

CSE Messenger

Your window to the Digital
Revolution

2023
Volume 8

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Vision of the Department



To be a center of excellence in Computer Science & Engineering imparting quality education, competencies, skills, attitudes, and values while fostering research to create professionals capable of analyzing, designing and developing computing systems for a sustainable future of mankind.

Mission of the Department

M1: To develop professionals with *analytical* and *technical competencies* for productive careers in industry, academia and as entrepreneurs.

M2: To impart *theoretical and applied skills to students* in computer science and engineering on industrially, environmentally, and socially relevant issues.

M3: To continuously improve and provide state-of-the-art laboratories to keep pace with the new advancements in computer science and engineering.

M4: To create an environment that empowers faculty and nurtures students towards life-long learning..



PROGRAM EDUCATIONAL OUTCOMES (PEOS)

PEO1

To develop in-depth problem-solving and technical skills in students to establish themselves in industry, academia, entrepreneurial ventures and pursuit of higher studies..

PEO2

To acquire theoretical concepts and applied knowledge to address industrial, environmental, and societal challenges by developing innovative solutions.

PEO3

To adapt emerging technologies by utilizing state-of-the-art laboratories and advanced tools for research, development, and life-long learning.

PEO4

To develop leadership, communication, and teamwork skills while fostering ethical and evolving attitudes to contribute effectively to society.

Message From Director's Desk



Engineering is not merely a field of study - it is a mindset rooted in exploration, problem-solving, and continuous improvement. This magazine reflects the curiosity, dedication, and technical excellence of our students and faculty. It showcases original ideas, innovative projects, and insightful research that embody the spirit of modern engineering education.

I am proud to witness our students not only acquiring knowledge but also applying it to address real-world challenges. To all our budding engineers, I encourage you to keep pushing boundaries. Never be afraid to question, to experiment, or to fail - for it is through these experiences that true innovation emerges.

Let this magazine inspire you to think beyond textbooks, to collaborate across disciplines, and to transform your ideas into impactful solutions. Let us move forward with passion, purpose, and the unwavering belief that we can shape a better world through engineering.



Prof (Dr) Shakti Kumar
(Director)

Message From HOD's Desk



With great enthusiasm, I share my message for this edition of the Department's technical magazine *CSE Messenger*. This publication stands as a reflection of the innovative spirit, tech-savvy mindset, and commitment of our students and faculty. In a constantly evolving field like computer science and technology, it is truly inspiring to see our budding engineers engaging deeply, thinking creatively, and making meaningful contributions beyond the boundaries of the classroom. Computer Science is not just about writing code—it's about solving problems, thinking critically, and building solutions that can shape the future. This magazine serves as a platform for our students to present their ideas, research, and projects, and I am proud of the enthusiasm they continue to demonstrate. To our students, I urge you to keep learning, stay curious, and embrace challenges as opportunities. I extend my sincere appreciation to the editorial team and all contributors for their hard work and passion.



Prof (Dr) S. C. Gupta
HOD, Dept. CSE

IIT DELHI VIRTUAL LAB WORKSHOP

The **Department of Computer Science and Engineering** at PIET organized a **One Day Workshop "INNOTECH 2K23"** in association with **IIT Delhi**, focused on **Virtual Labs**. The aim was to introduce students to the concept of **remote-access labs** in various fields of science and technology.

Mr. Chandan Kumar and **Mr. Vikas Pandey**, Field Engineers from IIT Delhi, conducted hands-on sessions explaining how to perform experiments virtually, access manuals, and analyze results using the online platform.

They highlighted the **flexibility**, **cost-effectiveness**, and **accessibility** of virtual labs, especially in institutions with limited lab infrastructure.

The workshop saw enthusiastic participation from students and faculty, who appreciated this step toward promoting **digital and experiential learning** in technical education.



IIT Virtual Labs offer students remote access to high-quality laboratory experiments, making practical learning accessible to all, especially in rural and under-resourced areas. These labs provide cost-effective, flexible, and interactive simulations across various science and engineering disciplines. Available 24/7, they support self-paced learning and reduce dependence on physical infrastructure. Developed by experts, the content ensures standardization and quality across institutions. Teachers can also integrate these labs into classroom teaching, enhancing student engagement. By promoting hands-on experience and innovation, IIT Virtual Labs play a crucial role in making education inclusive, modern, and effective for learners across India.

Training Programs

The Department of Computer Science and Engineering at Panipat Institute of Engineering and Technology (PIET), in collaboration with the National Institute of Technical Teachers Training and Research (NITTTR), Chandigarh, successfully organized a one-week online training program on “Open Source Tools for Research.” This enriching academic event was held from May 15 to May 19, 2023.

Designed to equip faculty members, researchers, and students with essential open-source research tools, the training aimed to enhance research efficiency and academic output. The sessions focused on practical knowledge of software and tools widely used in data analysis, document preparation, collaboration, and project management—all vital for academic and industrial research.

The program was meticulously coordinated by Prof. (Dr.) S.C. Gupta, Head of the CSE Department, and Ms. Aakanksha Mahajan, Assistant Professor, CSE. Their guidance ensured the event's success and impact, promoting a culture of innovation and technical skill development among participants.

This initiative reflects PIET's commitment to academic excellence and its ongoing efforts to bridge the gap between education and research through collaboration with premier institutions like NITTTR, Chandigarh.



Engineer's Day Celebration

Our department celebrated Engineer's Day to honor the birthday of Sir M. Visvesvaraya, who made significant contributions to the field of engineering and played a pivotal role in the development of the nation. This day is a tribute to engineers and their valuable contributions to society.

On **15th September 2023**, the CSE and CSE (AIML) departments at PIET celebrated Engineer's Day with events like **Link Snipped (Digital Poster Making)**, **Slide Fest**, and an **Innovation Fair**. The celebration, coordinated by faculty and student teams, provided a platform to showcase creativity and technical talent.



Events Conducted

1. Link Snipped,
2. Slide Fest,
3. Innovation Fair



IEEE Conference ICCIMA-2023

ICCIMA-2023, the 2 - days AICTE Sponsored International Conference on Computational Intelligence and Mathematical Applications conducted on 21st- 22nd Dec, 2023 to provide a platform for academicians, researchers, industry experts, and students to come together and exchange ideas, share their latest research findings on the latest trends and advancements. Dr. R. K. Soni ji, Advisor, All India Council of Technical Education (AICTE) and senior professors Dr. Yoginder Malik, Dr. Shuchita Upadhyay, Prof. (Dr.) Rakesh Kumar, Prof. Dr. Brahmjit Singh, Prof. Irravian from Malaysia, Prof. Raj Rangayyan, University of Calgary, Alberta, Canada, enlightened the audiences by their vast knowledge of implementation of Computational Intelligence in various sectors.



We have followed three tier reviewing of each paper with plagiarism of less than 10%. We have received 185 papers, 163 we have received via easy chair and rest by official email. We have selected 50 papers having good score for publication in proceedings. Conference 358 participants from all over the nation. There are 78 paper presenters, 32 respected reviewers from various universities of Country and broad.

In conclusion, ICCIMA-2023 proved to be a remarkable academic milestone that not only celebrated research excellence but also ignited new ideas and collaborations for solving real-world problems through intelligent systems. The success of this event has laid a strong foundation for more such global gatherings in the future.



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भविष्य में मशीन इतनी बुद्धिमान हो जाएगी कि शल्य चिकित्सा भी खुद करेगी : डा.योगेंद्र



पाइंट कॉलेज में पेपर्स का विमोचन करते हुए।

समालाखा, 21 दिसम्बर (अशोक चूष) : मुख्यमंत्री मनोहर लाल के पूर्व एडवाइजर डा. योगेंद्र मलिक ने कहा कि दुनिया बेहद जल्द बदलने वाली है। यह इतनी जल्द बदलने की आप सोच भी नहीं सकते। मशीन इतनी ज्यादा बुद्धिमान हो जाएगी कि खुद ही शल्य चिकित्सा कर सकेगी। चिकित्सक दूर बैठकर निर्देश देंगे और मशीन इलाज कर देगी। यहाँ तक की खेती से लेकर प्रत्येक क्षेत्र में मशीन का दखल होगा। डा. योगेंद्र यहाँ पाइंट कॉलेज में ऑल इंडिया काउंसिल फॉर टेक्निकल एजुकेशन (ए.आई.सी.टी.ई.) की ओर से आयोजित 2 दिवसीय अंतरराष्ट्रीय कॉन्फ्रेंस में पहले दिन बोल रहे थे। कंप्यूटर साइन्स एवं मैथेमेटिकल एप्लीकेशंस पर हुई इस कॉन्फ्रेंस में डा. मलिक ने भारत में ए.आई. मिशन

एवं मैट्रिकल इंटरमीडियेट में ए.आई. विषय पर अपनी बात रखी। उन्होंने कहा कि अगर बदलती तकनीक के साथ तालमेल नहीं बैठाएंगे तो पीछे रह जाएंगे। कुरुक्षेत्र यूनिवर्सिटी से पहुंची विशेष अतिथि डा. सुचिता उपाध्याय ने ए.आई. इन एप्लीकेशन और ए.आई. इन लाइफ साइंस पर अपनी बात रखी। मलेशिया की यूनिवर्सिटी से डॉ. इराहवन ने मशीन लर्निंग और ऑप्टिमाइजेशन पर शोध को साझा किया। उन्होंने कहा कि मशीन लर्निंग एक महत्वपूर्ण विषय हो गया है। दुनिया में इसी पर शोध हो रहे हैं। डाटा साइंस की मदद से सटीक

निर्णय लिए जा सकते हैं। पाइंट के वाइस चैंसलर राकेश तायल ने कहा कि चीथी इंडस्ट्रियल क्रांति का वक्त आ चुका है। भारत को इसमें महत्वपूर्ण भूमिका निभानी होगी, तभी हम दोबारा विश्व गुरु बन सकेंगे। पूरी दुनिया भारत की ओर देख रही है। आई.टी. में भारतीय दिमाग सर्वश्रेष्ठ है। हम प्रत्येक क्षेत्र में बेहतर कर सकते हैं। ज़रूरत है तो ज्यादा से ज्यादा पेटेंट और रिसर्च करने की। सचिव सुरेश तायल ने कहा कि यह पाइंट में पांचवां सम्मेलन है। भविष्य में भी इस तरह के कॉन्फ्रेंस का रिसर्च एवं पेटेंट को बढ़ावा दिया जाएगा। इस अवसर पर बोर्ड सदस्य शुभम

तायल, निदेशक डा. जे.एस. सैनी, डीन डा. बीबी शर्मा, बोटेक आर्टिफिशियल इंटेलिजेंस के विभाग अध्यक्ष डा. देवेन्द्र प्रसाद, आर.एंड.डी. विभाग की अध्यक्ष डा. अंजू गांधी एवं सी.एस.ई. विभाग के अध्यक्ष डा.एस.सी. गुप्ता भी मौजूद रहे। आर्टिफिशियल इंटेलिजेंस, क्लाउड कंप्यूटिंग, नैटवर्क सिस्टम और मशीन लर्निंग पर आधारित 22 शोध प्रस्तुत किए गए। अंतराष्ट्रीय स्तर पर 185 रिसर्च पेपर प्राप्त हुए थे। इनमें से 60 को स्वीकृत किया गया। इन्हीं में से 50 पेपर अब टेलर एंड फ्रांसिस ग्रुप की ओर से प्रकाश होंगे। पिछले एक साल से इस कॉन्फ्रेंस की तैयारी चल रही थी। शुक्रवार को राजस्थान, पंजाब, मध्य प्रदेश, तमिलनाडु, मलेशिया से रिसर्च एवं क्निट स्पेकर पहुंचेंगे।

भविष्य में मशीन इतनी बुद्धिमान हो जाएगी कि शल्य चिकित्सा भी खुद करेगी : डॉ. योगेंद्र



समालाखा/टीएम एक्शन इंडिया मुख्यमंत्री मनोहर लाल के पूर्व एडवाइजर डॉ. योगेंद्र मलिक ने कहा कि दुनिया बेहद जल्द बदलने वाली है। यह इतनी जल्द बदलेगी कि आप सोच भी नहीं सकते। मशीन इतनी ज्यादा बुद्धिमान हो

नहीं बैठाएगी तो पीछे रह जाएंगे। कुरुक्षेत्र यूनिवर्सिटी से पहुंची विशेष अतिथि डॉ. सुचिता उपाध्याय ने ए.आई. इन एप्लीकेशन और ए.आई. इन लाइफ साइंस पर अपनी बात रखी। मलेशिया की यूनिवर्सिटी से डॉ. इराहवन ने मशीन लर्निंग और

मैं पांचवां सम्मेलन है। भविष्य में भी इस तरह के कॉन्फ्रेंस का रिसर्च एवं पेटेंट को बढ़ावा दिया जाएगा। इस अवसर पर बोर्ड सदस्य शुभम तायल, निदेशक डॉ. जे.एस. सैनी, बोटेक आर्टिफिशियल इंटेलिजेंस के विभाग अध्यक्ष डॉ. देवेन्द्र प्रसाद,

भविष्य में मशीन इतनी बुद्धिमान हो जाएगी कि शल्य चिकित्सा भी खुद करेगी : डॉ. योगेंद्र मलिक

भविष्य में मशीन शल्य चिकित्सा भी करेगी : डॉ. योगेंद्र



समालाखा। सीएम मनोहर लाल के पूर्व एडवाइजर डॉ. योगेंद्र मलिक ने कहा कि अब मशीन इतनी ज्यादा बुद्धिमान हो जाएगी कि खुद ही शल्य चिकित्सा कर सकेंगी। चिकित्सक दूर बैठकर निर्देश देंगे और मशीन इलाज कर देगी। यहाँ तक की खेती से लेकर प्रत्येक क्षेत्र में मशीन का दखल होगा। डा. योगेंद्र यहाँ पाइंट कॉलेज में ऑल इंडिया काउंसिल फॉर टेक्निकल एजुकेशन (ए.आई.सी.टी.ई.) की ओर से आयोजित दो दिवसीय अंतरराष्ट्रीय कॉन्फ्रेंस में पहले दिन बोल रहे थे। सचिव सुरेश तायल ने कहा कि यह पाइंट में पांचवां सम्मेलन है। मौके पर बोर्ड सदस्य शुभम तायल, निदेशक डॉ. जे.एस. सैनी, डीन डा. बीबी शर्मा, डॉ. देवेन्द्र प्रसाद, डॉ. अंजू गांधी, डॉ. एस.सी. गुप्ता मौजूद थे।

समालाखा, 21 दिसम्बर (अशोक चूष) : मुख्यमंत्री मनोहर लाल के पूर्व एडवाइजर डॉ. योगेंद्र मलिक ने कहा कि दुनिया बेहद जल्द बदलने वाली है। यह इतनी जल्द बदलेगी कि आप सोच भी नहीं सकते। मशीन इतनी ज्यादा बुद्धिमान हो जाएगी कि खुद ही शल्य चिकित्सा कर सकेंगी। चिकित्सक दूर बैठकर निर्देश देंगे और मशीन इलाज कर देगी। यहाँ तक की खेती से लेकर प्रत्येक क्षेत्र में मशीन का दखल होगा। डा. योगेंद्र यहाँ पाइंट कॉलेज में ऑल इंडिया काउंसिल फॉर टेक्निकल एजुकेशन (ए.आई.सी.टी.ई.) की ओर से आयोजित दो दिवसीय अंतरराष्ट्रीय कॉन्फ्रेंस में पहले दिन बोल रहे थे। कंप्यूटर साइन्स एवं मैथेमेटिकल एप्लीकेशंस पर हुई इस कॉन्फ्रेंस में डॉ. मलिक ने भारत में ए.आई. मिशन एवं पेपर पर अपनी बात रखी।



अंतराष्ट्रीय कॉन्फ्रेंस से पूर्व रिसर्च पेपर्स का विमोचन करते हुए अतिथि।

उन्होंने कहा कि अगर बदलती तकनीक के साथ तालमेल नहीं बैठाएंगे तो पीछे रह जाएंगे। कुरुक्षेत्र यूनिवर्सिटी से पहुंची विशेष अतिथि डॉ. सुचिता उपाध्याय ने ए.आई. इन एप्लीकेशन और ए.आई. इन लाइफ साइंस पर अपनी बात रखी। मलेशिया की यूनिवर्सिटी से डॉ. इराहवन ने मशीन लर्निंग और ऑप्टिमाइजेशन पर शोध को साझा किया। सचिव सुरेश तायल ने कहा कि यह पाइंट में पांचवां सम्मेलन है। भविष्य में भी इस तरह के कॉन्फ्रेंस का रिसर्च एवं पेटेंट को बढ़ावा दिया जाएगा। इस अवसर पर बोर्ड सदस्य शुभम तायल, निदेशक डॉ. जे.एस. सैनी, डीन डा. बीबी शर्मा, बोटेक आर्टिफिशियल इंटेलिजेंस के विभाग अध्यक्ष डॉ. देवेन्द्र प्रसाद, आर.एंड.डी. विभाग की अध्यक्ष डॉ. अंजू गांधी एवं सी.एस.ई. विभाग के अध्यक्ष डॉ. एस.सी. गुप्ता भी मौजूद रहे। अंतरराष्ट्रीय स्तर पर 185 रिसर्च पेपर प्राप्त हुए थे। इनमें से 60 को स्वीकृत किया गया। इन्हीं में से 50 पेपर अब टेलर एंड फ्रांसिस ग्रुप की ओर से प्रकाश होंगे।

ACADEMIC ACHIEVERS OF CSE DEPARTMENT

Batch (2022-2026)



YASHIKA

1st Position
Roll Number: 2822273
Year: 1st Year
Combined SGPA (1st & 2nd Sem): 8.38



KASHISH NAYYAR

2nd Position
Roll Number: 2822276
Year: 1st Year
Combined SGPA (1st & 2nd Sem): 8.3



NISHANT

3rd Position
Roll Number: 2822046
Year: 1st Year
Combined SGPA (1st & 2nd Sem): 8.27



RAMAN MANDAL

3rd Position
Roll Number: 2822198
Year: 1st Year
Combined SGPA (1st & 2nd Sem): 8.27

"Success is not the key to happiness. Happiness is the key to success.
If you love what you are doing, you will be successful."
— Albert Schweitzer

ACADEMIC ACHIEVERS OF CSE DEPARTMENT

Batch (2021-2025)



TRIPTI GOYAL

1st Position
Roll Number: 2821190
Year: 2nd Year
Combined SGPA (1st & 2nd Sem): 8.38



SIMRAN MALHOTRA

2nd Position
Roll Number: 2821102
Year: 2nd Year
Combined SGPA (1st & 2nd Sem): 8.28



BHAWNA BHATIA

3rd Position
Roll Number: 2821030
Year: 2nd Year
Combined SGPA (1st & 2nd Sem): 8.25

"Go confidently in the direction of your dreams. Live the life you have imagined."
— Henry David Thoreau

ACADEMIC ACHIEVERS OF CSE DEPARTMENT

Batch (2020-2024)



DIKSHA

1st Position

Roll Number: 2820024

Year: 3rd Year

Combined SGPA (1st & 2nd Sem): 9.32



MANSI TYAGAI

2nd Position

Roll Number: 2820094

Year: 3rd Year

Combined SGPA (1st & 2nd Sem): 8.92



SARGAM

3rd Position

Roll Number: 2820093

Year: 3rd Year

Combined SGPA (1st & 2nd Sem): 8.69

"It's not about having the right opportunities. It's about handling the opportunities right."

— Mark Hunter

ACADEMIC ACHIEVERS OF CSE DEPARTMENT

Batch (2019-2023)



RINKU

1st Position
Roll Number: 2820902
Year: 4th Year
Combined SGPA (1st & 2nd Sem): 9.23



RAGHAV KHURANA

2nd Position
Roll Number: 2819122
Year: 4th Year
Combined SGPA (1st & 2nd Sem): 8.99



LUCKY KHANAN

3rd Position
Roll Number: 2819010
Year: 4th Year
Combined SGPA (1st & 2nd Sem): 8.94



SHIVANI DESWAL

3rd Position
Roll Number: 2819032
Year: 4th Year
Combined SGPA (1st & 2nd Sem): 8.94

"There are no secrets to success. It is the result of preparation, hard work, and learning from failure."
— Colin Powell

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RESEARCH ARTICLE

Decentralized Model to Protect Digital Evidence via Smart Contracts Using Layer 2 Polygon Blockchain

SUMIT KUMAR RANA¹, ARUN KUMAR RANA², SANJEEV KUMAR RANA³,
VISHNU SHARMA², (Member, IEEE), UMESH KUMAR LILHORE⁴,
OSAMAH IBRAHIM KHALAF⁵, AND ANTONINO GALLETTA⁶, (Member, IEEE)

¹Department of Computer Science and Engineering, Panipat Institute of Engineering and Technology, Panipat 132102, India

²Department of Computer Science and Engineering, Galgotia College of Engineering, Greater Noida, Uttar Pradesh 201310, India

³Department of Computer Science and Engineering, Maharishi Markandeshwar (Deemed to be University), Ambala, Haryana 133203, India

⁴Department of Computer Science and Engineering, Chandigarh University, Sahibzada Ajit Singh Nagar, Punjab 140413, India

⁵Department of Solar, Al-Nahrain Research Center for Renewable Energy, Al-Nahrain University, Jadriya, Baghdad 10070, Iraq

⁶MIFT Department, The University of Messina, 98166 Messina, Italy

Corresponding author: Antonino Galletta (angalletta@unime.it)

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ABSTRACT Modern legal proceedings heavily rely on digital evidence as a basis for decisions in a variety of contexts, including criminal investigations and civil lawsuits. However, factors like data alteration, unauthorised access, or flaws in centralised storage can threaten the security and integrity of digital evidence. We suggest a decentralised methodology for using smart contracts to safeguard digital evidence in order to overcome these issues. The decentralised model makes use of smart contracts and blockchain technology to guarantee the integrity, transparency, and immutability of digital evidence. The approach does not require a centralised authority because it makes use of a distributed ledger, which lowers the possibility of data loss or manipulation. Multiple parties participating in the evidence lifecycle can build confidence and accountability thanks to smart contracts' programmable rules and automated enforcement mechanisms. In our study, we show the decentralised model's architecture and describe its essential elements, such as the blockchain network, smart contracts, and decentralised storage. We go over the advantages of employing this architecture, including enhanced auditability, decreased dependency on centralised institutions, and increased data security. Additionally, we discuss potential difficulties and constraints, like scalability and interoperability. We run a few simulations and experiments to test the suggested model's viability and effectiveness while comparing it to conventional centralised methods. The outcomes show that our decentralised paradigm offers improved security for digital evidence, guaranteeing its reliability, usability, and tamper-proofness. We also go through how the model is used in actual legal systems, law enforcement organisations, and digital forensics investigations.

INDEX TERMS Blockchain technology, digital forensic, distributed ledger technology, IPFS.

1. INTRODUCTION

The use of digital evidence in court cases in many different fields has grown increasingly important in the current digital era. In criminal investigations, civil lawsuits, and regulatory compliance, digital evidence—such as electronic documents,

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Dr Sumit Rana

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RESEARCH ARTICLE

Holochain: An Agent-Centric Distributed Hash Table Security in Smart IoT Applications

SHIVANI GABA^{1,2}, HANEEF KHAN³, KHALID JABER ALMALKI⁴, ABDOL JABBARI⁵,
ISHAN BUDHIRAJA⁶, VIMAL KUMAR⁷, (Member, IEEE), AKANSHA SINGH⁸,
KRISHNA KANT SINGH⁹, S. S. ASKAR⁶, AND MOHAMED ABOUHAWWASH^{7,8}

¹Department of Computer Science and Engineering, Panipat Institute of Engineering and Technology, Panipat, Haryana 132102, India

²School of Computer Science Engineering and Technology, Bennett University, Greater Noida, Uttar Pradesh 201310, India

³Department of Computer and Network Engineering, College of Computer Science and Information Technology, Jazan University, Jazan 45142, Saudi Arabia

⁴College of Computing and Informatics, Saudi Electronic University, Riyadh 11673, Saudi Arabia

⁵Department of Computer Science Engineering, ASET, Amity University, Noida, Uttar Pradesh 201303, India

⁶Department of Statistics and Operations Research, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

⁷Department of Mathematics, Faculty of Science, Mansoura University, Mansoura 35516, Egypt

⁸Department of Computational Mathematics, Science and Engineering, College of Engineering, Michigan State University, East Lansing, MI 48824, USA

Corresponding author: Akansha Singh (akanshasingh@gmail.com)

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ABSTRACT The accomplishment of blockchain has increased the focus on the various applications for simplifying the confidentiality and transaction sanctuary using the decentralized architecture via consensus mechanisms between different internet of things (IoT) nodes in daily increasing societal areas. The growth of blockchain lasted to grow and used to do compare technologies. The major shortcomings of blockchain is the lack of scalability in modern application settings. Holochain technology vends itself as a “thinking” exterior to blocks, and it is a peer-to-peer disseminated ledger technology. It works contrarily compared to the blockchain, and it offers an exclusive value in the existing market. IoT devices are continuously used in distributed environments, in various smart applications. The peer-to-peer IoT networks, connected to smart agricultural systems are exposed to the security issues. Specifically, the personal data of agricultural land records need protection against unauthorized access and eradicate corruption in land transactions. The Blockchain offers a possible solution based on distributed ledger, but it has scalability issues due to high storage and processing requirements with growing network size. Also data is not locally stored in a Blockchain. This paper studies the conventions of holochain technology, its architecture and challenges, and critical mechanisms of holochain applications. We also analyze the numerous models utilized for the implementation of protected transactions. We discuss an agent centric framework with distributed hash table for secured applications.

INDEX TERMS Holochain, communication infrastructure, holo, ledger, process models, distributed ledger technology, agent centric technology, blockchain.

I. INTRODUCTION

Holochain is the one of the developing technology which provides an infrastructure of open source distributed network for secure communication without including large storage and the requirements of exchanging data as in blockchain. For systems that need global consensus with secured mechanisms and high degree of privacy, blockchain is the appropriate

technology. The environment that don't need global consensus, on the other hand, can use Holochain technology that is widely used nowadays. In addition to increased scalability, flexibility, efficiency, and extensibility, the absence of a worldwide consensus has several other advantages. As an alternative to Ethereum, which is also a decentralized application platform (dApp), Holochain technology has a wide range of potential applications. Aside than Distributed Ledger Technology (DLT), there are many more options available. The way these two technologies are put to use

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Dr Sumit Rana



Analyzing the Performance of Nature-Inspired Optimization Algorithms with Modified Grey Wolf Optimization for VM Migration Problems

Deepak Kumar¹ · Anju Bhandari Gandhi¹ · Deepti Mehrotra² · Parveen Singla³ · Suresh Chand Gupta¹ · Vijay Anant Athavale¹

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Abstract

The virtualized framework was generated among the terminal user and the computer platform by the software called virtual machine. For the fundamental bare hardware an identical interface was obtained and the end-users are managed by the virtual machine software. For the cloud infrastructure and cloud computing services, simulation and modeling are given by an extensible simulation tool called CloudSim. During virtual machine migration the following challenges occur; Transfer rate, Page resend, Missing pages, migration over WAN network, large applications, Resource availability, Address wrapping, and migration in high-speed LAN. In cloud computing, scheduling is required to reduce task completion time and to boost the effective use of resources. It allocates the particular work to a particular resource at a particular time. Resource allocation is also required for assigning the available resources to the required cloud application over the internet. It allows the service provider to control every individual module resource. To get quasi-optimal solutions several meta-heuristic procedures are implemented with a Cloud simulator.

Keywords Virtual machine · Resource allocation · Modified grey wolf algorithm · Meta-heuristic · Service level agreement · Virtual machine migration · Virtual machine scheduler · Service level agreement violation · Energy consumption

1 Introduction

On the basis of pay per usage, cloud computing is the most requested model for the provisioning of resources that are granted by service suppliers [1–3]. Because of its number of characteristics like on-demand service, upfront cost, elasticity, reliability, and access with ease, it has become very significant in both the academic IT sector and in our day-to-day

✉ Deepak Kumar
dk747692@gmail.com

¹ Panipat Institute of Engineering and Technology, Panipat, Haryana, India

² Amity University, Noida, Uttar Pradesh, India

³ Chandigarh Engineering College, Landran, Mohali, Punjab, India



Dr S.C. Gupta



Dr Anju Gandhi

Exploring Artificial Intelligence Transforming Image Creation Based Art.Ai Platform and Its Creative Impact

Rajender Kumar¹, Punit Soni², Anju Gandhi^{3*}, Stuti Mehla⁴

^{1,4} Associate Professor, Department of CSE, P.I.E.T, Samalkha, Panipat, Haryana, INDIA

² Assistant Professor, Chitkara University Institute of Engineering and Technology, Rajpura, Punjab, INDIA

³ Professor, Department of CSE (Emerging Technology), P.I.E.T, Samalkha, Panipat, Haryana, INDIA

Abstract: The creation of images has undergone substantial change as a result of artificial intelligence (AI), and this is not unique. This study explores the Art.ai platform, its intended audience, and the problem space it seeks to solve. The main goal of Art.ai technology is to speed and streamline the picture generating process while lowering the expenses related to human involvement. A wide spectrum of users, including those who create digital assets, those looking for photographs for personal use, companies, research, ICT, and independent contractors, are catered to by the site. By utilizing cutting-edge AI algorithms, Art.ai disrupts the traditional picture generating workflow and provides major advantages including quick output, cost reductions and new creative opportunities. The influence of Art.ai on the creative industries is carefully examined in this article, shining light on the possibilities for innovation and difference in the fields of art, design, and entertainment.

Keywords: Artificial intelligence, image generation, Art.ai platform, target users, problem context, streamlining, accelerating, digital asset creators

1. Introduction

The field of image generation has undergone a revolution with the advent of artificial intelligence (AI). This paper explores the Art.ai platform, an AI-based solution that simplifies and expedites the image generation process. The purpose of this research is to analyze the impact of Art.ai on creative industries, addressing its purpose, target users, and the problem context it addresses [1]. The website Art.ai is an AI-based platform for generating images. AI has revolutionized various industries by expediting data processing and image generation. AI can generate a wide range of images, from inanimate objects to humans and animals, and can enhance existing images [2]. It is transforming the fields of art, design, and entertainment. However, comprehending the underlying concept of AI generation can be challenging for beginners. Art.ai addresses this by generating images based on user prompts. It utilizes machine learning and operates autonomously, saving time and resources. For instance, in fashion, AI image generators can design clothes and style outfits without human intervention. In gaming, they can create realistic characters, backgrounds, and environments that

would otherwise require months of manual work [3].

1.1 Target Users And Purpose

The Art.ai platform caters to a diverse range of target users with varying needs and objectives. Target user refers to the group of people to whom the product will be most useful [4]. Target user is not necessarily limited to the specified audience it can be to other groups which is not stated in target groups. For Art.ai the target users are the people are:

- Digital asset creators (art, tweet, any digital asset)
- People who want images for personal use.
- People who want images for commercial use
- Freelancers
- Small projects
- Large projects

Art.ai is targeted towards all the people who have requirements for images and use these images in projects targeted towards commercial use and personal use. AI has significantly impacted various industries by accelerating data generation and processing. Image generation is an area where AI has surpassed humans, transforming the way we



Dr Anju Gandhi



Dr Stuti Mehla

THE INTERNET OF THINGS: BUILDING SMARTER CONNECTED ENVIRONMENTS

- The Internet of Things (IoT) is revolutionizing the way we interact with our surroundings by connecting devices, systems, and people through the internet. By enabling seamless communication between smart devices, IoT enhances automation, efficiency, and decision-making across various industries.

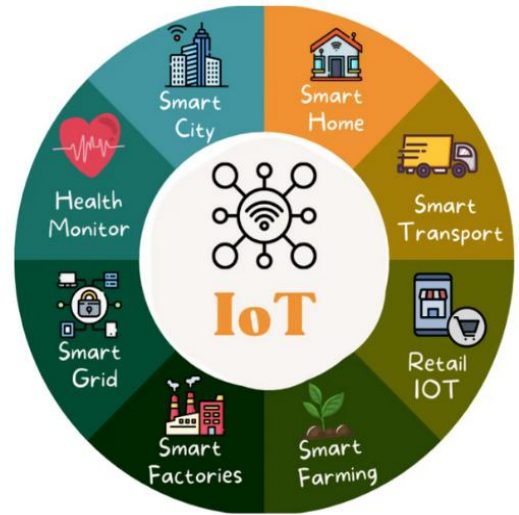
- Applications of IoT-IoT is widely used in smart homes, where devices like thermostats, lighting, and security systems communicate to optimize energy use and improve convenience. Smart cities leverage IoT for intelligent traffic management, waste disposal, and environmental monitoring, making urban life more sustainable.

- In healthcare, IoT-enabled wearables and remote monitoring systems track patient vitals, improving preventive care and emergency response. The industrial sector benefits from IoT by optimizing supply chains, enhancing predictive maintenance, and reducing downtime in manufacturing. Agriculture also utilizes IoT for precision farming, where sensors monitor soil moisture, weather conditions, and crop health.

- Technologies Driving IoT**-IoT relies on cloud computing, big data analytics, artificial intelligence (AI), and wireless communication technologies like 5G. These innovations enable real-time data processing, allowing devices to react instantly to changing conditions. Edge computing further enhances IoT by reducing latency and improving data security.

- Challenges and Future Prospects**-Despite its benefits, IoT faces challenges such as cybersecurity risks, data privacy concerns, and interoperability issues between different devices and platforms. Ensuring robust security protocols and standardization is essential for IoT's growth.

- As IoT continues to evolve, it holds the potential to create smarter, more connected environments, enhancing productivity, sustainability, and quality of life across the globe. By addressing its challenges, IoT will pave the way for a future where intelligent systems seamlessly integrate into daily life.



THE POWER OF NATURAL LANGUAGE PROCESSING



Natural Language Processing (NLP) is a branch of artificial intelligence that enables computers to understand, interpret, and respond to human language. From voice assistants like Siri and Alexa to chatbots, translation tools, and sentiment analysis, NLP is transforming the way we interact with technology.

At its core, NLP bridges the gap between human communication and machine understanding. It allows computers to read text, hear speech, interpret meaning, and even generate language that feels natural. With the explosion of digital content, NLP helps make sense of vast amounts of unstructured data—emails, social media posts, reviews, and more.

One of the most powerful applications of NLP is in customer service. AI-powered chatbots can respond to queries in real time, improving user experience and reducing response times. In healthcare, NLP is used to analyze patient records and support faster, more accurate diagnoses. In business, it helps in sentiment analysis, extracting customer opinions and trends from online feedback.

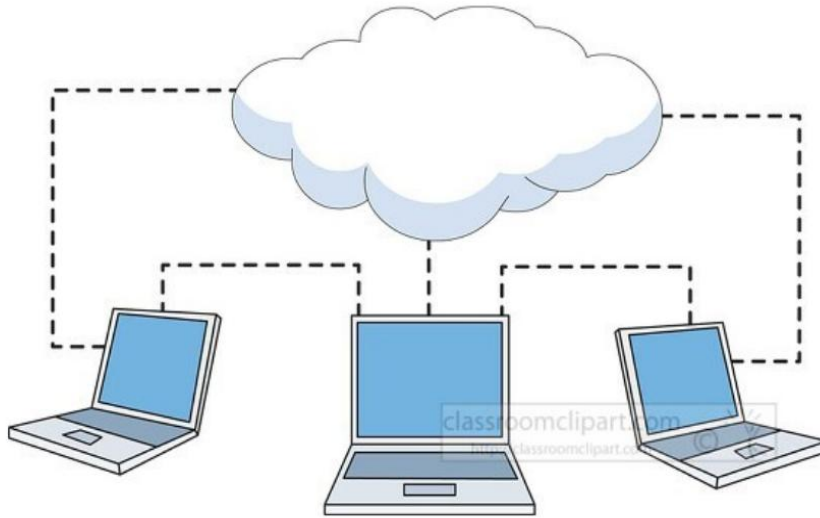
Recent advancements in deep learning have taken NLP to new heights. Large language models, like ChatGPT, can write articles, summarize documents, answer questions, and even hold meaningful conversations. These tools are being integrated into education, content creation, programming, and many other fields.

However, challenges such as language ambiguity, cultural context, and data privacy remain. Ongoing research is focused on making NLP systems more accurate, fair, and inclusive.

In a world driven by communication, NLP is unlocking the true potential of human-machine interaction—making technology more accessible, responsive, and intelligent. It's not just understanding words; it's understanding people.



CLOUD COMPUTING: POWERING THE DIGITAL TRANSFORMATION



In today's fast-paced digital era, cloud computing stands at the forefront of technological evolution, driving innovation and efficiency across industries. It provides on-demand access to computing resources such as storage, servers, databases, and applications via the internet, eliminating the need for physical infrastructure.

Cloud computing empowers businesses to scale quickly, reduce operational costs, and enhance collaboration. With models like Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), organizations can choose services tailored to their specific needs. Giants like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud are leading the way, offering secure and scalable cloud solutions.

One of the key benefits of cloud computing is agility. Startups and enterprises alike can innovate rapidly, deploying new applications and services without worrying about hardware limitations. It also supports remote work and global collaboration, making it vital in a post-pandemic world.

Moreover, cloud platforms are integrating advanced technologies such as artificial intelligence (AI), machine learning (ML), and big data analytics, enabling smarter decision-making and automation.

As digital transformation continues to reshape the world, cloud computing remains its backbone, enabling businesses to stay competitive, resilient, and future-ready. Embracing the cloud is no longer an option — it's a necessity.



AI IN HEALTHCARE: REVOLUTIONIZING DIAGNOSTICS AND TREATMENT



Artificial Intelligence (AI) is rapidly transforming healthcare by enhancing diagnostic accuracy, personalizing treatments, and streamlining administrative tasks. One of the most significant areas of impact is medical diagnostics. AI algorithms can analyze medical images, such as X-rays, MRIs, and CT scans, with remarkable accuracy, often detecting conditions like cancer, heart disease, or neurological disorders at earlier stages than human doctors. AI also aids in genomic medicine, helping researchers identify genetic markers for diseases and enabling more personalized treatment strategies.

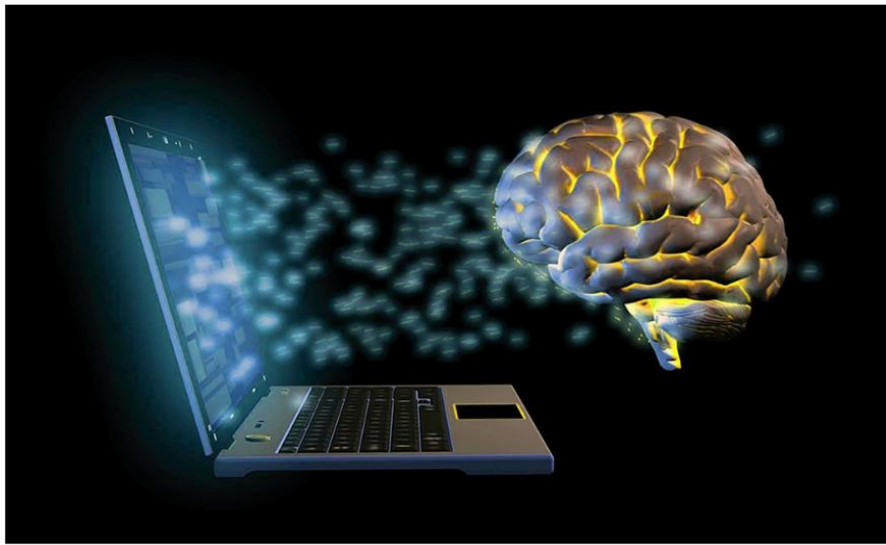
In personalized medicine, AI analyzes data from genetic tests, medical history, and lifestyle factors to create tailored treatment plans. This helps doctors prescribe the most effective therapies with minimal side effects, particularly in complex diseases like cancer. AI's role in drug discovery is also game-changing. It accelerates the process of identifying potential drug candidates by predicting how chemical compounds will interact with biological targets, dramatically reducing the time and cost of developing new medications.

AI also helps with the automation of routine tasks in healthcare, like medical coding, appointment scheduling, and patient reminders, allowing healthcare professionals to focus more on direct patient care. Additionally, robotic surgery and AI-assisted procedures offer greater precision, improving patient outcomes and reducing recovery times.

As AI continues to evolve, it holds immense potential to revolutionize healthcare, making it more efficient, accurate, and accessible. However, it's crucial to address ethical concerns, data privacy, and regulatory challenges to fully realize its benefits in patient care.



FUTURE OF HUMAN-COMPUTER INTERACTION: GESTURE AND BRAIN-COMPUTER INTERFACES



Human-Computer Interaction (HCI) is entering an exciting new era, where touchscreens and keyboards are giving way to more intuitive, seamless technologies like gesture control and brain-computer interfaces (BCIs). These innovations aim to make interaction with digital devices faster, more natural, and highly personalized.

Gesture-based interfaces allow users to control systems through body movements, such as hand waves, finger motions, or facial expressions. Already used in gaming, smart TVs, and AR/VR environments, gesture recognition is becoming more precise thanks to advanced sensors and AI algorithms. It enables touchless interaction, which is especially useful in sterile environments like hospitals or in hands-busy scenarios like driving.

Even more futuristic are Brain-Computer Interfaces, which create a direct communication link between the human brain and external devices. BCIs work by detecting brain signals and translating them into commands. This technology holds immense potential in fields like healthcare—helping people with disabilities control prosthetic limbs, communicate, or operate computers using only their thoughts.

These emerging technologies promise to redefine how we engage with machines, reducing the need for physical input and increasing accessibility. Combined with AI, they can adapt to individual users, learning preferences and predicting intentions for smoother interactions.

However, challenges remain, including ensuring privacy, improving accuracy, and reducing the cost of these systems. As research progresses, gesture and brain-computer interfaces are expected to become more mainstream, bringing us closer to a world where technology truly feels like an extension of ourselves.

The future of HCI is not just interaction—it's immersion, intuition, and intelligence.



CYBERSECURITY: DEFENDING AGAINST AI-DRIVEN THREATS



As technology advances, so do the threats that target it. With the rise of Artificial Intelligence (AI), cybercriminals are now leveraging intelligent tools to launch more sophisticated and unpredictable attacks. This new wave of AI-driven threats poses a serious challenge to traditional cybersecurity systems.

AI-powered malware, deepfakes, phishing campaigns, and automated bots can adapt and evolve rapidly, making them harder to detect and counter. For instance, AI can analyze human behavior to craft highly personalized phishing emails, increasing the chances of tricking users into revealing sensitive information. Deepfake technology can manipulate videos and voices to impersonate trusted individuals, causing potential damage in both personal and professional settings.

To counter these threats, cybersecurity must also evolve. Organizations are now using AI and Machine Learning to detect anomalies, predict attacks, and respond in real time. These intelligent systems can analyze vast amounts of data, identify unusual patterns, and take automated actions to mitigate risks—faster than any human analyst.

Moreover, cybersecurity strategies must now include continuous monitoring, regular updates, employee training, and multi-layered defenses. Zero-trust architecture, biometric authentication, and encrypted communication channels are also becoming vital components in securing digital assets.

As AI continues to reshape the threat landscape, defending against it requires equally smart and adaptive solutions. The battle between AI-driven threats and AI-powered defense is ongoing—and only those who stay ahead in this technological arms race can ensure their data and systems remain secure.

Cybersecurity is no longer just an IT issue; it's a critical foundation for trust in the digital age.



Pratishta
B.Tech CSE , 3rd Sem
2822093

AI AND MACHINE LEARNING: SHAPING THE FUTURE OF INDUSTRIES



Artificial Intelligence (AI) and Machine Learning (ML) are revolutionizing the way industries operate, transforming traditional systems into intelligent, data-driven solutions. From healthcare to finance, manufacturing to retail, these technologies are enabling smarter decisions, automation, and improved efficiency.

AI refers to machines that can mimic human intelligence, while ML is a subset of AI that allows systems to learn from data and improve over time without being explicitly programmed. Together, they are powering innovations like predictive maintenance, personalized customer experiences, fraud detection, and autonomous vehicles.

In healthcare, AI assists in early diagnosis, drug discovery, and robotic surgeries. In finance, ML algorithms detect fraudulent transactions and optimize investment strategies. The manufacturing sector uses AI to enhance quality control and streamline supply chains, while retailers leverage it for customer insights and inventory management.

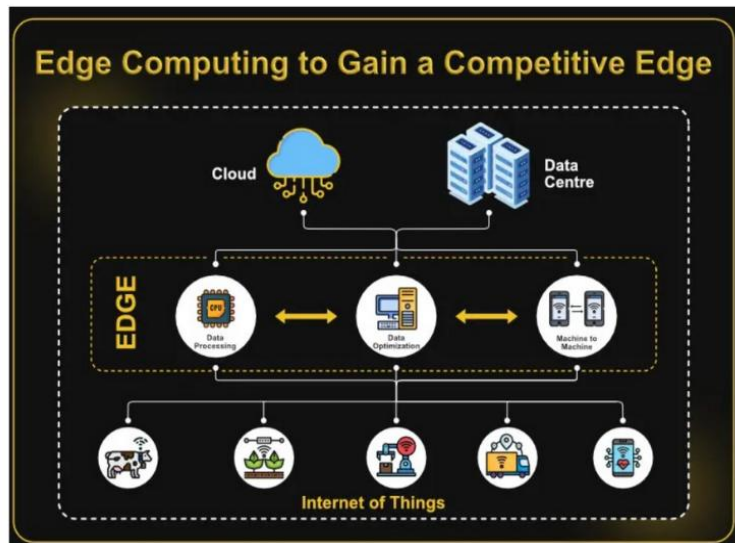
What sets AI and ML apart is their ability to analyze massive amounts of data quickly and accurately, uncovering patterns that would be impossible for humans to detect. This leads to faster decision-making and greater adaptability in a constantly changing world.

As these technologies continue to evolve, they promise to unlock new possibilities and create smarter, more efficient industries. However, ethical considerations and responsible use remain crucial to ensure that AI and ML benefit society as a whole.

In shaping the future, AI and ML aren't just tools — they are the foundation of the next industrial revolution.



EDGE COMPUTING



Edge computing refers to the practice of processing data closer to its source—on local devices or "edge" nodes—rather than relying solely on centralized cloud servers. This approach is crucial in industries where real-time data processing is essential, such as autonomous vehicles, healthcare, and industrial automation.

The primary advantage of edge computing is its ability to **reduce latency**. By processing data locally, it eliminates the delays associated with sending data to remote cloud servers, enabling faster, more immediate decision-making. In applications like autonomous vehicles, where split-second decisions can be life-critical, edge computing ensures that data from sensors and cameras is processed in real-time, enabling instant responses to environmental changes.

Another key benefit is **bandwidth efficiency**. With the proliferation of IoT devices generating massive amounts of data, transmitting all that information to the cloud can overwhelm networks. Edge computing allows for local data filtering and processing, transmitting only relevant information to the cloud, which reduces network congestion and associated costs.

Additionally, edge computing improves **security and privacy** by processing sensitive data locally, minimizing the risk of breaches during data transmission. It also enhances **reliability** since local devices can continue functioning even if connectivity to the cloud is lost, ensuring critical systems remain operational.

While edge computing offers significant benefits, it also comes with challenges, including infrastructure complexity and security concerns. Nonetheless, as demand for real-time data processing grows, edge computing is set to play a pivotal role in industries like smart cities, healthcare, and manufacturing, transforming how we handle and process data.



About Our Department

PIET-CSE aims to encourage research and innovation in Computer Science and allied areas. The objective of the BTech program in Computer Science and Engineering (CSE) is to prepare students to undertake careers involving innovation and problem solving using computational techniques and technologies to undertake computational techniques and technologies, or advanced studies for research careers to take up entrepreneurship. In order to give due importance to applied as well as theoretical aspects of computing, the curriculum for the BTech (CSE) program covers most of the foundational aspects of computing sciences, and also develops in students the engineering skills for problem solving using computing sciences.

Most engineering programs start with general courses in Sciences, and then migrate to specialized courses for the disciplines. While these courses are indeed foundational for many engineering disciplines, they can be treated as application domains (as is evidenced from the fact that most sciences and Engineering disciplines heavily use computing now) Hence, the BTech (CSE) program at PIET starts with computing-oriented courses first and allows the possibility of doing science courses later. Besides being better suited for a CSE program, it also enables the possibility of students seeing newer applications and possibilities of using computing in these subjects.

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Assistant Professor,
Department of CSE,
PIET

Ms Anjani Gupta
Assistant Professor,
Department of CSE,
PIET



Dr Kavita
Assistant Professor,
Department of CSE,
PIET

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Mr Narotam Dass
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Department of CSE,
PIET

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B. Tech CSE,
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CONTACT US

REACH US

Department Of CSE,

PIET Campus: 70, Milestone GT Road,

Samalkha, Panipat, Haryana -132102

India

Call: 1800 120 6884 (Toll Free),

+91-9069547000, +91-

9069548000, +91-9069549000

Email: info@piet.co.in

