TECHTALKS

DEPARTMENT OF INFORMATION TECHNOLOGY

VOLUME 3, ISSUE 01

DEPARTMENT OF INFORMATION TECHNOLOGY

COLLEGE VISION & MISSION STATEMENT

VISION

"To become an Internationally Renowned Institution in Technical Education, Research and Development by Transforming the Students into Competent Professionals with Leadership Skills and Ethical Values."

MISSION

- Providing the Best Resources and Infrastructure.
- Creating Learner-Centric Environment and Continuous Learning.
- Promoting Effective Links with Intellectuals and Industries.
- Enriching Employability and Entrepreneurial Skills.
- Adapting to Changes for Sustainable Development.

DEPARTMENT VISION & MISSION STATEMENT

VISION

- To produce competent IT professionals, researchers and entrepreneurs with moral values in the field of Information Technology.

MISSION

- Enrich the students' programming and computing skills through best teaching learning processes, laboratory practices and through project based learning.
- Inculcate real world challenges, emerging technologies and endeavour the students to become entrepreneurs or make them employable.
- Inculcating moral and ethical values to serve the society and focus on students' overall development.

CONTENTS

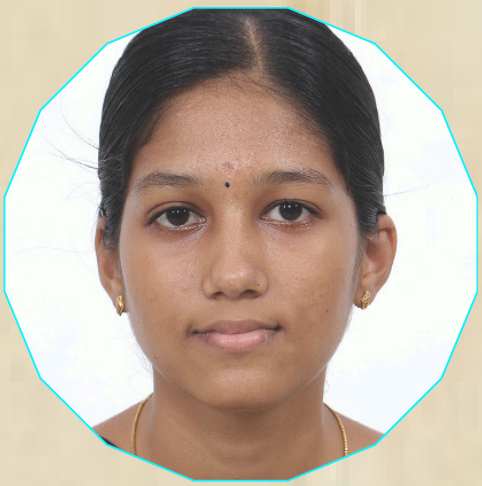
TECHNICAL ARTICLES

ADVANCES IN NATURAL LANGUAGE PROCESSING (NLP) WITH MODELS LIKE GPT-3.

The paper "Language Models are Few-Shot Learners" by Tom Brown et al. introduced GPT-3, a groundbreaking language model that utilizes a transformer architecture with 175 billion parameters, significantly larger than its predecessor, GPT-2. This model showcased the ability to perform a variety of language tasks with minimal examples, demonstrating few-shot, one-shot, and even zero-shot learning capabilities. The authors presented evaluations across diverse benchmarks, highlighting GPT-3's impressive performance in tasks like translation, question answering, and summarization. Trained on a vast dataset from the internet, GPT-3 can adapt to different tasks based on prompts, making it highly versatile. However, the paper also addressed ethical considerations, including the potential for biased or inappropriate outputs stemming from its training data. Overall, this work has had a profound impact on natural language processing, opening up new applications and discussions around the ethical deployment of advanced AI technologies.GPT-3 is based on the transformer architecture, which enables it to process and generate text more effectively than previous models with 175 billion parameters, GPT-3 demonstrated that larger models could lead to better performance on various NLP tasks.

MUHILAN M S
IV-IT

CYBERSECURITY CHALLENGES WITH INCREASED REMOTE ACCESS.

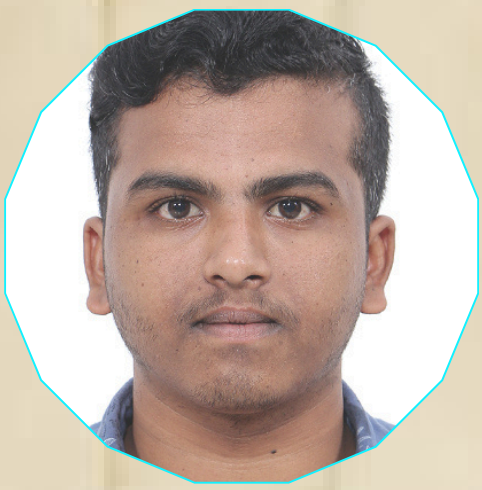


SWATHIHASREE M
IV-IT

The shift to remote work in 2021 significantly heightened cybersecurity challenges, primarily due to the increased reliance on digital tools and remote access. Employees often accessed company resources through less secure home networks and personal devices, expanding the attack surface and making them vulnerable to threats. Phishing and social engineering attacks surged, as cybercriminals exploited uncertainties in remote environments, often targeting individuals with tailored approaches. The rapid adoption of collaboration tools like Zoom raised concerns about security vulnerabilities, leading to potential data leakage. Many organizations struggled to provide adequate cybersecurity training, leaving remote workers unaware of best practices, which heightened the risk of human error. Endpoint security became a critical issue, as managing and monitoring devices accessing corporate networks proved complex.Navigating compliance with data protection laws further complicated the security landscape, prompting organizations to reevaluate their strategies and implement more robust measures to safeguard against evolving threats.

AI APPLICATIONS IN HEALTHCARE, FINANCE, AND AUTONOMOUS SYSTEMS.

In 2021, advancements in artificial intelligence (AI) led to significant applications across healthcare, finance, and autonomous systems. In healthcare, AI improved diagnostics and personalized medicine by analyzing vast datasets, enabling early detection of diseases and tailored treatment plans. Tools like predictive analytics were used to enhance patient care and optimize hospital operations. In finance, AI transformed risk assessment, fraud detection, and algorithmic trading, allowing institutions to analyze transactions in real-time and make data-driven decisions, thus increasing efficiency and security. Meanwhile, in the realm of autonomous systems, AI powered self-driving vehicles and drones, enhancing navigation and decision-making capabilities through real-time data processing and machine learning.These applications not only streamlined operations but also raised ethical considerations regarding data privacy and job displacement, prompting discussions about the responsible deployment of AI technologies. Overall, 2021 marked a pivotal year for AI, showcasing its transformative potential across diverse sectors. These platforms provided new ways to work and share data, enhancing productivity and efficiency for employees and teams.



YUVARAJ K
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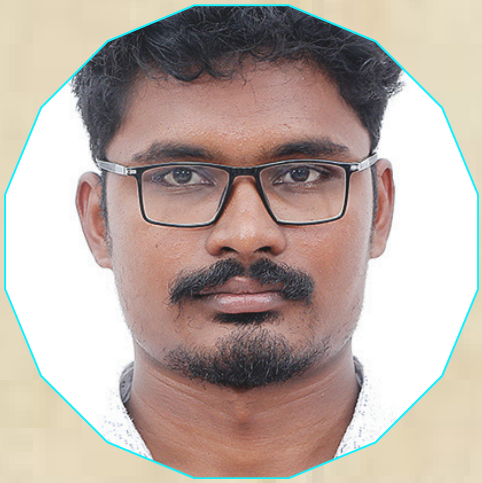
RISE OF COLLABORATION TOOLS LIKE ZOOM, SLACK, AND MICROSOFT TEAMS.



GOKUL E
II-IT

In 2021, collaboration tools like Zoom, Slack, and Microsoft Teams saw a significant rise in usage. The COVID-19 pandemic forced many to work from home, leading to an increased reliance on these platforms. Zoom became a popular choice for video meetings and online classes, allowing people to connect globally. Tools like Slack and Microsoft Teams facilitated communication and collaboration within teams, making it easier for groups to share information and coordinate tasks in real time. These platforms provided new ways to work and share data, enhancing productivity and efficiency for employees and teams. However, they also introduced challenges related to security and privacy, prompting organizations and users to focus more on how to use these tools responsibly. Overall, 2021 marked a transformative year for collaboration tools, emphasizing their critical role in the future of work and technology.Many collaboration platforms began integrating with other software (like project management tools and document sharing apps), creating seamless workflows and improving overall efficiency.Additionally, many collaboration platforms began integrating with other software, such as project management tools and document-sharing apps, creating seamless workflows and improving overall efficiency.

INNOVATIONS IN VIRTUAL REALITY (VR) FOR REMOTE TEAM ENGAGEMENT.

PREMKUMAR S
II-IT

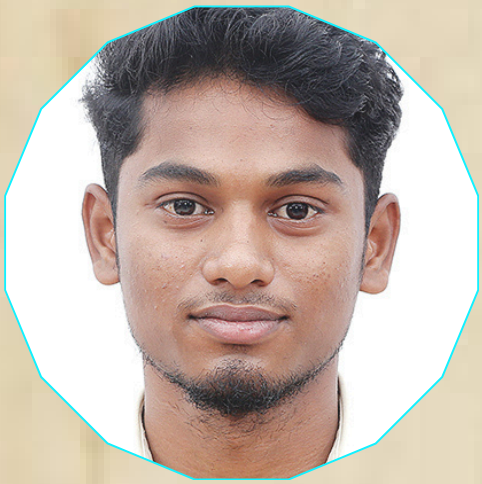
In 2021, innovations in virtual reality (VR) emerged as powerful tools for enhancing remote team engagement. With the rise of remote work, organizations sought new ways to foster collaboration and connectivity among dispersed teams. VR platforms enabled immersive experiences that simulated physical presence, allowing team members to interact in shared virtual spaces. Features like virtual meeting rooms and collaborative environments facilitated brainstorming sessions, training, and social gatherings, bridging the gap created by geographical distances. Companies began adopting VR for team-building activities, making interactions more engaging and memorable compared to traditional video calls. This technology not only improved communication but also addressed feelings of isolation, promoting a sense of belonging among remote employees. As organizations explored the potential of VR, they recognized its ability to transform remote work dynamics and create more cohesive teams, signaling a significant shift in how teams can collaborate in the digital age.In 2021, innovations in virtual reality (VR) emerged as powerful tools for enhancing remote team engagement. With the rise of remote work, organizations sought new ways to foster collaboration and connectivity among dispersed teams.

CYBERSECURITY CHALLENGES WITH INCREASED REMOTE ACCESS.

In 2021, the shift to remote work significantly amplified cybersecurity challenges as organizations increasingly relied on digital infrastructure. With employees accessing corporate networks from home, the attack surface expanded, exposing companies to greater risks from unsecured home networks and personal devices. Phishing and social engineering attacks surged, as cybercriminals targeted remote workers who were often less vigilant and trained. Collaboration tools, essential for communication, also presented vulnerabilities that could lead to data breaches. The lack of comprehensive security training for employees further compounded these issues, leaving them susceptible to human error. Additionally, managing and securing endpoints became more complex as organizations struggled to implement effective monitoring and control measures. As ransomware attacks rose, particularly targeting remote access points, companies faced urgent pressures to bolster their security frameworks. Overall, the increased reliance on remote access highlighted the need for robust cybersecurity strategies to protect sensitive information and maintain organizational integrity in a rapidly evolving threat landscape.

VISHALINI V
IV-IT

INCREASE IN RANSOMWARE ATTACKS AND STRATEGIES FOR PREVENTION



RAJ KUMAR M

II-IT

In 2021, there was a notable increase in ransomware attacks, targeting organizations across various sectors and causing significant disruptions. Cybercriminals employed sophisticated tactics to infiltrate networks, often exploiting vulnerabilities in remote access tools as more employees worked from home. These attacks not only led to financial losses but also jeopardized sensitive data and organizational reputation. In response, organizations began implementing robust prevention strategies, including regular software updates, employee training on phishing awareness, and the adoption of multi-factor authentication. Additionally, companies focused on developing incident response plans to minimize the impact of potential breaches and invested in advanced threat detection systems to identify and neutralize attacks before they could escalate. The emphasis on a proactive cybersecurity posture, coupled with a zero-trust approach, became essential in mitigating the risks associated with ransomware. Overall, the surge in ransomware incidents underscored the importance of comprehensive cybersecurity measures and highlighted the ongoing battle against increasingly sophisticated cyber threats.

APPLICATIONS IN IOT, SMART CITIES, AND ENHANCED STREAMING SERVICES.

In 2021, the applications of the Internet of Things (IoT), smart cities, and enhanced streaming services witnessed significant advancements, reshaping various aspects of daily life and urban management. IoT technology enabled the interconnection of devices, allowing for real-time data collection and analysis, which proved invaluable in sectors like healthcare, agriculture, and manufacturing. Smart cities began leveraging IoT solutions to optimize traffic management, reduce energy consumption, and enhance public safety, resulting in more efficient urban environments and improved quality of life for residents. Enhanced streaming services also emerged, driven by demand for high-quality content and seamless user experiences. Innovations such as adaptive bitrate streaming and AI-driven content recommendations transformed how users consume media, offering personalized viewing experiences while ensuring minimal buffering and downtime. Additionally, the integration of smart devices with streaming platforms allowed for voice-controlled functionalities and synchronized experiences across various devices, making media consumption more interactive. Overall, these developments illustrated the potential of IoT and smart technologies to drive progress in urban living and entertainment, paving the way for a more connected and efficient future.

SUBASH D

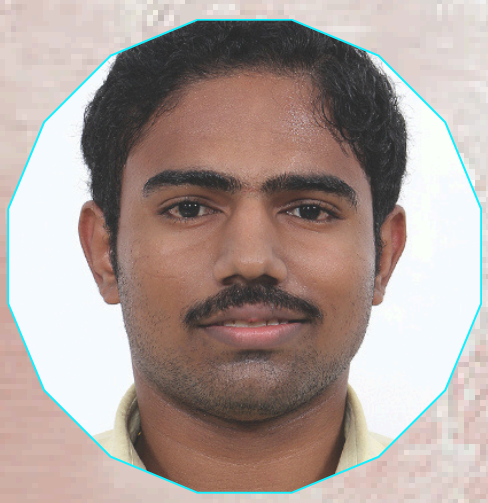
III-IT

NON-TECHNICAL ARTICLES

HIGH-PERFORMANCE TRANSISTOR MODELS AND CIRCUITS USEFUL FOR SPACE AND DEFENSE APPLICATIONS

Indian researchers have developed a high performance industry-standard model for Aluminium gallium nitride (AlGaN/GaN) High Electron Mobility Transistors (HEMTs) with simple design procedures which can be used to make high-power Radio Frequency (RF) circuits owing to its high breakdown voltage. Radio Frequency circuits include amplifiers and switches, which are used in wireless transmission and are useful for space and defense applications.As AlGaN/GaN HEMTs can also extend the power level of solid-state microwave circuits by a factor of five to ten, resulting in an appreciable reduction in the overall chip size and cost, the standard developed can significantly reduce the development cost of the circuits and devices for transmitting high-frequency signals.

The technology is rapidly gaining popularity owing to its high performance and efficiency. It has two excellent properties – high mobility and high-power performance. These properties reduce the noise figure and complexity while designing Low Noise Amplifiers (LNAs) (used in wireless transmission like mobile phones, base stations) while increasing the achievablebandwidth.



ANNAMALAI P
IV-IT

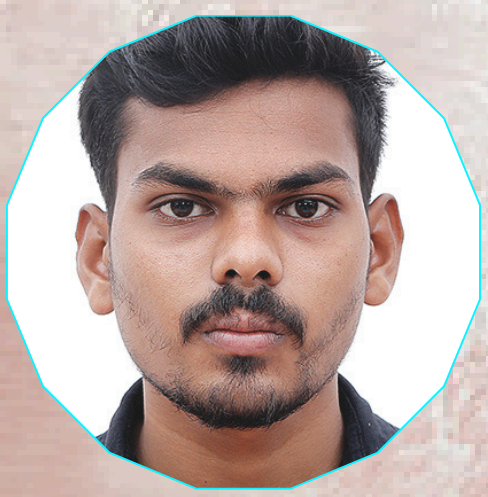
AIR POLLUTANTS & METEOROLOGICAL VARIABLES INFLUENCE POLLEN CONCENTRATION

HARINI M
IV-IT

Scientists have found that air pollutants influence Pollens remain suspended in the air and form part of the air we breathe. When inhaled by humans, they put a strain on the upper respiratory system. They cause widespread upper respiratory tract and naso-bronchial allergy with manifestations like asthma, seasonal rhinitis, and bronchial irritation.Airborne pollen varies in character from place to place due to diverse meteorological or environmental conditions. There is growing evidence that airborne pollen plays a crucial role in increasing allergic diseases in the urban environment. As pollen, climatic variables, and air pollutants coexist in nature, they have the potential to interact with one another and exacerbate their adverse effects on human health.Considering this, Prof. Ravindra Khaiwal from Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, along with Dr. Suman Mor, Chairperson, Department of Environment Studies and Ms. Akshi Goyal, Ph.D. research scholar, studied the influence of meteorology and air pollutants on the airborne pollen of the city Chandigarh.

INDIA-JAPAN SCIENCE AND TECHNOLOGY SEMINAR HIGHLIGHTS NEED TO EVOLVE TO BIGGER MISSIONS

“Focusing on handling of data, machine learning, and artificial intelligence, S&T has a very important role to play to address ever emerging global challenges as we go forward and the cooperation between India and Japan need to scale up based on the cooperation that we already have," Prof K VijayRaghavan pointed out while delivering the keynote addresses at the seminar titled Nobel Laureate S&T Seminar Series -India-Japan Science and Technology Seminar.The two-day seminar was jointly organized in hybrid mode by the Sree Chitra Tirunal Institute for Medical Sciences & Technology, an autonomous institution of the Department of Science and Technology (DST), Govt. of India, and Indian JSPS Alumni Association (IJAA) to commemorate the 70th anniversary of India Japan diplomatic relations and the 75th anniversary of Indian Independence --Azadi ka Amrit Mahotsav. It was initiated on December 6 and was sponsored by the Japan Society for the Promotion of Science (JSPS) and the Embassy of India, Japan, in co-association with DST- India, and JST-Japan.H.E. Mr. Sanjay Kumar Verma, Ambassador of India to Japan, Embassy of India, Tokyo, GOI.



AJITH L

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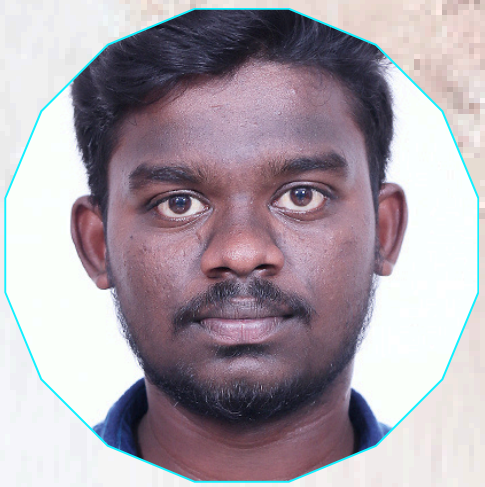
NEW ROADMAP FOR SCIENCE, TECHNOLOGY & INNOVATION COOPERATION SIGNED BETWEEN INDIA & RUSSIA



MANICKAM M

III-IT

A new roadmap for Science, Technology & Innovation (STI) cooperation for next 5 years was signed on the occasion of the meeting between Russian President Vladimir Putin and Indian Prime Minister Narendra Modi for the 21st India-Russia Annual Summit in New Delhi, India, on December 6, 2021.As the two sides emphasised the importance of joint research in science, technology, and innovation, the roadmap for STI cooperation was concluded by Mr. Sanjeev K Varshney, Head of the International Cooperation of the Department of Science & Technology for the Ministry of Science and Technology, Government of India and Mr. Starzhenetsky Vladislav Valerievich, Director of the Department of International Cooperation for Ministry of Science and Higher Education of the Russian Federation. The Roadmap is expected to boost innovation-related engagements between the two countries and focus on commercialization of technologies and full-cycle support joint projects for economic and societal impact.

NEED FOR SOCIO-CULTURAL CHANGES, FLEXI WORK TIMES & GENDER NEUTRAL PAYS HIGHLIGHTED AT INDIA-ISRAEL WOMEN IN STEM CONFERENCE

Experts from India and Israel highlighted the need for changes in the socio-cultural environment while deliberating on ways of achieving gender parity in the field of Science, Technology, Engineering and Mathematics (STEM) at the conference on India-Israel Women in STEM on November 24, 2021."There are 3 main issues about lesser women participation in STEM fields which have existed historically across millennia-- how well S&T has translated into the economic sphere and how our institutions are structured. S&T could become a changemaker in society by introducing flexible work times, and gender-neutral pays to enhance women participation in STEM," Prof. K. VijayRaghavan Principal Scientific Adviser to the Government of India, highlighted at the conference jointly organized by the Department of Science & Technology (DST) Govt. of India and Ministry of Innovation, Science and Technology (MOIST), Israel. Dr Gaya Loren, Deputy Chief Scientist, Ministry of Innovation, Science & Technology, Israel, said that Israel Innovation Authority sees increased women participation in tech fields as an investment for the country's advancement in the future .

YUVARANI S

III-IT

DST INSPIRE FACULTY FELLOW DEVELOPS ALGORITHMS TO ENSURE EFFICIENCY OF NETWORKED SYSTEMS

KAVYA S

II-IT

Atreyee Kundu, a Department of Science & Technology (DST) INSPIRE Faculty fellow, has designed scheduling and control algorithms for networked control systems whose shared communication networks have a limited communication capacity and are prone to data losses.The paper written in collaboration with Prof. Daniel Quevedo of Queensland University of Technology, Australia, and accepted for publication in the journal IEEE Transactions on Control of Network Systems studies systems in which multiple devices are accessing a wireless network of limited capacity and prone to loss of information and gives algorithms for the sequence in which the devices can be given access to the network and control inputs that can be applied so that all the devices maintain desired properties to ensure efficiency of the networked system.Dr. Kundu works on developing new sets of decision and control algorithms to help society take maximum benefits of technology for fixing various wide-ranged problems in various sectors such as health, education, drone flying, and so on. She works on the design of decision and control algorithms for networked control systems.

SCALABLE SYNTHESIS METHOD DEVELOPED OF NANOCRYSTALS WITH BRIGHT EMISSION COLOURS USEFUL FOR LED

Indian researchers have developed a method that can help large scale synthesis of a special class of semiconductor nanocrystals. These nanocrystals called two-dimensional layered perovskite and perovskite nanocrystals, which have bright emission colours and are not affected by or corroded by the environment, are useful for both high colour purity and low-cost solution processability.Nanomaterials have unique properties compared to their bulk counterpart as they exhibit bright emission and are useful for light-emitting diodes (LED) apart from several other applications in our day-to-day life. However, large-scale syntheses of such materials are challenging as the reaction mechanism, and kinetics of large-scale syntheses are often different from small-scale syntheses. Such large scale synthesis methods are necessary for industrial applications.To this end, a group of researchers at the Centre for Nano and Soft Matter Sciences (CeNS), an autonomous research institute under the Department of Science and Technology (DST), have synthesized two-dimensional layered perovskite and perovskite nanocrystals by a method called sonochemical process that is often used for large scale synthesis.

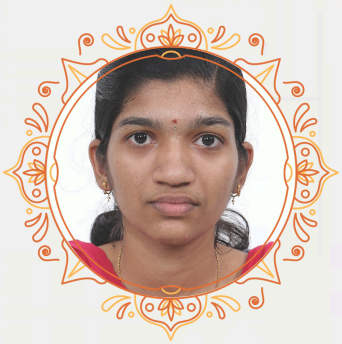
YOGESH S A
IV-IT

NOVEL COMPOSITE MATERIALS DEVELOPED FOR HIGH-TEMPERATURE BATTERY AND SUPERCAPACITORS

ISWARYA J
IV-IT

Indian researchers have developed a thermally stable solid electrolyte for lithium-ion batteries for energy storage that promise application for a wide range of temperatures from 30-500 degrees Celsius.Energy generation and storage is the need of the hour, and worldwide efforts are being invested for developing cost-effective, efficient options. The current state of art indicates a possible replacement of conventional low energy density, low shelf life batteries with Lithium-ion and Sodium-ion batteries. Therefore, efforts are required to develop solid-state energy storage devices.In this direction, a group of researchers led by Dr. Anshuman Dalvi of Department of Physics, BITS Pilani, Pilani Campus has developed solid-state energy storage devices in the form of thermally stable solid electrolytes for Li+ ion batteries and super capacitors and tested their stability and efficiency using state of the art facilities. The establishment of the FIST program of the Department of Science & Technology (DST), Govt. of India supported XRD facility has given a new dimension to the ongoing research by providing them infrastructural support to investigate composite materials at high temperature with great resolution.

POIESIS



TAMIL SELVI S
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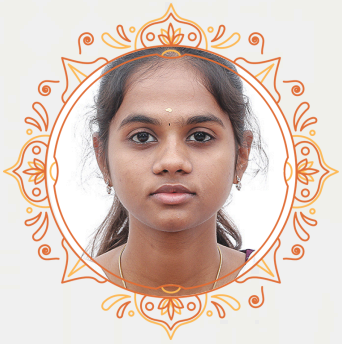
செம்மையான பூமி
ஒரு பசுமையான இலை
ஒரு வண்ணமயமான பட்டாம்பூச்சி
ஒரு பறவையின் மென்மையான கீச்சொலி
மேகங்களற்ற நீல வானம்
இவையனைத்தும் தூய்மையான
ஒளியின் மாயமே

- தமிழ் செல்வி எஸ்



LAKSHMIPRIYA R
II-IT

கறுத்து வீங்கிய முகத்தோடு மேகம்
கண்ணீர் விடத் தயாராய் இருப்பதாக
தெரிகிறது
அழத்தான் வேண்டும் கட்டாயமாக அவன்
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இலகுவாக மாற
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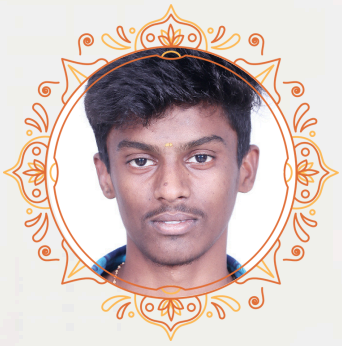
அருள்பெற்ற ஒவ்வொரு துளியும்
ஆதாரமாகும் உயிர்க்கு

- லக்ஷ்மிப்ரியா ஆர்



SUGUMARAN S
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தினமும் இரவு வந்தால்
கருப்பு நிற உடையை
அணிந்து கொள்கிறது பகல்

- சுகுமாரன் எஸ்

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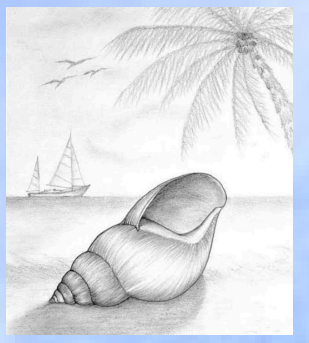

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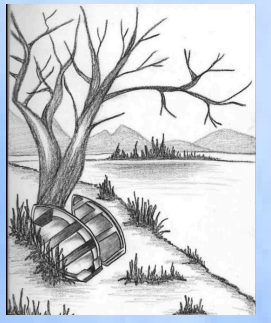

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KONGUNADU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

THE BEST WAY TO PREDICT THE FUTURE IS TO INVENT IT