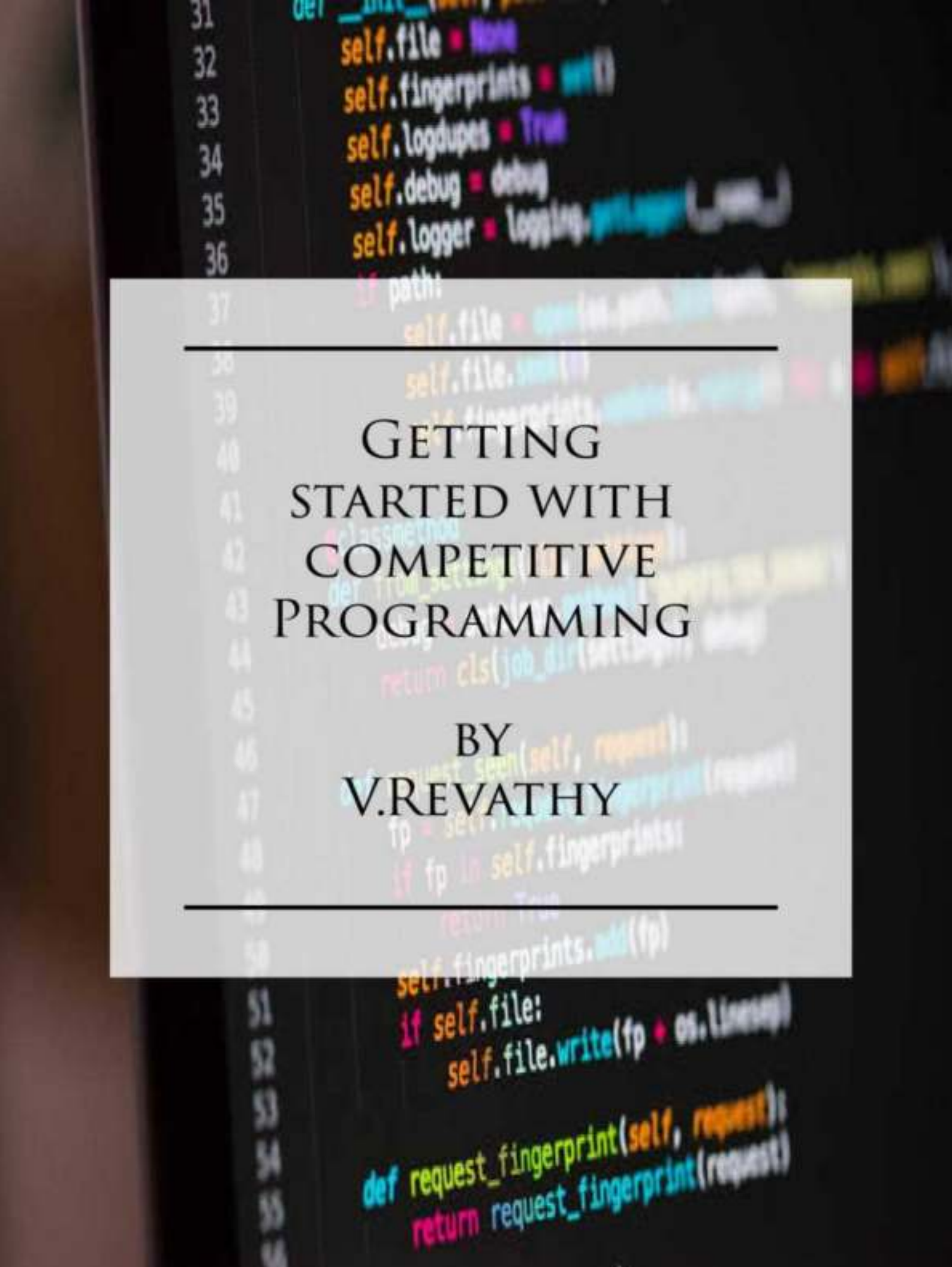
by

varshini.M

Srinithi.A

End of Shoplifting?

December 5th, 2016 Amazon announced the arrival of Amazon Go Store , a new shopping experience that fundamentally changes the very fabric of shopping and payments at the same time. However , unlike other physical shops it does not have any registers or checkout. You simply walk in, pick out what you want and walk out. Amazon is calling this as the "Just Walk OUT " shopping experience and when you walk out, your purchase is complete with a receipt in your app , charged to your Amazon account. Amazon has combined decades of research with artificial intelligence and machine learning along with image recognition . Today Amazon just reinvented the entire retail and payment experience . It is a store with no credit card machines or cash registers , just AI. It is very powerful technology I (Srinithi) have visited Amazon 's original Seattle Amazon Go store to experience the " future of retail". The first thing is that the technology works extremely well - I had my receipt emailed to us in no time at all and the system wasn 't fooled by us picking up things and putting them back . The most fascinating thing about the experience is how you feel about picking things up and putting them back . And there's definite feeling that you could be stealing by "just walking out - is security going to come and stop you ? Yes this sounds like magic , retail magic . A smart phone with the app installed is required to enter the store via presenting a barcode to a sensor . This barcode scan tracks that you have entered the store , identifies you're moving through the store and then identifies the product you pick up . To complete your shopping experience just walk out the door . Yes , that 's it . The image recognition combined with a sensor fusion of technologies has already confirmed your order and totaled it up. All items are billed to your future Amazon Bank Card , but currently it is billed to the payment card you have on filed with them , there are nearly 1 billion payment cards they have on file .This Amazon magic is all achieved through a number of very advanced technologies . Amazon said it is using a combination of artificial intelligence , computer vision and data pulled from multiple sensors to ensure customers are only charged for the stuff they pick up. The most fundamental is the use of hundreds of image sensing cameras . Amazon can detect a product that is not only missing from the shelves, being held in your hands, put into a bag , or even under a shirt . There is also a mention of "facial recognition " and user information ,which may include images of the user , details about the user like height and weight, user biometrics , username and password , even user purchase history . Yes, Amazon has solved shoplifting almost entirely



Getting started with competitive Programming

BY
V.Revathy

Programming is fun , programming is an exercise for your brain , programming is a mental sport. Competitive programming is usually held over the Internet or a local network , involving participants trying to program according to provided specifications How to start competitive programming ?Here are some steps that help you to learn competitive programming . 1. Pick a programming language You need a medium to code your thoughts and that medium is called a language. You can do competitive programming in any programming language but it is highly recommended that you choose one of C/ C++ or Java. The reason being that the time of execution is a key factor in Competitive Programming and so , choosing a language whose time of execution is fast is surely going to give you a benefit . Python is slow as compared to C/C++ and JAVA , that's why very smaller number of programmers used to do Competitive Programming in Python

2. Choose some platforms to practice

Pick any website of your choice (I prefer Hackerrank). HackerRank has a good set of problems for beginners placed in well - defined manner according the tagsand difficulty levels . You might get stuck after first 4-5 questions and that's normal. In that case, feel free to see the editorial or google to look for the solution . When you find it, make sure to understand it, and then code it on your own. First, solve "Easy" questions of all sections , and then "Medium " questions . Another site which is used by many programmers is Leetcode . Solve the first 100 questions in any of your preferred website or so in order of decreasing number of submissions. This will get you started and you 'll have an idea of what kind of questions you can get

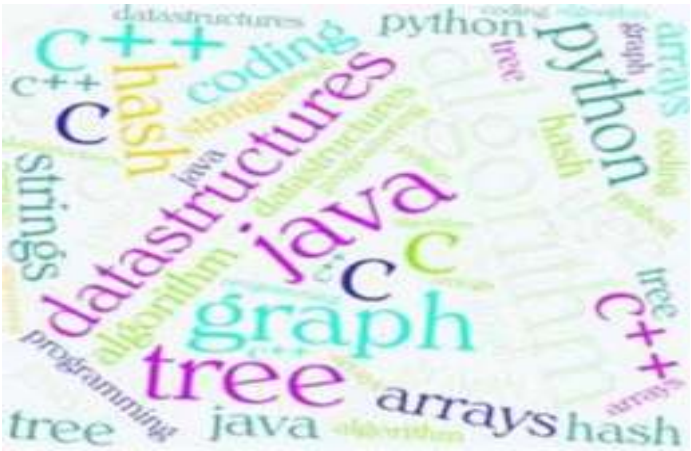
3. Learn Data Structures and Algorithms

Problems with higher difficulty cannot be solved by just simply translating the problem statement into code . Such problems require knowledge of some new concepts that you don 't know . Data Structures are something that helps you in making the program more efficient. Having good amount of knowledge in Data Structures will help you in selecting the optimal Data Structure for any problem.

Algorithms are something that use various data structures to implement the logic and then we get the result in form of output produced by the algorithm.

Anyone can learn Data Structures and Algorithms from GeeksForGeeks , it contains Data Structures and Algorithms tutorials and problems in rich amount.

4. Test Yourself After the practice of 2 or 3 months you can also start doing practice and participating in contests on some of these famous sites CodeChef , CodeForces , AtCoder . CodeChef is known for long challenge (10 days duration), CookOff (2. 5 hrs), LunchTime (3 hrs). Codeforces is known for short duration contests of at most 3 hrs long . Developing your Competitive Programming skills requires that you are both fast and are able to think deeply about a problem .Codechef long challenges = Deep thinking AND Codeforces rounds = Fast coding , If you want to be good , you should try to be good in both these areas . But it's fine if you are just good at long challenges (deep thinking) or just good with short contests (fast thinking), both will help you become a better programmer.

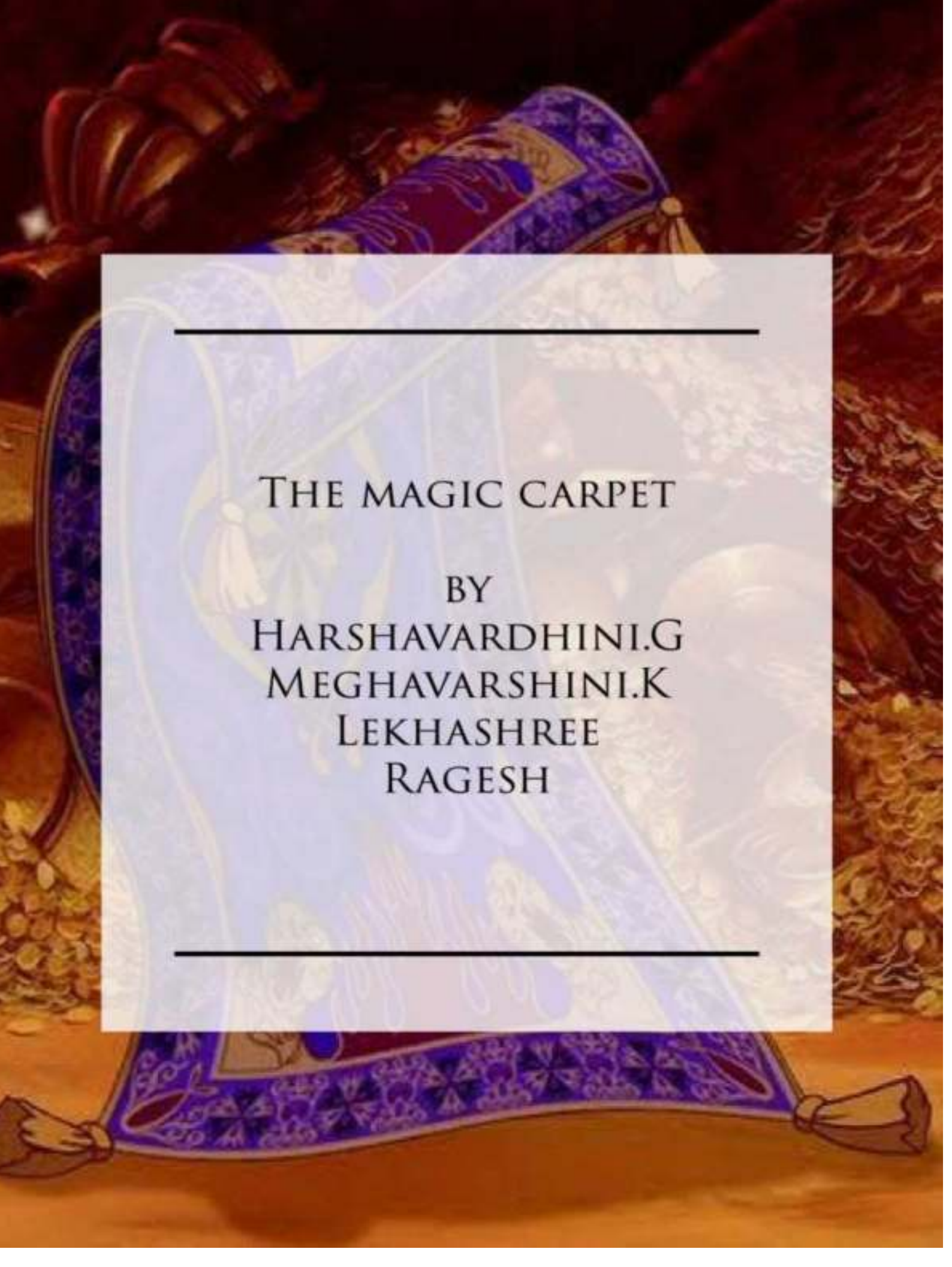


5. Keep practicing

Always keep yourself motivated enough to solve the problem ; it will help you in enhancing your problem -solving skills. As now you have good knowledge of Data Structures and Algorithms you can do really well in world of Competitive programming if you keep practicing continuously . Up-solving is an important part of

learning and developing your skills . Up-solving generally means that you try to solve a question that is just out of your comfort zone , i. e., you try to solve a question that you could not solve previously . Look at the editorial for that question and then try to solve it again. Also, look at other' s code. Eventually, this widens your comfort zone.

Most important thing you need to learn is patience while doing the problems . Many people who start the competitive programming and left it just after a week , and the reason will surprise you, they all left the competitive programming because of impatience and they all used to say that we can't waste our time on a single problem for more than few hours. So please you need to patience and gradually you will surely feel the improvement in solving problems . Please do participate regularly in as many as contest you can , why because participating in the contests you will learn many new topics and will get experienced how to fight with the programmers from across the globe . Sometimes you will also find decrement in your rating, but please don't get demotivated or discouraged everyone have gone through all these things to become a successful programmer , rating is just a matter of time as the time will pass and you will keep practicing , then you will see increment in your rating . You can find many resources online that will help you in competitive coding. Get started today and Keep rocking!



The magic carpet

by
Harshavardhini.G
Meghavarshini.K
Lekhashree
Ragesh

Wonder , how amazing it would be if we were to travel in few seconds from one place to another!!

Is that even possible ? Yes ! It's THE HYPERLOOP.

The real life "Iron -man " of the world made it possible .Who do you think the Real-life iron man is? Elon Musk!

The vactrain concept was first proposed by Robert. H Goddard in 1904.

What actually is vactrain concept?

It is a proposed design for a very -high speed rail transportation.

Elon Musk, CEO of Tesla and Space X, first mentioned that he was thinking about a concept for a "fifth mode of transport "' calling it the Hyperloop , in July 2012 at a Pando-Daily event in Santa Monica, California.

Why is it 'Hyperloop '? The name hyperloop was chosen because it would go in a Loop . Elon Musk envisions the more advanced versions of transport systems will be able to go at hypersonic speed

Hyperloop in Canada

Do you think hyperloop exists? Well yeah! Startups in various countries are already planning routes . There are routes being planned in Poland by the company 'Hyper Poland ', and other routes being planned between major European countries.

Hyperloop's design requires it to travel only in a straight line.

The tech by design is a rapid mode of transportation , sometimes accelerating to more speed than a human can handle, and as such , the tubes need to be in a straight path to avoid any unexpected accidents.

Will the hyperloop be safe ? Is it even possible to build in this lifetime ? Will it look anywhere near as awesome as the Star Wars- sequel shuttle/capsule rendering that' s shown online? Yes!

On November 8, 2020, the first passengers travelled safely on a hyperloop - making transportation history . This test demonstrated that we can safely put a person in a near-vacuum environment, and our entire safety approach was validated by an independent third party

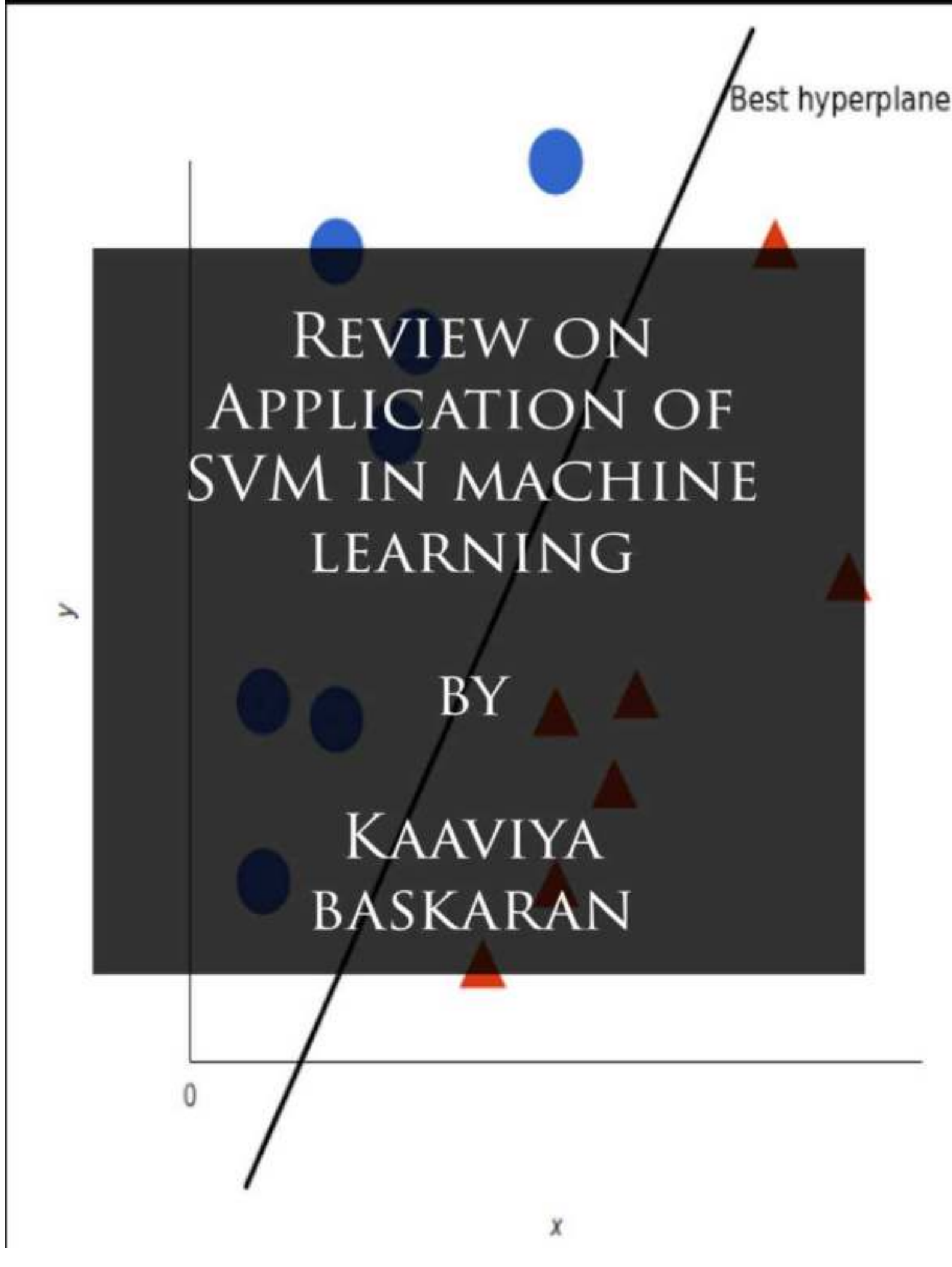
Why hyperloop , instead of other transportation?

It is fast , efficient and cheap to operate and uses solar energy for power. It uses a sealed tube through which a magnetic levitating pod may travel with less resistance for

increased speed and acceleration over trains or planes . The proposed hyperloop system could operate below ground , above ground and under water . Hyperloop tubes are protected from the weather,

birds , objects on railroad tracks . In the event of equipment or electrical failure , the system comes to a stop which is, does not fall from the sky . Also , automation reduces the risk of human error.

The next stage for Hyperloop is to move beyond initial testing and feasibility studies , start longer distance trials of the technology and , even more importantly , testing the service with passengers . Another challenge will be to find commercial models that works around the world . Only when all this is done will it become clear whether Hyperloop can really become a success.



Review on Application of SVM in machine learning

BY

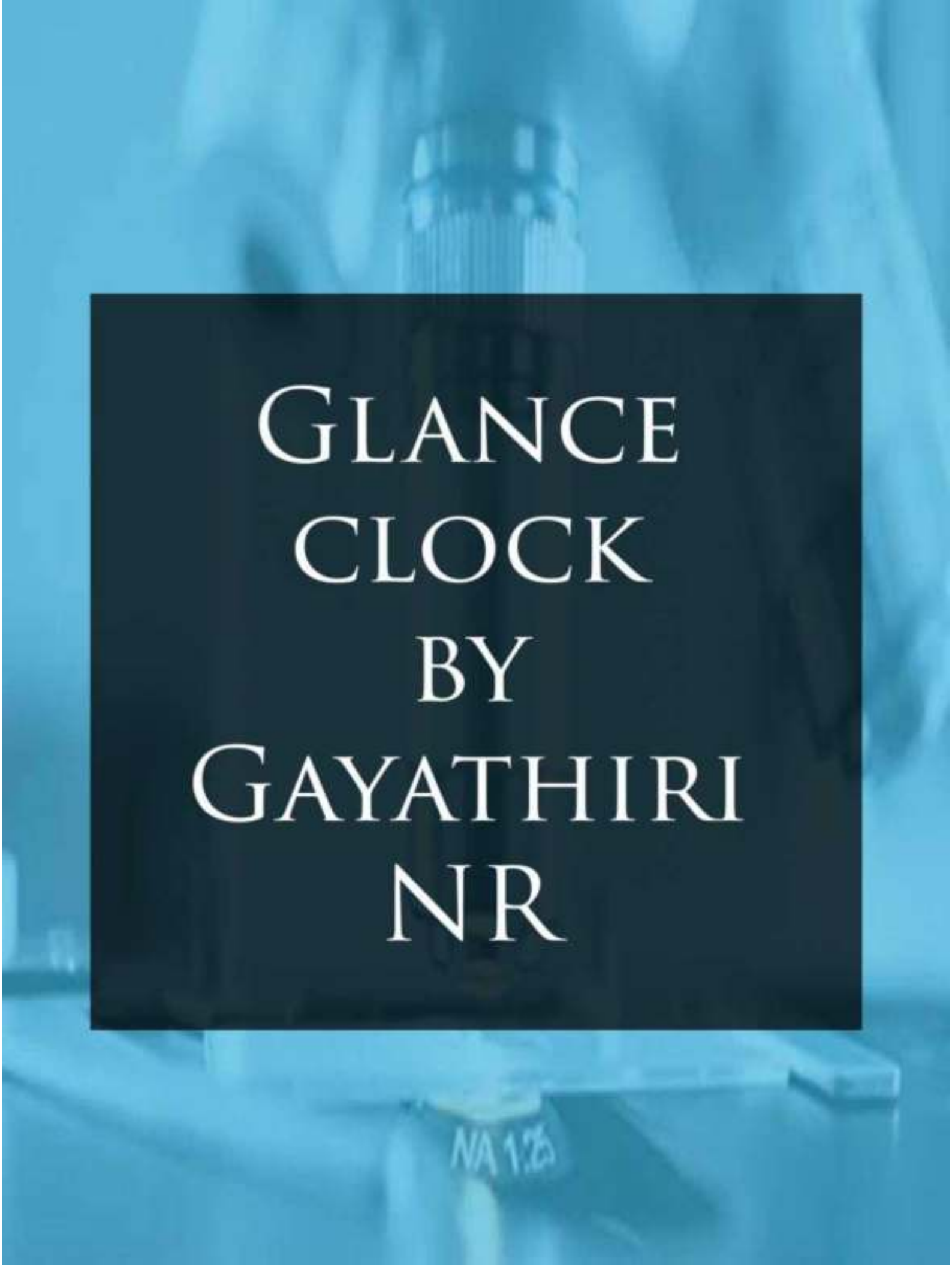
Kaaviya Baskaran

Article on the Wiley Journal paper titled 'Machine learning approach for secure communication in wireless video sensor networks against denial - of - service attacks'

While doing research on the different types of wireless networks, I came across the paper entitled "Machine learning approach for secure communication in wireless video sensor networks against denial - of - service attacks" authored by Swaminathan Ramesh , Calpakkam Yaashuwanth and Bala Anand Muthukrishnan . This paper brought in the concepts of MANET (Mobile Ad-Hoc Network). While the curriculum has briefly touched upon MANET , this paper provided me better insights on how the absence of a centralised functionality in MANET leads to compromise in the security of the information transmitted. It also helped me to learn about an hierarchial protocol named LEACH (Low -Energy Adaptive Clustering Hierarchy) with each node equipped with sufficient radio power to be able to reach the base station itself.

Furthermore, the paper casts limelight on how encryption in machine learning can be achieved using Support Vector Machine (SVM) algorithm along with the different ways in which the essential parameters such as packet quality ratio, arrival interval and delay of a node can be calculated. Adoption of a SVM approach prevents the occurrence of DoS. Going through the explanation given on the above instance provided me more backing to the theoretical concept of DoS which I came across in the Information Security lectures . Dynamic Source Routing (DSR) and Optimised Link State Routing (OLSR) protocols were explained providing excellent implementation results.

In addition , the paper also drew my attention to how delays in DoS can be faced when the TCP protocol , which we could easily relate with, was used. Utilisation of line charts allowed for easier visual interpretation and correlation with respect to the data given on packet delivery performance using various protocols


Glance
clock
by
Gayathiri
NR

All clocks are usually meant to tell you the time or be a piece of unique art on your walls . But with Glance Clock there's more interesting aspects to a wall clock . Glance Clock is a minimalist time piece which not only displays time but also displays information from all your wearable 's, smart home devices , third party applications and many moreGlance Tech Pvt Ltd is the company behind this amazing piece of innovation and the founder and CEO of the company Anton Zriashchev came up with this idea after being inspired by the book Enchanted Objects by David Rose . Glance Clock is based out in Singapore and their crowd funding began in the month of September 2016. Smart phones have existed for the past so many years and the time has come for smart clocks on your walls . With Glance Clock you get to organize your busy days which would thus allow you to focus on what's important

FROM THE INVENTORS DESK : According to Anton Zriashchev , " Glance Clock is a smart wall clock that talks to the cloud and displays information from fitness trackers, smart home devices, and web services right at the moment user needs it. Sitting on an office wall Glance Clock will show a breakdown of a day through integration with Google calendar. At home, it alerts an important incoming call or notifies when your UBER has arrived."

Glance Tech Pvt Ltd is the company behind this amazing piece of innovation and the founder and CEO of the company Anton Zriashchev came up with this idea after being inspired by the book Enchanted Objects by David Rose . Glance Clock is based out in Singapore and their crowd funding began in the month of September 2016 . Smart phones have existed for the past so many years and the time has come for smart clocks on your walls. With Glance Clock you get to organize your busy days which would thus allow you to focus on what's important.

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Glance Clock as such has no direct competition but there are other companies which have come up with an idea such as to move information from a phone to another physical object . Lametric and DOTTI are the two products who are based on a similar idea such as the Glance Clock, however Glance Clock is much more advanced than the two and have much more in depth options.

Glance Clock 's objective was to bring more value to an already existing object such as a wall clock . The biggest challenge while developing the Glance Clock was the glanceable interface that had to done. Glanceable means that you can read and understand information weather integration followed by reminders and fitness data after that.

quickly at a glance without being disrupted from current tasks . The most popular use case is a calendar integration to display meetings and appointments . Next the

FEATURES:

• Glance Clock will wake you up in the morning. And it's even a great help in the kitchen with timers.

• Never forget to take your medication or miss loved ones birthdays.

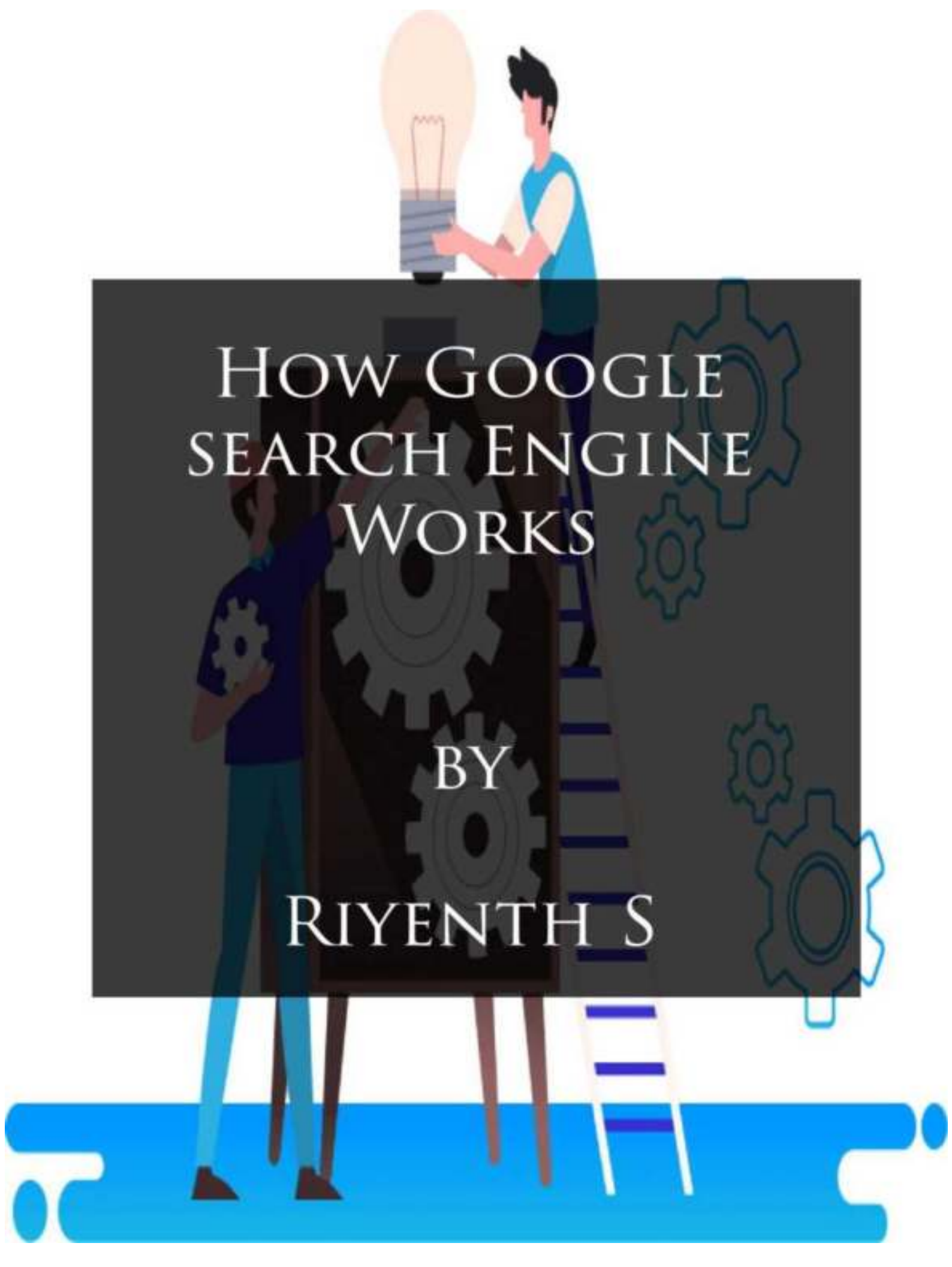
• Glance clock displays the current time & date. Choose the format you like.

• Google Calendar and Apple Calendar.

• Daily weather, including outside temperature and humidity from OpenWeather.

• Never miss another call from the people that matter to you!

Try this smart clock to make yourself smart.



How Google search Engine Works

BY

Riyenth S

Every time we search on Google search engine , there are thousands , sometimes millions , of webpages with helpful information . According to netcraft , there are about 150 ,000 ,000 active webpages in the internet. This forces us to address the question "How does Google fetch the most relevant and reliable answer to a user query?"

How Search organizes information

Before we search , web crawlers gather information from across hundreds of billions of webpages and organize it in the Search index.

The fundamentals of Search

The crawling process begins with a list of web addresses from past crawls and sitemaps provided by website owners . As these crawlers visit these websites , they use links on those sites to discover other pages . The software pays special attention to new sites , changes to existing sites and dead links . Computer programs determine which sites to crawl , how often and how many pages to fetch from each site.

Organizing information by indexing

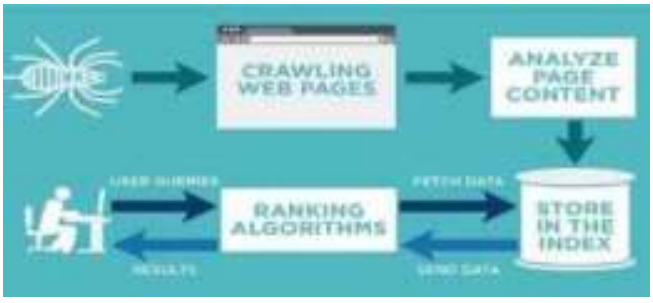
When crawlers find a webpage , their systems render the content of the page , just as a browser does. they take note of key signals — from keywords to website freshness — and they keep track of it all in the Search index.The Google Search index contains hundreds of billions of webpages and is well over 100,000,000 gigabytes in size. It's like the index in the back of a book — with an entry for every word seen on every webpage we index. When we index a webpage , they add it to the entries for all of the words it contains

How Search algorithms work?

With the amount of information available on the web , finding what the user needs would be nearly impossible without some help sorting through it. Google ranking systems are designed to do just that : sort through hundreds of billions of webpages in their Search index to find the most relevant , useful results in a fraction of a second , and present them in a way that helps you find what you're looking for.

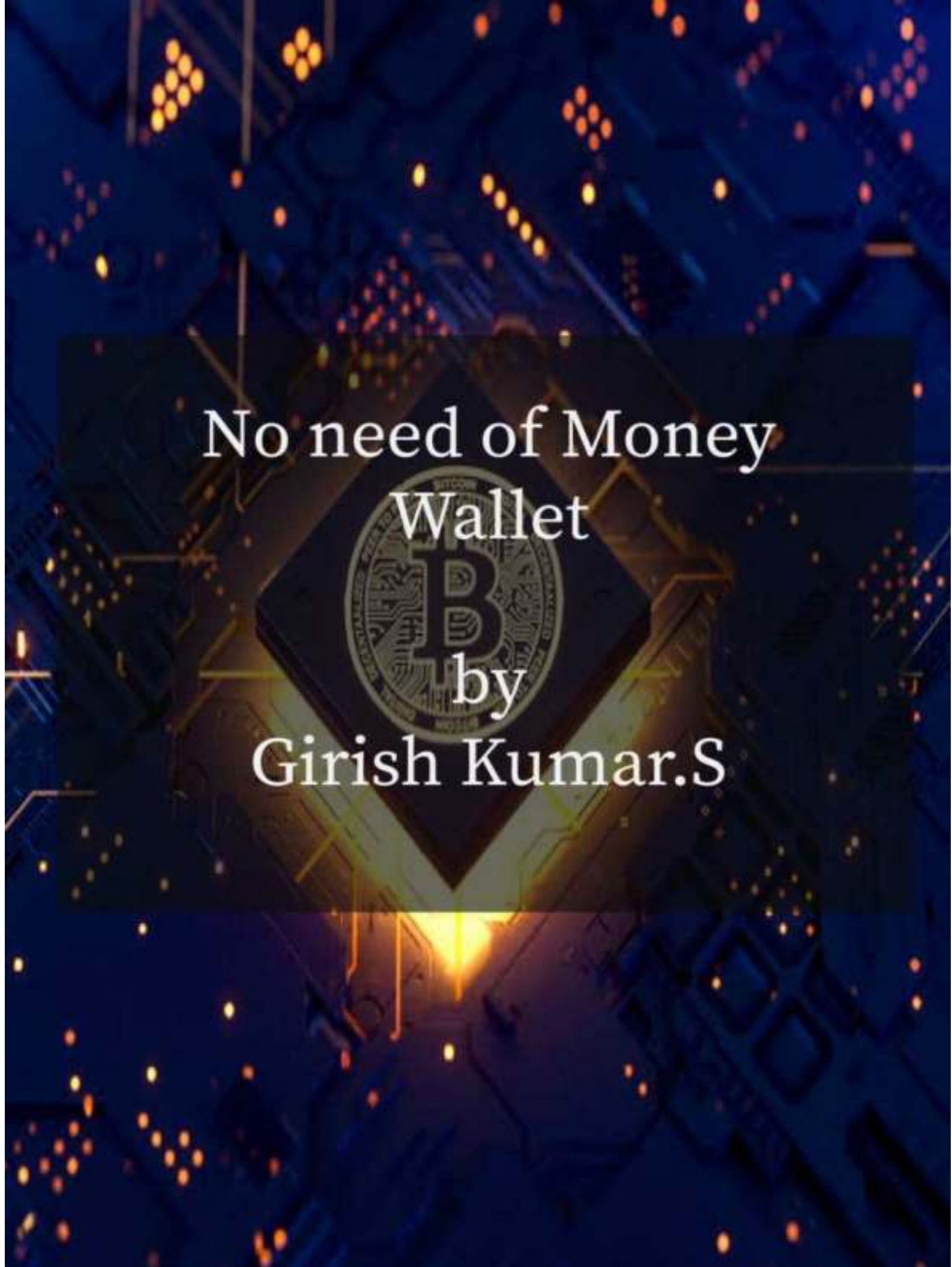
These ranking systems are made up of not one, but a whole series of algorithms . To give us the most useful information, Search algorithms look at many factors , including the words of your query , relevance and usability of pages , expertise of sources , and your location and settings. The weight applied to each factor varies depending on the nature of your query—for example , the freshness of the content plays a bigger role in answering queries about current news topics than it does about dictionary definitions.

To help ensure Search algorithms meet high standards of relevance and quality , they have a rigorous process that involves both live tests and thousands of trained external Search Quality Raters from around the world . These Quality Raters follow strict guidelines that define their goals for Search algorithms and are publicly available for anyone to see



The web is constantly evolving , with hundreds of new webpages published every second. That's reflected in the results we see in Google Search : they constantly re-crawl the web to index new content . Depending on our query , some results pages change rapidly. For example, when we are searching for the latest score of a sports game they have to perform up-to-the-second updates , while results about a historical figure may remain static for years at a time.

Today , Google handles trillions of searches each year . Every day , 15% of the queries that they process are new ones . While the main principles of crawling and indexing have remained largely the same since the start, the way in which rankings are established has changed countless times over the past few years . Google is constantly updating and improving its algorithm to deliver the best possible results to its users.


No need of Money Wallet
by
Girish Kumar.S

NO NEED OF MONEY WALLET

Cryptocurrency made the leap from being an academic concept to (virtual) reality with the creation of Bit coin in 2009 .

While Bitcoin attracted a growing following in subsequent years, it captured significant investor and media attention in April 2013 when it peaked at a record $ 266 per bitcoin after surging 10-fold in the preceding two months . Bitcoin sported a market value of over $2 billion at its peak , but a 50 % plunge shortly thereafter sparked a raging debate about the future of cryptocurrencies in general and Bitcoin in particular . So , will these alternative currencies eventually supplant conventional currencies and become as ubiquitous as dollars and euros someday ?For this,first we try to understand what's the concept behind cryptocurrency.

The concepts behind cryptocurrency transactions are:

- Blockchain technology
- Cryptography
- Bitcoin transactions

Cryptography:

Crypt -> hidden , graphy -> writing . Cryptography is the process of securing information and transactions by the use of code and various algorithms so that the information can be revealed to particular people and hidden for the others . The process of converting ordinary information into some converted text form by means of some algorithms is termed as Encryption and the reverse process in which the original information is retrieved is termed as decrypting .Mostly Asymmetric key cryptography is used in the cryptocurrency transaction.

Blockchain Technology:

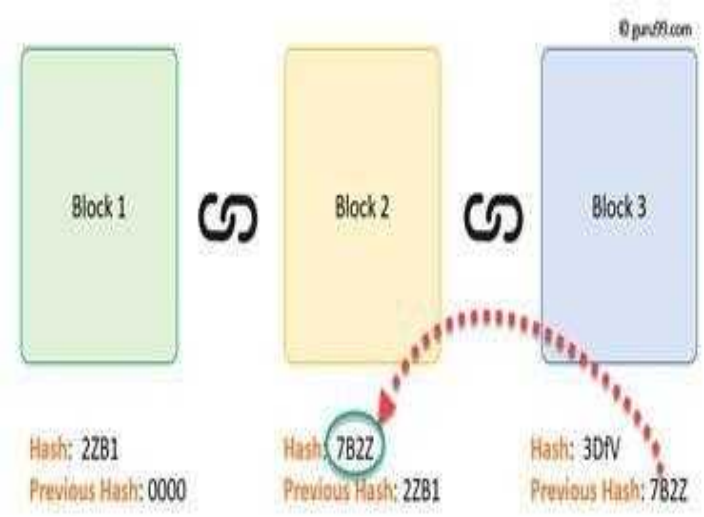
Distributed Ledger Technology .In this technology, a series of blocks containing the transaction information and timestamps of previous blocks are stored . The main advantage of blockchain is that they are decentralized.

Blockchain has three segments namely:

Blocks: They contain the data. Whenever a block is created a 32 bit number called nonceis associated with it which is used to create the hash for every block.

Miners : Miners use special software to solve algorithms for finding an accepted hash.

Nodes : Nodes can be of various electronic devices from which the blocks can be arrived and decentralization is achieved.



Bitcoin Transactions:

Cryptocurrency is an internet -based money exchange medium which uses cryptography and block chain technology for safe and secure money transaction in P2P transfer . They also have minimum processing fees.

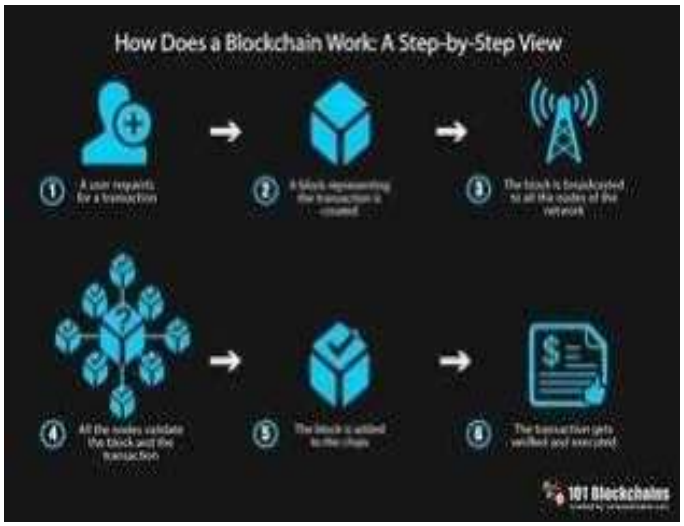
Bit coins have a special process namely PROOF OF WORK done by miners to add and verify transactions and blocks.

What leaves cryptocurrency with disadvantages:

Market Fluctuations can be a major disadvantage of cryptocurrency.

Reverse tracking is impossible as the user's details are not centralized.

Mostly all scammers , hackers gain money from victim through bitcoin transaction



Carouge-The New Metric For Text Summarisation

BY

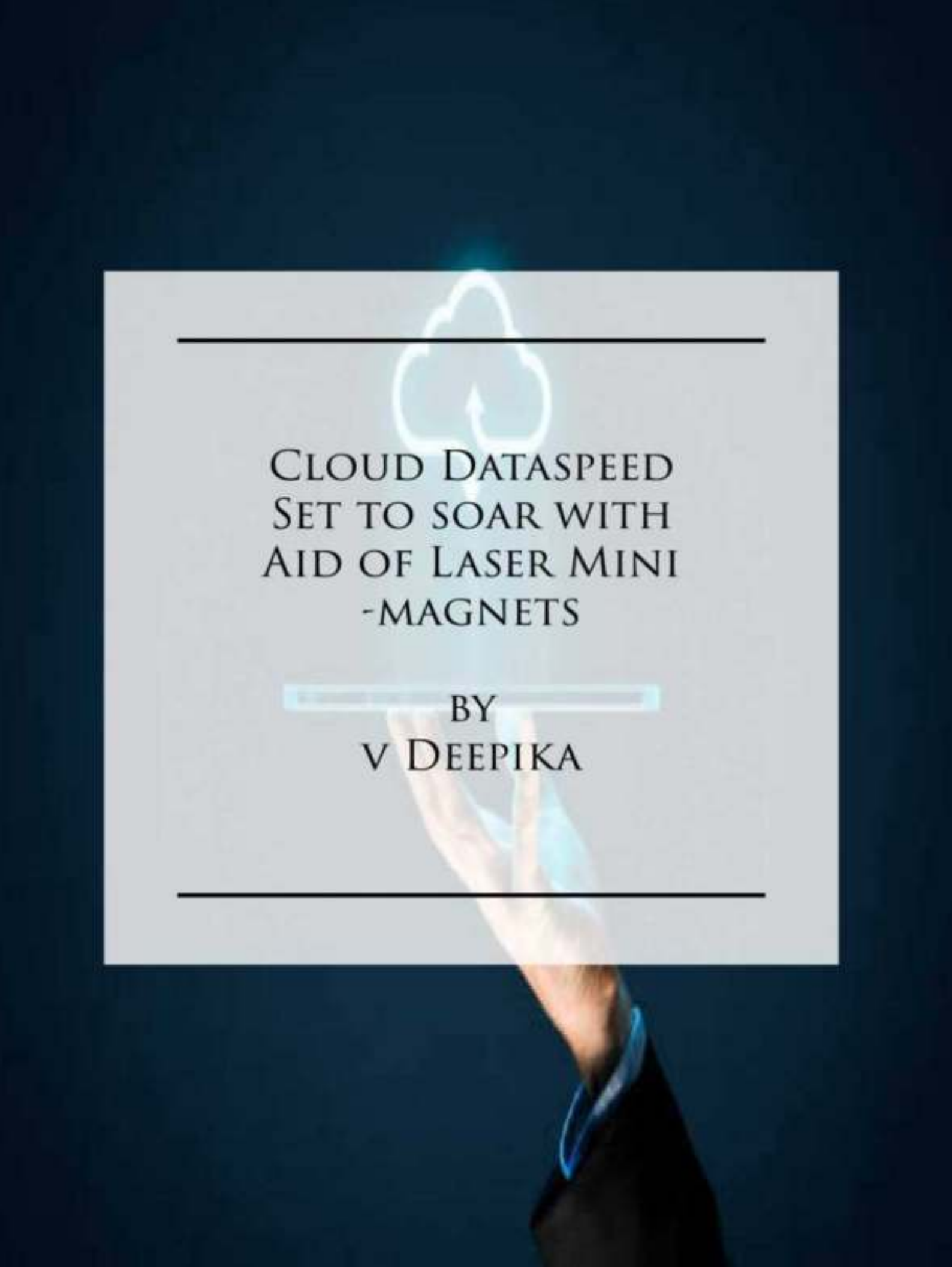
Deepika s

While doing research on the different types of scientific text summarisation and its evaluation metrics, I came across the paper entitled "Continuous Abstractive Recall-Oriented Understudy for Gisting Evaluation " authored by Nithyashree M, Dr. Sukumar T, S. Kalavathi and K. Kamal Kumar. This paper presents an overview of various text summarisation techniques , extractive and abstractive algorithms , evaluation metrics like ROUGE and CAROUGE

The paper initially discusses the three main classes of models that are used for text summarization task : statistical frequency computation models (TFIDF etc .), graph methods (TextRank , LexRank etc .) and machine learning approach

Furthermore, it highlights the working of ROUGE . The metric works by comparing an automatically produced summary or translation against a set of reference summaries . ROUGE works well for extractive text summarization . But if we need to evaluate the generated summary which contains different words from the ones that occurred in paper , the score will always be small because , even though the new words can be close to the expected ones , two summaries don't overlap in terms of word equality.

The paper in addition proposes a new metric "CAROUGE" which overcomes the disadvantages of ROUGE . CAROUGE uses word embeddings to evaluate summaries based on their semantic distance to the space of good summaries . The metric proposed is in fact a continuous version of ROUGE-N. Instead of testing the equality of n-grams in the compared summaries we use the continuous measure of semantic distance between those n-grams. For each n-gram in the generated summary we calculate the embedding -based score as its distance to the closest important n-gram in the document



Cloud Dataspeed Set to soar with Aid of Laser Mini -magnets

BY
v Deepika

Cloud data speeds set to soar with aid of laser mini-magnets

SVM

Tiny , laser -activated magnets could enable cloud computing systems to process data up to 100 times faster than current technologies.

Everywhere you turn these days "cloud" is being spoken . This ambiguous term seems to encompass almost everything about us . While "cloud " is just a metaphor of internet, cloud computing is what people are really talking about these days. It provides better data storage, data security , flexibility , increased collaboration between employees , and changes the workflow of small businesses and large enterprises to help them make better decisions while decreasing the cost.

It is clear that utilizing the cloud is a trend that continues to grow . It is very important to implement cloud in companies like Alibaba , Amazon , Google and Microsoft etc.

Cloud has become incredibly popular in recent years . The cloud offers some benefits for data management and software hosting , but only when the technology is utilized intelligently and with a clear understanding of its practical limitations . Firstly, let us get a basic idea on what cloud storage actually mean. So , what is cloud storage?

Cloud storage is a model of computer data storage in which the digital data is stored in logical pools . The physical storage spans multiple servers (sometimes in multiple locations), and the physical environment is typically owned and managed by a hosting company . These cloud storage providers are responsible for keeping the data available and accessible , in physical environment as protected . People and organizations buy or lease storage capacity from the providers to store user , organization, or application data.

Cloud storage services may be accessed through a co -located cloud computing service , a web service application programming interface (API) or by applications that utilize the API , such as cloud desktop storage , a cloud storage gateway or Web-based content management systems.

A question may araise regarding how safe the cloud is? Yes, your data is relatively safe in the cloud —likely much more than on your own hard drive . In addition , files are easy to access and maintain . However , cloud services ultimately put your data in the hands of other people . If you 're not particularly concerned about privacy , then no big whoop.

Existing hard drives store data using a magnetic field generated by passing an electric current through a wire , which generates a lot of heat. Replacing this with a laser-activated mechanism would be more energy efficient as it does not produce heat. Sounds interesting right?

Chemists have studied a new magnetic material that could boost the storage capacity and processing speed of hard drives used in cloud -based servers .This could enable people using cloud data systems to load large files in seconds instead of minutes

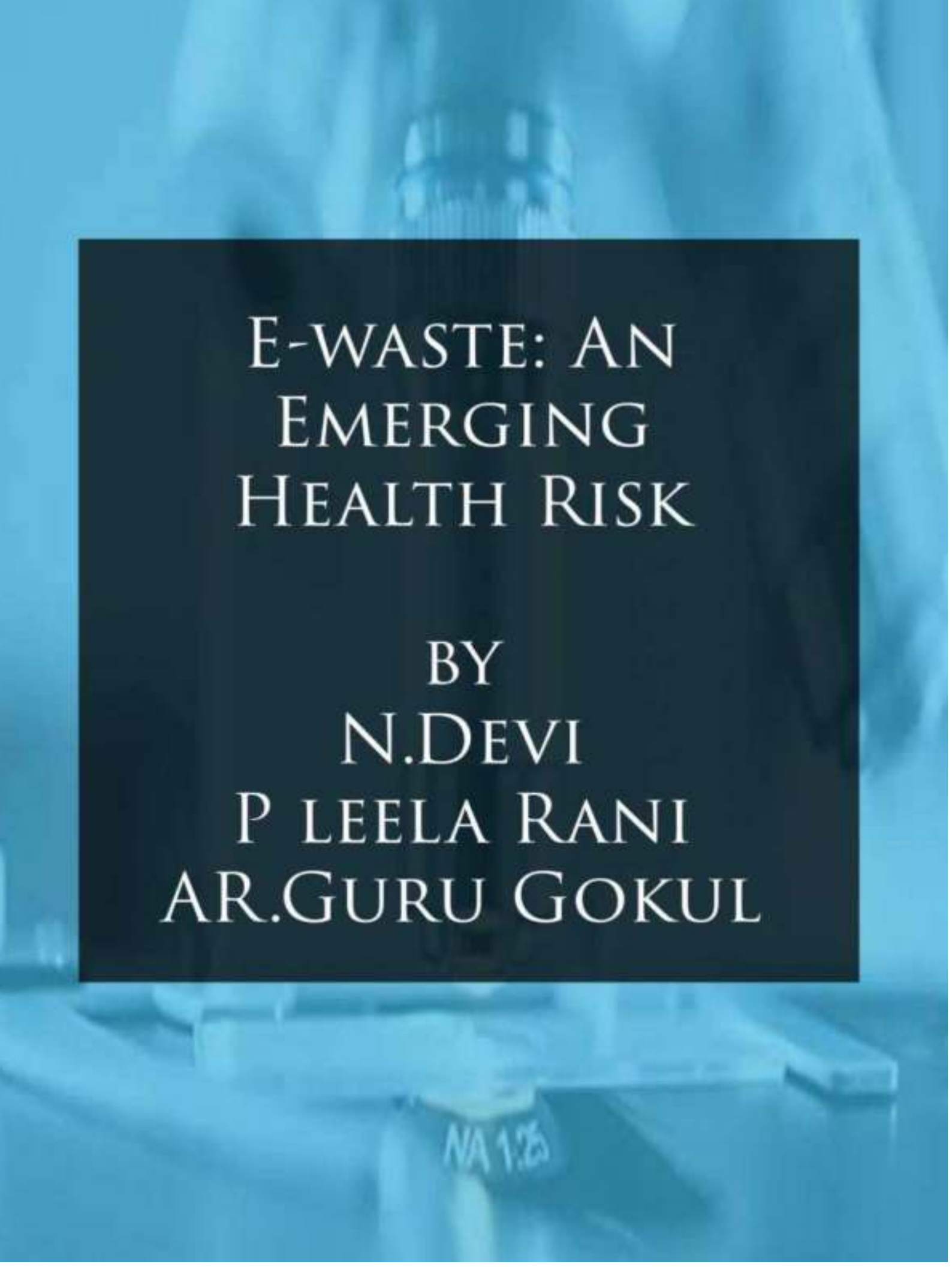
It is discovered that a chemical bond that gives the compound its magnetic properties can be controlled by shining rapid pulses from a laser on it. The compound is composed mainly of the element manganese , which is named after the Latin word magnes , which means magnet.

The findings suggest that data could be stored and accessed on the magnets using laser pulses lasting one millionth of a billionth of a second . It is estimated that this could enable hard drives fitted with the magnets to process data up to 100 times faster than current technologies.

The development could also improve the energy efficiency of cloud computing systems , which collectively emit as much carbon as the aviation industry.

The study , published in the journal Nature Chemistry , from Newcastle University was funded by the Royal Society of Edinburgh, the Carnegie Trust and the Engineering and Physical Science Research Council.

There is an ever -increasing need to develop new ways of improving data storage devices . It would increase the capacity and energy efficiency of hard drives used in cloud-based storage servers , which require tremendous amount of power to operate and to keep it cool. This work could help scientists develop the next generation of data storage devices.



E-waste: An Emerging Health Risk

BY
N.Devi
P leela Rani
AR.Guru Gokul

Approximately 40 million tons of electronic waste (e-waste) are generated by discarding electronic equipments. This creates a global waste stream that poses serious threat to human health. E-waste is considered to be as a potential hazard since these chemicals and metals used in electronic gadgets are capable of endangering lives of human beings. The e-waste recycling centres are situated in places where children tend to play and live, which aids to grave danger. E-waste exposure tends to harm human beings as they are exposed to variety of chemicals and metals from various sources via multiple ways of exposure.

"We know the toxicities and health implications of the individual components that make up e-waste, but we need to understand how these components potentially interact to affect human health," said William A. Suk , Ph .D ., Branch Chief of the NIEHS Hazardous Substances Research Branch . E-waste is recycled by developing countries and by resorting to basic techniques of acid leaching and cable burning . These techniques are employed to extract gold , silver , copper and other expensive metals . Employees of recycling centres are exposed to the metals and chemicals directly , as they disassemble the electronic equipment. These centres release poisonous gases and dioxins into the surroundings. This pollutes the nearby surroundings as well

A team of researchers from the WHO Collaborating Centre for Children 's Health and the Environment at the University of Queensland , Australia , reviewed the facts of exposure to e-waste and they also analysed the health effects in children and adults . They spotted a reasonable association between exposure of e-waste and a plethora of diseases namely, thyroid disfunction, adverse birth outcomes, behavioural changes, decreased lung function, and adverse changes at the cellular level . They concluded that exposure to e-waste indeed , had adverse side effects and they recommended for more active research regarding the side effects of e-waste exposure in pregnant women and children.

The WHO along with NIEHS and other partners , have launched a project to raise awareness about this emerging health threat , with a special focus on adverse effects on children's health.

According to Suk , researchers need to view e-waste as a community issue , since majority of e-waste recycling centres are situated in villages . It is important to inculcate proper awareness regarding the adverse effects of e-waste that may contribute more on reducing exposure in the community.

Researchers , health professionals and government should work together with these communities to inculcate awareness and reduce the incidence of diseases among the population