TECH talk

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)

Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK, Kakinada
Accredited by NAAC with "A" Grade & NBA (CSE, IT, ECE, EEE, &ME) under Tier-I

TECH - TALK

Foreword

Department of Computer Science & Engineering involves researching, designing, developing in current trends of computing systems. It gave me great satisfaction to know that department has come up with its own magazine, “Tech-Talk”. The way they presented it was unique, very creative and hope it will serve as a motivational and technological source for the students to exhibit their inherent talents and improve their skills. I would like to express my appreciation to whole team members of Tech-Talk including faculty coordinators who really made it possible.

Dr. K. Appa Rao
Principal

Dr. D. Veeraiah
Professor & Head

I Congratulate the department of CSE, LBRCE for bringing out the prestigious bi-annual magazine, Tech-Talk. I am sure that the magazine will provide a platform for students and faculty members to expand their technical knowledge and sharpen their hidden literary talent and also strengthen all round development of the students. My congratulations to the editorial board who took the responsibility for the arduous task most effectively.

TECH - TALK

DEPARTMENT VISION

"The Computer Science & Engineering aims at providing continuously stimulating educational environment to its students for attaining their professional goals and meet the global challenges."

DEPARTMENT MISSION

- *To develop a strong theoretical and practical background across the computer science discipline with an emphasis on problem solving.*
- *To inculcate professional behavior with strong ethical values, leadership qualities, innovative thinking, and analytical abilities into the student.*
- *Expose the students to cutting edge technologies which enhance their employability and knowledge.*
- *Facilitate the faculty to keep track of latest developments in their research areas and encourage the faculty to foster the healthy interaction with industry.*

About Department

The Department of Computer Science and Engineering at the LBRCE was established in 1998, offers Undergraduate Programs - B.Tech in CSE, CSE (AI&ML), and Post Graduate Program - M.Tech in CSE. The B.Tech (Computer Science and Engineering) program was started in the year 1998 with an intake of 40 students and the intake was subsequently increased to 60 students in the year 1999, 90 students in the year 2008, 120 students in the year 2009 and 180 students in the year 2019. The B.Tech (CSE (AI&ML)) program was started in the year 2021 with an intake of 60 students. The M.Tech (Computer Science and Engineering) was started in the year 2008 with an intake of 18 students and present intake is 06 students. Currently, our institue enabled high speed Internet bandwidth of 1720 (1000 + 500 + 200 + 20) Mbps.

Labs In The Department

P.C. Mahalanobis
Data Analytics Lab

F.C. Kohli
IT Workshop Lab

Arthur Samuel
Machine Learning Lab

Tim Berners - Lee
Web Engineering Lab

Ray Noorda
Networks & Systems Lab

TABLE OF CONTENTS

RESEARCH PUBLICATIONS

8 OPTIMIZED CNN-BASED BRAIN TUMOR SEGMENTATION AND CLASSIFICATION USING ARTIFICIAL BEE COLONY AND THRESHOLDING

9 A MASS CORRELATION BASED DEEP LEARNING APPROACH USING DEEP CONVOLUTIONAL NEURAL NETWORK TO CLASSIFY THE BRAIN TUMOR

10 GW- CNNDC: GRADIENT WEIGHTED CNN MODEL FOR DIAGNOSING COVID-19 USING RADIOGRAPHY X-RAY IMAGES

11 AN EFFECTIVE MACHINE LEARNING TECHNIQUES TO DETECT PARKINSON'S DISEASE

12 CROSS-LAYER OPTIMIZATION FOR WIRELESS SYSTEMS USING COMPUTER VISION METHODS

13 CONVOLUTIONAL GATED RECURRENT UNIT NETWORKS BASED REAL-TIME MONAURAL SPEECH ENHANCEMENT

14 PREDICTION OF BIOMEDICAL SIGNALS USING DEEP LEARNING TECHNIQUES

15 GENE EXPRESSION DATA CLASSIFICATION WITH ROBUST SPARSE LOGISTIC REGRESSION USING FUSED REGULARISATION

16 A REVIEW ON IOT-BASED DEFENSIVE DEVICES FOR WOMEN SECURITY

17 AN AI ENABLED IOT MODEL TO AUTOMATE SHRIMP CULTURE

Optimized CNN-based Brain Tumor Segmentation and Classification using Artificial Bee Colony and Thresholding

International Journal of Computers Communications & Control, Vol. 18 No. 1 (2023), https://doi.org/10.15837/ijccc.2023.1

One of the most important tasks used by the medical profession for disease identification and recovery preparation is automatic medical image processing. Statistical approaches are the most commonly used algorithms, and they consist several important steps.

Brain tumors are the foremost causes of death of cancerous diseases all over the world. The hippocampus is the human body's primary control structure. Since a tumor attacks the brain, it can kill the patient if it is not detected early. Among the various imaging modalities available, Magnetic Resonance Image (MRI) is a better implement for calculating area and classifying tumors based on their grade. MRI does not emit any toxic radiation. There is currently no automated method for detecting and identifying the grade of a tumor.

This study mainly focusses on classifying and segmenting brain tumors from MRI scan data. It aids physicians in the planning of future care or surgery. This procedure consists of four steps: image de-noising, tumor extraction, attribute extraction, and hybrid classification.

In the first step of image de-noising, the curvelet transformation (CT) is used. Then, in the next stage, Artificial Bee Colony (ABC) Optimization is used in conjunction with the thresholding process to remove tumors from brain MRI scans.

Author

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A mass correlation based deep learning approach using deep Convolutional neural network to classify the brain tumor

Biomedical Signal Processing and Control journal homepage:
www.sciencedirect.com/journal/measurement-sensors
Volume 81, March 2023, 104395
https://doi.org/10.1016/j.bspc.2022.104395

The 3D MRI images are mainly considered for detecting the brain tumor. The deep learning approaches are highly effective for detecting the disease in its early stage. However, the detection and classification is achieved though the highly enhanced deep learning approaches that provides various classes.

However, the considerable limitation in this field is detecting the significant features. In order to handle these issues, a highly enhanced deep learning approach is considered that is based on Convolutional Neural Network (CNN) with mass correlation analysis. Here, the input dataset is initially taken to pre-processing where Average Mass Elimination Algorithm (AMEA) is applied.

AMEA is to remove the noisy pixel form the images. The significant features are fetched using Median values of white mass. Then the extracted features are trained using the CNN model based on Mass Correlation Analysis (MCA) that helps to assign the weight measure. The obtained weight helps to improve the performance of the CNN model to fetch most effective results.

Author

Dr. Venkata Subbaiah Desanamukula
Professor

GW- CNNDC: Gradient weighted CNN model for diagnosing COVID-19 using radiography X-ray images

Measurement: Sensors
journal homepage: www.sciencedirect.com/journal/measurement-sensors
Volume 27, June 2023, 100735
https://doi.org/10.1016/j.measen.2023.100735

COVID-19 is one of the dangerous viruses that cause death if the patient doesn't identify it in the early stages. Firstly, this virus is identified in China, Wuhan city. This virus spreads very fast compared with other viruses. Many tests are there for detecting this virus, and also side effects may find while testing this disease.

Corona-virus tests are now rare; there are restricted COVID-19 testing units and they can't be made quickly enough, causing alarm. Thus, we want to depend on other determination measures. There are three distinct sorts of COVID-19 testing systems: RTPCR, CT, and CXR. There are certain limitations to RTPCR, which is the most time-consuming technique, and CT-scan results in exposure to radiation which may cause further diseases. So, to overcome these limitations, the CXR technique emits comparatively less radiation, and the patient need not be close to the medical staff.

COVID-19 detection from CXR images has been tested using a diversity of pre-trained deep-learning algorithms, with the best methods being fine-tuned to maximize detection accuracy. In this work, the model called GW-CNNDC is presented.

The Lung Radiography pictures are portioned utilizing the Enhanced CNN model, deployed with RESNET-50 Architecture with an image size of 255*255 pixels. Afterward, the Gradient Weighted model is applied, which shows the specific separation regardless of whether the individual is impacted by Covid-19 affected area. This framework can perform twofold class assignments with exactness and accuracy, precision, recall, F1-score, and Loss value, and the model turns out proficiently for huge datasets with less measure of time.

Author

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An Effective Machine Learning Techniques to Detect Parkinson's Disease

2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS)
DOI: 10.1109/ICAIS56108.2023.10073685

Parkinson's disease is one type of neurological disorders that affects the systema nervosum and causes unintended or uncontrollable movement in the body parts. More than 6 million people all over the world were affected by PD disease. It is difficult to identify the disease at its early stages. Signs of the disease may be can vary from person to person.

Symptoms usually begin with a tremor in one hand and gradually start affecting the whole body. At present, there is no clinical equipment or process to recognize this disease at the beginning stage of Parkinson's disease. Doctors usually diagnose the person by taking a previous medical history and MRI images of the person's brain and also by observing the symptoms of the person manually which takes more time and cannot detect the disease at its early stages.

This disease can be detected at early stages using a machine learning approach with high accuracy. Voice and spiral drawing dataset are collected from normal and PD-affected people and is given as input. 60% of the total dataset is used to train and build the model and the resting 40% dataset is used to test the model. By applying Linear regression and support vector machine and KNN algorithms on voice data sets, this system measures the deflections in the voice of a person. Accuracy with different algorithms is measured. Random forest and CNN algorithms are applied to the spiral data set. Random forest converts spiral drawings into pixels which are very helpful for classification. At the time of testing, the pixels of the current drawing are compared with the previously trained models to detect the disease. By combining the results of the voice dataset and spiral drawings dataset, the machine will detect the disease with high accuracy. The data of a person can be entered into the dataset to detect the disease.

Author

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Cross-Layer Optimization for Wireless Systems Using Computer Vision Methods

Hindawi Wireless Communications and Mobile Computing
Volume 2023, Article ID 5018436, 10 pages,
https://doi.org/10.1155/2023/5018436

Ad hoc network nodes are aggregate data packet from different environment; there is multiple path communication causing the sudden energy depletion in network. This type of energy loss can lead to failure of connectivity between the two intermediate nodes.

If link gets failure, then it has frequent loss of data packets. Less energy nodes do not classify data from the network structure. It reduces packet delivery ratio and increases the energy consumption. The proposed cross-layer method for data agglomeration (CLA) is designed to organize the data packet frequently among the various communication routes; the nodes in the path can able to proceed packet organization for the support of cross-layer scheme.

Magnificent path discovery algorithm is constructed to offer the better packet collection route to target node. This process uses multisource node with multiple path for packet transmission in network. It minimizes the energy consumption and increases the packet delivery ratio. The simulation parameters are delay, detection efficiency, energy consumption, network lifetime, and packet delivery ratio.

Author

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Associate Professor

Convolutional gated recurrent unit networks based real-time monaural speech enhancement

Multimedia Tools and Applications (2023)
https://link.springer.com/article/10.1007/s11042-023-15639-9

Deep-learning based speech enhancement included many applications like improving speech intelligibility and perceptual quality. There are many methods which focus on amplitude spectrum enhancement. In the existing models, computation of the complex layer is huge which leads to a very big challenge to the device. DFT data is complex valued, so computation is difficult since we need to deal with the both real and imaginary parts of the signal at the same time.

To reduce the computation, some researchers use the variants of STFT as input, such as amplitude/energy spectrum, Log-Mel spectrum, etc. They all enhance amplitude spectrum without estimating clean phase, this would limit the enhancement performance. In the proposed method DCT is used which is real-valued transformation without information lost and contains implicit phase. This avoids the problem of manually design a complex network to estimate the explicit phase and it will improve the enhancement performance. More research has done on phase spectrum estimation directly and indirectly, but it is not ideal. Recently, complex valued models are proposed like deep complex convolution recurrent network (DCCRN).

The computation of the model is very huge. So a Deep Cosine transform convolutional Gated Recurrent Unit (DCTCGRU) is proposed to reduce the complexity and improve further performance. GRU can well model the correlation between adjacent frames of noisy speech. The results from the experiment show that DCTCGRU achieves better results in terms of SNR, PESQ and STOI compared with the state-of-the-art algorithms.

Author

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Prediction of biomedical signals using deep learning techniques

Journal of Intelligent & Fuzzy Systems, vol. 44, no. 6, pp. 9769-9782, 2023
DOI: 10.3233/JIFS-230399

The electrocardiogram (ECG), electroencephalogram (EEG), and electromyogram (EMG) are all very useful diagnostic techniques. The widespread availability of mobile devices plus the declining cost of ECG, EEG, and EMG sensors provide a unique opportunity for making this kind of study widely available. The fundamental need for enhancing a country's healthcare industry is the ability to foresee the plethora of ailments with which people are now being diagnosed. It's no exaggeration to say that heart disease is one of the leading causes of mortality and disability in the world today.

Diagnosing heart disease is a difficult process that calls for much training and expertise. Electrocardiogram (ECG) signal is an electrical signal produced by the human heart and used to detect the human heartbeat. Emotions are not simple phenomena, yet they do have a major impact on the standard of living. All of these mental processes including drive, perception, cognition, creativity, focus, attention, learning, and decision making are greatly influenced by emotional states. Electroencephalogram (EEG) signals react instantly and are more responsive to changes in emotional states than peripheral neurophysiological signals.

As a result, EEG readings may disclose crucial aspects of a person's emotional states. The signals generated by electromyography (EMG) are gaining prominence in both clinical and biological settings. Differentiating between neuromuscular illnesses requires a reliable method of detection, processing, and classification of EMG data. This study investigates potential deep learning applications by constructing a framework to improve the prediction of cardiac-related diseases using electrocardiogram (ECG) data, furnishing an algorithmic model for sentiment classification utilizing EEG data, and forecasting neuromuscular disease classification utilizing EMG signals.

Author

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Gene expression data classification with robust sparse logistic regression using fused regularisation

International Journal of Ad Hoc and Ubiquitous Computing, Vol. 42, No. 4

Microarray technology has become popular and is extensively used for gene classification. It is essential to identify a proper set of gene expressions that help to classify cancer data. However, microarray data comprises large number of genes with small set of samples.

A penalized logistic regression (PLR) is good for variable selection in high dimensional microarray data. The techniques like Lasso, ridge and elastic net are suitable to reduce irrelevant features. However, they failed to produce properties like oracle property and sparsity resulted over fitting.

To retain sparsity and oracle property, the weighted L1 and L2 penalties are used in logistic regression for gene expression data. In this paper, a new fused logistic regression (FLR) has been introduced using weighted L1 and L2 penalties for better gene selection. Regression algorithms were tested over the simulated as well as the real gene data sets.

Author

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A Review on IoT-based Defensive Devices for Women Security

2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS),
DOI: 10.1109/ICACCS57279.2023.10113015

In India, the number of crimes committed against women and girls is rising quickly every day. Even in our developed environment, women are unable to live autonomously. Domestic violence, assaults, threats, and teasing of women and girls are recorded often each day. Women are worshipped as goddesses in India. Women play many roles like mother, sister, and spouse and guide men in many aspects. But they are underrated and face unexpected assaults, domestic violence, and threats from society.

One female in India is physically assaulted every 1 hour, as per the latest official data. But owing to a lack of sufficient proof, the offender escapes punishment. Such incidents are 99% unidentified, undetected, and undocumented. Surveillance cameras are somewhat helpful, but when the incident takes place in a secluded place, it is impossible to track down the suspect. One of the key causes is that school children are not taught the distinction between pleasant and unpleasant touch. Girls who are aware of the unpleasant touch but don't want to tell their parents tend to do so reluctantly or wait until after the crime has been done, which is useless.

In such circumstances, the chance of the offender being punished is relatively minimal. Many researchers have suggested, designed, and implemented Women's Safety Devices (WSD) which protect them from unexpected abuses, assaults, teasing, and threats. There are many WSDs implemented by many researchers in this modern world using the Internet of Things (IoT), Embedded Systems, and Mobile apps. In this work, we studied the existing methods related to Embedded and IOT-based WSD that worked effectively and efficiently and presented challenges that most of the researchers faced while developing WSD. We hope these challenges and research gaps may be useful for building new, efficient, flawless, and accurate WSD by the existing and young researchers who are working in the domain of WSD.

Author

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An AI enabled IoT model to automate Shrimp culture

International Conference On Advances in Signal Processing Communications and Computational Intelligence, Volume 2477, Issue 1
https://doi.org/10.1063/5.0125544

In India shrimp culture is very important agriculture allied sector, this field providing lot of employment to various people in different stages of its process starting from hatcheries to selling final shrimp to customers. Shrimp forming requires huge investments and majority of the times formers turning in losses due to various factors like virus attacks, climatic conditions, dynamic price drops etc. are major problem with various kinds of diseases attacks on shrimp.

To solve these problems traditionally formers using various kinds of antibiotics in the pond to kill viruses and making the shrimp sustain from various dynamic climatic conditions but they are failing to handle the situation properly. Apart from that excess use of chemicals may damage health of shrimp intern damage humans who are consuming it. To have good environment inside the pond PH, Salinity, Ammonia and DO need to be controlled regularly so that shrimp in the pond will grow healthy there by former can able to produce high yields.

To solve these problems, we are introducing technological solutions such as Internet of things. In this proposed chapter we are explaining how to deploy various sensors such as PH, Salinity, Ammonia and DO on Raspberry-PI with a GSM component to build wireless communication. Then corresponding properties from the water are periodically sensed and that information is sent to the former mobile number. DO (dissolved oxygen) levels are very crucial for the survival of shrimp, so to increase oxygen formers install fans inside the pond. Our model automatically turns fans on when DO levels are fallen down to certain threshold. In this system formers without visiting the pond can control it and knows about data time to time. Even former need not required visiting labs for water testing, this system will help former to maintain proper conditions inside the pond then that will help to achieve high yielding with low investment.

Author

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ARTICLES

The Internet of Things: How Connected Devices Are Changing Our Lives

The Internet of Things (IoT) has become a game-changer in today's digital era, connecting devices and enabling seamless communication and data exchange. From smart homes and cities to industries and healthcare, IoT technology is transforming the way we live and work. In this article, we explore the impact of IoT on various aspects of our lives and how it is revolutionizing our everyday experiences.

1. **Smart Homes:**

IoT is revolutionizing the concept of home automation, making our living spaces smarter and more convenient. Connected devices such as smart thermostats, lighting systems, security cameras, and voice assistants allow homeowners to control and monitor their homes remotely. IoT-enabled home appliances, like refrigerators and washing machines, can optimize energy usage and offer personalized functionalities

2. **Healthcare:**

IoT is playing a crucial role in the healthcare industry, empowering remote patient monitoring, improving diagnostics, and enhancing treatment outcomes. Connected medical devices, wearable health trackers, and sensors enable real-time health monitoring, collecting vital data and transmitting it to healthcare professionals. This technology facilitates early detection of health issues, personalized care, and improved patient-doctor communication.

3. Transportation:

IoT is transforming transportation systems, making them smarter, safer, and more efficient. Connected vehicles equipped with sensors and GPS enable real-time tracking, route optimization, and predictive maintenance. IoT technology is also being used to develop intelligent traffic management systems that can alleviate congestion and enhance road safety. Additionally, IoT-based ride-sharing and car-sharing platforms are revolutionizing the way we travel.

4. Industrial Automation:

IoT is driving the fourth industrial revolution, known as Industry 4.0, by enabling smart factories and industrial automation. Connected sensors, actuators, and machinery collect and share data, optimizing production processes, reducing downtime, and improving productivity. IoT-enabled asset management systems track inventory, streamline supply chains, and enhance logistics operations

5. Smart Cities:

IoT is transforming cities into smart, sustainable, and interconnected ecosystems. Connected sensors and devices monitor and manage various aspects of urban life, including energy consumption, waste management, traffic flow, and public safety. IoT technology enables efficient resource allocation, enhances public services, and improves the overall quality of life for citizens

Conclusion:

The Internet of Things is reshaping our world by connecting devices and enabling seamless data exchange. From smart homes to healthcare, transportation to industrial automation, and smart cities, IoT technology is revolutionizing various aspects of our lives. As IoT continues to evolve, it promises to bring unprecedented levels of convenience, efficiency, and connectivity, transforming the way we live, work, and interact with our surroundings

Ms. D. Teja Sri
20761A0511.

Safeguarding in the Cybersecurity Landscape

Introduction:

In today's interconnected world, the cybersecurity landscape has become increasingly complex and challenging. Cyber threats are constantly evolving, targeting individuals, businesses, and governments worldwide. Safeguarding our digital assets requires a proactive and multi-layered approach to ensure the confidentiality, integrity, and availability of our sensitive information. In this article, we delve into the key components of safeguarding in the cybersecurity landscape and explore strategies to protect our digital assets.

Risk Assessment and Management:

Effective safeguarding begins with a thorough understanding of potential risks and vulnerabilities. Conducting a comprehensive risk assessment helps identify critical assets, assess potential threats, and evaluate the impact of cybersecurity incidents. By prioritizing risks and implementing appropriate controls, organizations can proactively manage and mitigate potential vulnerabilities.

Robust Security Policies and Procedures:

Establishing and implementing robust security policies and procedures is crucial in safeguarding digital assets. These policies should cover areas such as password management, access controls, data encryption, and incident response protocols. Regularly reviewing and updating security policies ensures alignment with evolving cyber threats and industry best practices.

Secure Network Infrastructure:

A secure network infrastructure is the backbone of a robust cybersecurity posture. Implementing firewalls, intrusion detection and prevention systems, and secure Wi-Fi protocols helps protect against unauthorized access and network-based attacks. Regular monitoring and auditing of network traffic can identify anomalous behavior and potential security breaches.

Employee Awareness and Training:

Human error remains one of the biggest cybersecurity risks. Educating employees about cybersecurity best practices, such as recognizing phishing emails, avoiding suspicious links, and practicing good password hygiene, is crucial. Regular training sessions and awareness campaigns promote a cybersecurity-conscious culture within organizations and empower employees to become the first line of defense against cyber threats.

Data Protection and Encryption:

Data is a valuable asset that requires strong protection. Implementing robust data encryption techniques, both at rest and in transit, helps safeguard sensitive information from unauthorized access. Regularly backing up data and storing backups in secure locations adds an extra layer of protection against ransomware attacks and data loss incidents.

Incident Response and Recovery:

Despite robust preventive measures, security incidents can still occur. Having a well- defined incident response plan in place allows organizations to respond swiftly and effectively when a breach or cyber-attack occurs. This plan should include procedures for containment, analysis, mitigation, and recovery, as well as the involvement of relevant stakeholders and communication protocols to minimize the impact of an incident.

Ms. Kondreddy Krishnaveni
20761A0528

A Tricky Path to Quantum-Safe Encryption

Quantum computers, once seen as a remote theoretical possibility, are now widely expected to work within five to 30 years. By exploiting the probabilistic rules of quantum physics, the devices could decrypt most of the world's "secure" data, from NSA secrets to bank records to email passwords. Aware of this looming threat, cryptographers have been racing to develop "quantum-resistant" schemes efficient enough for widespread use.

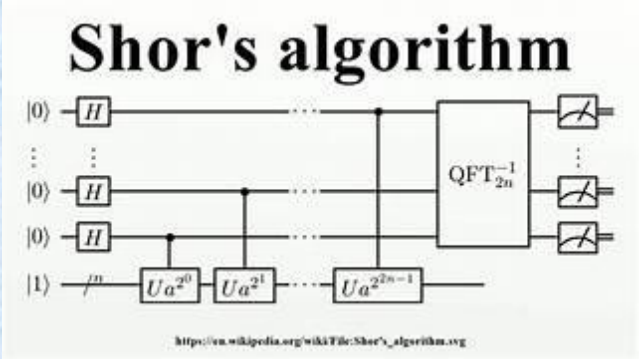
The most promising schemes are believed to be those based on the mathematics of lattices — multidimensional, repeating grids of points. These schemes depend on how hard it is to find information that is hidden in a lattice with hundreds of spatial dimensions, unless you know the secret route.

But last October, cryptographers at the Government Communications Headquarters (GCHQ), Britain's electronic surveillance agency, posted an enigmatic paper online that called into question the security of some of the most efficient lattice-based schemes.

Building on the GCHQ claims, two teams of cryptanalysts have spent the past year determining which lattice-based schemes can be broken by quantum computers, and which are safe — for now.

"This is the modern incarnation of the classic cat-and-mouse game between the cryptographer and cryptanalyst," said Ronald Cramer of the National Research Institute for Mathematics and Computer Science (CWI) and Leiden University in the Netherlands. When cryptanalysts are quiet, cryptographers loosen the security foundations of the schemes to make them more efficient, he said. "But at some point

a red line might be crossed. That's what happened here." Now, the cryptanalysts are speaking up. Assumptions about which math problems are hard for computers to solve shattered in 1994, when an AT&T researcher named Peter Shor revealed the theoretical decrypting power of future quantum computers.



In an ordinary computer, information is stored in units called bits that can exist in either of two states, designated 0 or 1. The computer's computational capacity is proportional to the number of bits. In quantum computers, however, the information-storing units, called qubits, can exist in both the 0 and 1 states simultaneously. (Qubits might take the form of subatomic particles spinning both clockwise and counterclockwise at the same time, for example.) Because a system of many qubits can exist in all possible combinations of all their possible individual states, the computational capacity of a quantum computer would increase exponentially with the number of qubits

With the superior computational capabilities of quantum computers revealed by Shor's algorithm, researchers worldwide have been racing to build them ever since. In parallel, cryptographers have raced to come up with new schemes that quantum computers can't crack. "We didn't know where to look for a long time," said Chris Peikert, a cryptographer at the Georgia Institute of Technology in Atlanta. "But lattices seem to be a very good foundation."

Mr. Are Santhosh

20761A0504.

The Robot Rat Race: How Technology is Changing Jobs, and What That Means For Society

It's not an easy life. Truckers work long hours, and often spend days or weeks at a time on the road away from their families. Obesity and other health problems, like diabetes, are rife. Still, trucking is a good way for someone in America without a college degree to earn a decent wage. So what happens in another few years when driverless trucks start to take the place of human drivers at the wheel?

How Will Automation Change Our Future?

We're used to thinking about robots on the assembly line. Carmakers have been using them to replace human labor for more than 60 years. But the robot revolution is spreading. Millions of US truckers aren't the only people whose jobs are in the crosshairs.

There's a decent chance that salad you're eating contains lettuce picked in California using a machine that can harvest twice as many plants using half the labor of traditional methods. That child's toy you just ordered online will be shipped from a warehouse where robots and human beings work together with ruthless efficiency. The self-checkout kiosks that have become ubiquitous in grocery stores aren't robots, exactly. But they automate a task that store workers used to perform. Next time you go to the doctor; your tests could be reviewed by a computer. Legal problems? The paralegal at the law offices you consult might not be a human being any more.

The industrial revolution in the 18th and 19th centuries led to the widespread replacement of human (and animal) labor with machines. But it didn't lead to mass-unemployment. It created new jobs for people to do. Farm hands who were put out of work by machines migrated to cities and worked in factories.

Some experts fear the next wave technological disruption will be different. Over the next decade or so, rapid advances in computing power and artificial intelligence will dramatically expand the number and types of tasks that machines can do better than human workers. As computers get better at skills that require problems solving and intuition, robots won't just replace human muscle – they'll replace human brainpower. Think: computers that analyze CAT scans better than human doctors; virtual accountants that can do your taxes in a fraction of the time – and at a fraction of the cost – of a human CPA; kiosks at retail shops that will do everything from taking your measurements, to sewing your garments, to remotely sensing what's in your shopping cart to ring you up at checkout.

These technologies are just over the horizon. But they've already prompted a wave of speculation about future of work. One influential study from Oxford University estimated that a AI-driven automation could destroy nearly half of all US jobs over the next couple of decades. Another widely cited study suggested the figure could be closer to 14 percent of jobs in advanced economies. Other experts insist that far more jobs will be created by automation than destroyed.

The fact is that no one really knows. What is certain is that the rat race will never be the same. Even if automation creates more jobs than it destroys, they won't be the same jobs, and not all workers will successfully make the transition to new types of work.

Mr. Karna Bhargava

21761A4228.

Neural Networks Need Data to Learn. Even If It's Fake.

At first, the engineers behind Navlab tried to control the vehicle with a navigation algorithm, but like many previous researchers they found it difficult to account for the huge range of driving conditions with a single set of instructions. So they tried again, this time using an approach to artificial intelligence called machine learning: The van would teach itself how to drive.

A graduate student named Dean Pomerleau constructed an artificial neural network, made from small logic-processing units meant to work like brain cells, and set out to train it with photographs of roads under different conditions. But taking enough photographs to cover the huge range of potential driving situations was too difficult for the small team, so Pomerleau generated 1,200 synthetic road images on a computer and used those to train the system. The self-taught machine drove as well as anything else the researchers came up with.

Navlab didn't directly lead to any major breakthroughs in autonomous driving, but the project did show the power of synthetic data to train AI systems. As machine learning leapt forward in subsequent decades, it developed an insatiable appetite for training data. But data is hard to get: It can be expensive, private or in short supply. As a result, researchers are increasingly turning to synthetic data to supplement or even replace natural data for training neural networks.

"Machine learning has long been struggling with the data problem," said Sergey Nikolenko, the head of AI at Synthesis AI, a company that generates synthetic data to help customers make better AI models. "Synthetic data is one of the most promising ways to solve that problem." Fortunately, as machine learning has grown more sophisticated, so have the tools for generating useful synthetic data.

One area where synthetic data is proving useful is in addressing concerns about facial recognition. Many facial recognition systems are trained with huge libraries of images of real faces, which raises issues about the privacy of the people in the images. Bias is also a problem, since various populations are over- and underrepresented in those libraries. Researchers at Microsoft's Mixed Reality & AI Lab have tackled these concerns, releasing a collection of 100,000 synthetic faces for training AI systems. These faces are generated from a set of 500 people who gave permission for their faces to be scanned.

Microsoft's system takes elements of faces from the initial set to make new and unique combinations, then adds visual flair with details like makeup and hair. The researchers say their data set spans a wide range of ethnicities, ages and styles. "There's always a long tail of human diversity. We think and hope we're capturing a lot of it," said Tadas Baltrušaitis, a Microsoft researcher working on the project.

Another advantage of the synthetic faces is that the computer can label every part of every face, which helps the neural net learn faster. Real photos must instead be labeled by hand, which takes much longer and is never as consistent or accurate.

The results aren't photorealistic — the faces look a little like characters from a Pixar movie — but Microsoft has used them to train face recognition networks whose accuracy approaches that of networks trained on millions of real faces.

Ms. CH Joshna

21761A0521.

Secret Messages Can Hide in AI-Generated Media

It also brought attention to steganography, a way of disguising a secret message within another message. The New York spies hid their secrets in plain sight, encoding communications within the pixels of seemingly innocuous images posted on publicly available websites. To read them, the recipient had to download an image, translate it into the 1s and 0s of binary code, and know which altered digits, taken in sequence, would spell out the secret.

Steganography, which is both an art and a science, differs from the better-known method of secret communication known as cryptography. Where cryptography intentionally conceals the content of a message, transforming it into a tangle of text or numbers, steganography conceals the fact that a secret exists at all. “Steganography hides the presence of the message,” said Christian Cachin, a computer scientist and cryptographer at the University of Bern. “If an adversary can detect a hidden message, then the sender has lost the game.”

As with any method of covert communication, the challenge is how to make it perfectly secure, meaning neither a human nor a machine detector would suspect a message of hiding a secret. For steganography, this has long been a theoretical possibility, but it was deemed impossible to achieve with actual human communications.

The advent of large language models such as ChatGPT suggests a different way forward. While it might be impossible to guarantee security for text created by humans, a new proof lays out for the first time how to achieve perfect security for steganography in machine-generated messages — whether they’re text, images, video or any other media. The authors also

include a set of algorithms to produce secure messages, and they are working on ways to combine them with popular apps.

"As we increasingly become a society where it's very common to interface with AI models, there are increasingly many opportunities to encode secret information in media that people use all the time," said Samuel Sokota, a computer scientist at Carnegie Mellon University who helped develop the new algorithms.

The result comes from the world of information theory, which provides a mathematical framework for understanding communication of all sorts. It's an abstract and tidy field, in contrast to the complicated messiness of practical steganography. The worlds don't often overlap, said Jessica Fridrich, a researcher at Binghamton University who studies ways to hide (and detect) data in digital media. But the new algorithms bring them together by satisfying long-standing theoretical criteria for security and suggesting practical applications for hiding messages in machine-generated content.

Ms. B Himani

20761A0580.

ACTIVITIES

A Two Days Workshop on Cyber security Ethical hacking

Resource Person: Mr. D.Sai satish

Name of Organization: CEO of Indian servers.

About the Event

This Program is designed to mainly Train and Develop III Year Students of CSE, IT and AI&DS to provide the basic concepts of Cyber Security and Ethical Hacking like Malware Analysis Tools, OWASP top 10, Pen testing Tools.

The Students are exposed to latest Cyber-attacks, like OTP bypassing, TOP 10 OWASP, Windows 11 OS password cracking. They will learn how to detect and defend from Cyber-attacks, they will have hands on experience on various attacking tools for DOS, Brute Force attacks, Data tampering etc.

A Two Days Workshop on Red Hat Linux Administration

Resource Person: Mr. J Praveen, Technical Consultant

Name of Organization: Prodevans Technologies Pvt.Ltd.

About the Event

This Program is designed to mainly I Year Students of CSE, CSE (AI&ML) to provide the basic concepts of Linux and enhance their skills in Linux Environment, Network Administration and Applications.

Resource person J Praveen covered Red Hat Linux versions, installation and all commands and motivated the student's importance of red hat Linux course and certifications.

PLACEMENTS AND ACHIEVEMENTS

PLACEMENTS

Jan – June 2023

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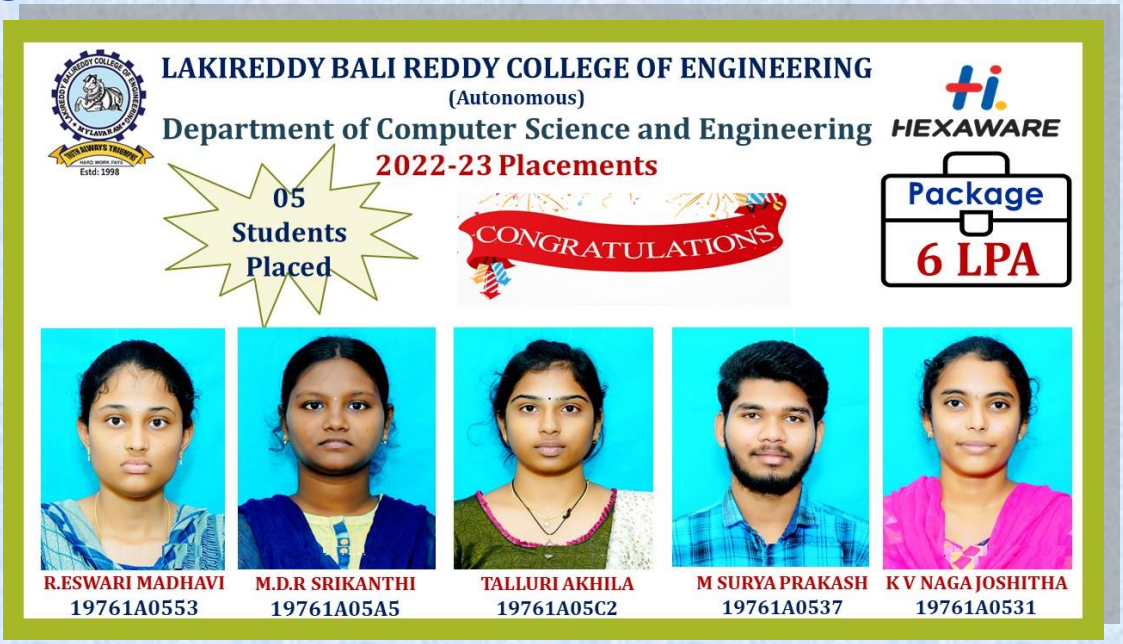

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CODING PUZZLES

- CAN YOU CRACK IT !!!

Coding Puzzle - I

Even OR Odd Digits' Sum

Puzzle Description:

In Mathematics, the "digit sum" of a given integer is the sum of all its digits, e.g., the digit sum of 84001 is calculated as 8+4+0+0+1 = 13,

The digit sum of 158 is 1+5+8 = 14.

Rohan's teacher has asked him to write a function (method) that takes as input a positive number and performs digitSum of either only the even digits or only the odd digits in the given number, based on the option "even" or "odd".

The function will takes two input parameters –

- The first parameter will be an integer number representing the number whose digitSum needs to be found.
- The second parameter will be a string representing the option, which will be either "even" or "odd"

Example 1: If the given number is 9625, and the option is "odd", we must add only the odd digits, i.e., 9+5 = 14

Example 2: If the given number is 2134, and the option is "even", we must add only the even digits, i.e., 2+4 = 6

Assumptions:

- The input number (input1) will be a positive integer number >= 1 and <= 25000.
- The input string (input2) will always be either "even" or "odd".

Coding Puzzle - II

Boy or Girl

Puzzle Description:

Those days, many boys use beautiful girls' photos as avatars in forums. So it is pretty hard to tell the gender of a user at the first glance. Last year, our hero went to a forum and had a nice chat with a beauty (he thought so). After that they talked very often and eventually they became a couple in the network.

But yesterday, he came to see "her" in the real world and found out "she" is actually a very strong man! Our hero is very sad. So he came up with a way to recognize users' genders by their user names.

This is his method: if the number of distinct characters in one's user name is odd, then he is a male, otherwise she is a female. You are given the string that denotes the user name, please help our hero to determine the gender of this user by his method.

Input: The first line contains a non-empty string, that contains only lowercase English letters – the user name. This string contains at most 100 letters.

Output: If it is a female by our hero's method, print "CHAT WITH HER!" (without the quotes), otherwise, print "IGNORE HIM!" (without the quotes).

Examples:

Input: wjmzbmr	**Output:** CHAT WITH HER!
Input: xiaodao	**Output:** IGNORE HIM!

Note: For the first example. There are 6 distinct characters in "wjmzbmr". These characters are: "w", "j", "m", "z", "b", "r". So wjmzbmr is a female and you should print "CHAT WITH HER!".

Coding Puzzle - III

Upgrade to UpperCase

Puzzle Description:

Read Second Word and Chane to Uppercase:

Write a function (method) that takes as input a string (sentence), and returns its second word in uppercase.

For Example:-

If **input1** is “Wipro Technologies Banglore”,

The function should return “TECHNOLOGIES”

If **input1** is “Hello World”,

The function should return “WORLD”

If **input1** is “Hello”,

The function should return “LESS”

NOTE 1: if **Input 1** is a sentence with less than 2 words, the function should return the word “LESS”

NOTE 2: The result should have no leading or trailing spaces.

Coding Puzzle - IV

Nearly Lucky Number

Puzzle Description:

Petya loves lucky numbers. We all know that lucky numbers are the positive integers whose decimal representations contain only the lucky digits 4 and 7. For example, numbers 47, 744, 4 are lucky and 5, 17, 467 are not.

Unfortunately, not all numbers are lucky. Petya calls a number nearly lucky if the number of lucky digits in it is a lucky number. He wonders whether number n is a nearly lucky number.

Input:

The only line contains an integer n ($1 \le n \le 1018$).

Please do not use the %lld specificator to read or write 64-bit numbers in C++. It is preferred to use the cin, cout streams or the %I64d specificator.

Output:

Print on the single line "YES" if n is a nearly lucky number. Otherwise, print "NO" (without the quotes).

Examples:

Input: 40047	Ouput: NO
Input: 7747774	Ouput: YES

Note

In the first sample there are 3 lucky digits (first one and last two), so the answer is "NO".

In the second sample there are 7 lucky digits, 7 is lucky number, so the answer is "YES".

In the third sample there are no lucky digits, so the answer is "NO".

Coding Puzzle - V

Is Palindrome Possible?

Puzzle Description:

Write a function to find whether it is possible to get a palindrome number from a given number by re-arranging the positions of the digits. If yes, the function should return 2, else it must return 1.

Example1:

If the given number is 21251, it is possible to form a palindrome by re-arranging the digits, as 21512 or 12521. So the function must return 2.

Example 2:

If the given number is 2125, it is not possible to form a palindrome by re-arranging the digits. So the function must return 1.

Note

All the digits of the given number should be retained while deciding whether they can together form a palindrome.

Assumption:

The input number will be a positive number > = 1 and < = 25000.

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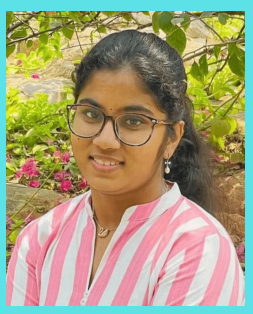

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2022-23 ISSUE-2

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