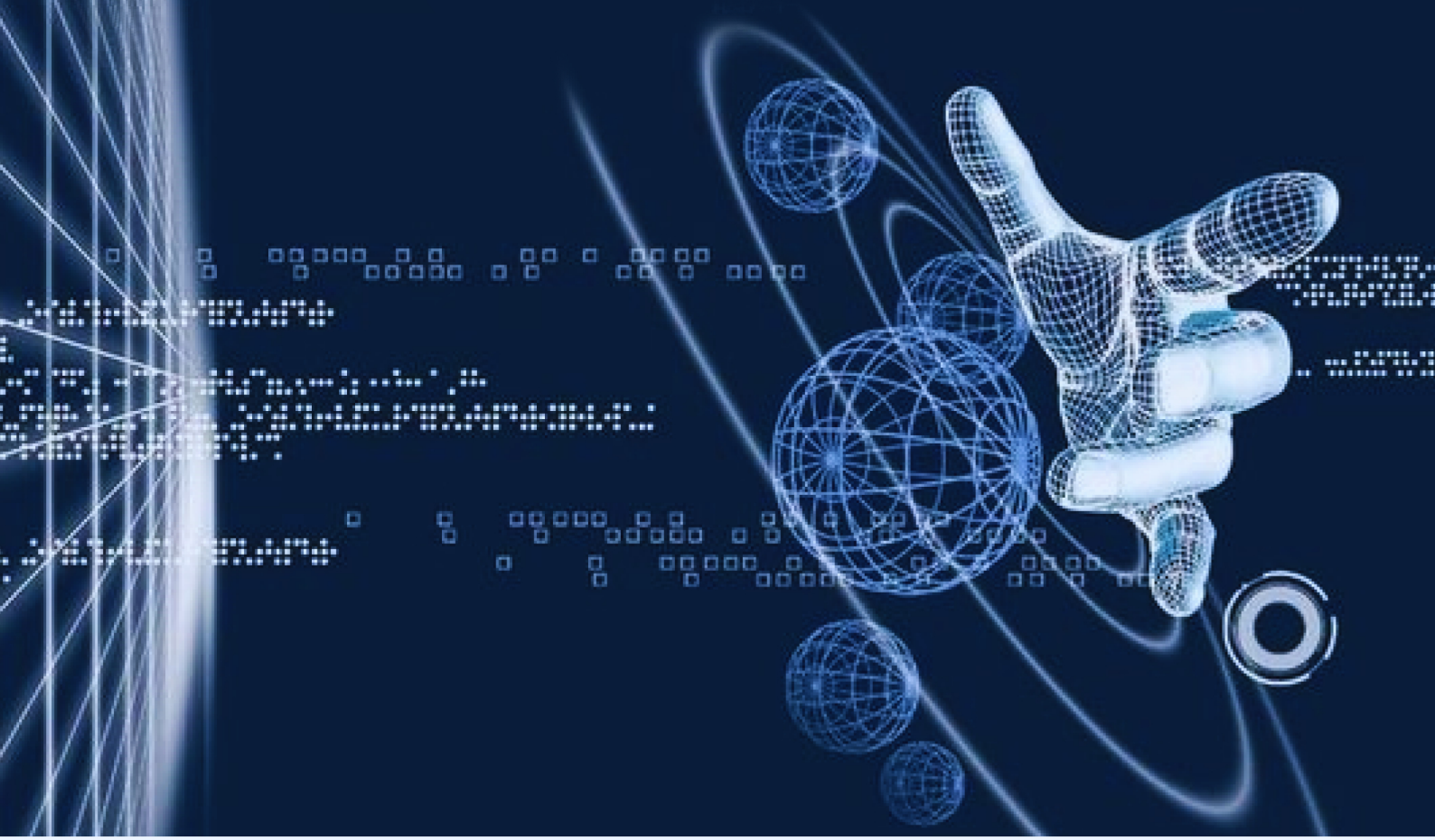
NAAC Accredited

Vidarbha Bahu-uddeshiya Shikshan Sanstha's

TULSIRAMJI GAIKWAD-PATIL College of Engineering & Technology

An Autonomous Institute

DTE CODE 4151



DEPARTMENT OF CSE-DATA SCIENCE

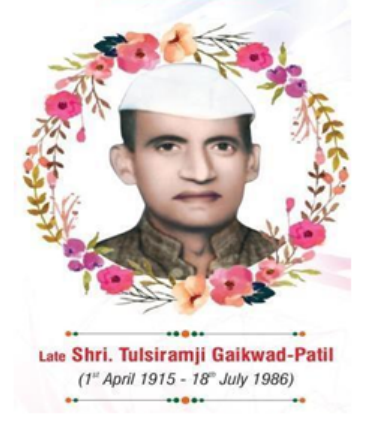
DATA ZOIDS

24 - 25

"Empowering growth through exploration.
Life's not a race, take the time to see you, for yourself."

GAIKWAD-PATIL GROUP OF INSTITUTIONS

OUR INSPIRATION



The Gaikwad-Patil Group draws its inspiration from the late Shri Tulsiramji Gaikwad-Patil, the grandfather of the Group's Chairman, Dr. Mohan Gaikwad-Patil. A visionary ahead of his time, Shri Tulsiramji was primarily an agriculturist, yet he possessed a diverse range of interests, with a particular passion for education. Defying the norm of directing his sons toward agriculture, he prioritized ensuring exceptional educational opportunities for his children and grandchildren. His foresight transformed the family from rural landlords into urban, high-caliber professionals and entrepreneurs. It is fair to assert that the true foundation of the Gaikwad-Patil Group was established through Shri Tulsiramji Gaikwad-Patil's visionary outlook.

Looking ahead, the Gaikwad-Patil Group of Institutions (GPGI) is poised to emerge as one of the premier and most dynamic educational institutions in the rapidly evolving Vidarbha region. Given the intensifying competition within the education sector, there exists a continual opportunity to exceed expectations and set new milestones and benchmarks.

MESSAGES

Dr. Mohan Gaikwad Patil
Chairman, Gaikwad Patil Group of Institutions

"As Chairman of Tulsiramji Gaikwad-Patil College of Engineering and Technology, I take pride in our institute's achievements and the efforts of those involved. Our focus on academic excellence, research innovation, and community engagement drives our mission. I invite everyone —alumni, students, faculty, and global readers— to explore the articles in this e-magazine that showcase our remarkable work. Join us on this journey of intellectual exploration."

Tulsiramji Gaikwad-Patil College of Engineering & Technology in Nagpur has released its college magazine, DATAZOID, showcasing student achievements and creativity through seminars, workshops, and industrial visits. The magazine serves as a resource for faculty and prospective students. Congratulations to the editorial board and students on the 2024-25 edition!

Mr. Akash Gaikwad-Patil
Vice-Chairman, Gaikwad-Patil Group of Institutions

Prof. Sandeep Gaikwad
Treasurer, Gaikwad-Patil Group of Institutions

"As the Treasurer of our esteemed institute, I am pleased to address you through this e-magazine. Within its pages, you will find stories of success, innovation, and the impactful contributions of our community. Let this serve as a testament to our collective strength and the positive change we continue to create together."

MESSAGES

Dr. P. L.Naktode
Principal, TGPCET

"As the college principal, I testify to our students' and faculty's resilience over the past year. Despite global challenges, they have contributed through research and artistic expressions, enhancing our college's character. I invite you to explore this e-magazine, celebrating our community's stories and achievements, as we collaboratively shape our college's future."

Dr. Pragati Patil
Vice - Principal, TGPCET

"Congratulations to the department of Data Science on the release of the latest edition of "DATAZOID." This magazine showcases the literary talents of students and faculty while promoting leadership within our community. It effectively highlights our college's strengths and accomplishments, enhancing public awareness of TGPCET. Kudos to the editorial board for their dedication and hard work. Wishing the magazine continued success!"

TGPCET

VISION AND MISSION

VISION OF THE INSTITUTE

To emerge as Learning Center of Excellence in the National Ethos in domains of Science, Technology and Management.

MISSION OF THE INSTITUTE

- [M1] To strive for rearing standard and stature of the students by practicing high standards of professional ethics, transparency and accountability.
- [M2] To provide facilities and services to meet the challenges of Industry and Society.
- [M3] To facilitate socially responsive research, innovation and entrepreneurship.
- [’M4] To ascertain holistic development of the students and staff members by inculcating knowledge and profession as work practices.

CSE-DS

VISION AND MISSION

VISION OF THE DEPARTMENT

To emerge as a Center of proficiency in Data Analytics and Create professionals in the field of Data Analytics and Machine Learning.

MISSION OF THE DEPARTMENT

- [M1] Develop innovativeness and create skillful expertise in the field of Data Science.
- [M2] Inculcate the seed of knowledge among students in order to excel in Data driven world.
- [M3] Provide excellent computing facility to nurture the young professional for lifelong learning.
- [M4] Create a socio-disciplinary attitude and acquire professional ethics among young upcoming professionals.

PEO & PSO

PROGRAM EDUCATIONAL OUTCOMES/ PEO

- PEO1: Apply mathematical knowledge mathematics and logical programming to frame engineering solutions in the computing domain.
- PEO2: Analyze the real life problems and apply latest tools for developing software solutions.
- PEO3: Apply emerging technology by communicating effectively as a team.
- PEO4: Enhance the quality, security, privacy, cost utility, etiquette and ethics by their computing abilities.
- PEO5: Adapt emerging technology and advances in careers for fulfilling the societal needs to protect the environment for lifelong learning.

PROGRAM SPECIFIC OUTCOMES/ PSO

- PSO 1 - Basic Fundamental: Analyse fundamental knowledge of computer science to analyze complex problem and design effective solution.
- PSO 2 - Design and Implementation: Apply modern tool to solve engineering, societal problem and communicate effectively as team member in software project management.
- PSO 3 – Higher Studies and Entrepreneur: The ability to use modern computer technologies to create career paths for higher studies and entrepreneurship, also inculcate moral values and ethics for lifelong learn

Program Outcomes

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems .
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and software tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and applythese to one'sown work, as a memberand leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

About TGPCET

Tulsiramji Gaikwad-Patil College of Engineering and Technology (TGPCET) was established in the year 2007 by Vidarbha Bahu-uddeshiya Shikshan Sanstha (VBSS), a registered society. It is a self financed Private Engineering College, which is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University (RTMNU) Nagpur and is approved by All India Council for Technical Education, New Delhi. The college is approved by Directorate of Technical Education (DTE), Mumbai, Maharashtra State. The Institute is Accredited with A+ (3.32 CGPA) by NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL (NAAC). An Autonomous Institute affiliated to RTM Nagpur University, Nagpur.

The College offers four years UG programs in Nine disciplines of engineering viz. Bio-Technology (B.Tech), Aeronautical Engineering (AE), Computer Science and Engineering (CSE), Information Technology (IT), Electronics and Communication Engineering (ECE), Mechanical Engineering (ME), Civil Engineering (CE), Electrical Engineering (EE) Computer Science and Engineering (Data Science).

TGPCET offers Eight PG programs in engineering viz. Computer Science and Engineering (CSE), Integrated Power System (IPS), Structural Engineering (SE), Electronics and Communication Engineering (ECE), Artificial Intelligence, Machine Learning (AIML) & Mechanical Engineering design (MED), Aeronautical Engineering (AERO) and Electric Vehicle (EVT) and also offers Two years PG programs in Master of Business Administration (MBA) as well as Two years Master in Computer Application (MCA).

In addition TGPCET conducts three years Diploma programs in six disciplines of engineering such as Civil Engineering (CE), Mechanical Engineering (ME), Computer Science and Engineering (CSE) and Electrical Engineering (EE), Electronics and Communication Engineering (ECE) and Information Technology (IT).

College is located in the midst of Multimodal International Cargo Hub and Airport (MIHAN) and also in the vicinity of Butibori Industrial area, Nagpur. This sanstha is started by the dedicated and renowned academicians genuinely committed to impart quality technical education to the students, who are aspiring for carrier in Engineering, Technology and Management.

College offers additional courses beyond syllabus to expose the students towards the industrial climate by conducting courses in C++ with PYTHON, C#.NET, Java, Oracle-SQL and Administration, CCNA, PLC SCADA, MATLAB, AUTOCAD, STAAD PRO, CREO, PHP.

The college has signed MoU with Charusat University, Gujrat Dr. Panjabrao Deshmukh Krishi Vidyapeeth (PDKV), Akola and Vignan's University, Guntur to excel the academic and research capability of staff and students in the emerging fields of Science, Engineering and Agriculture.

The staff having versatile rich experience in teaching, research and industry are educating students of all sections of society to foster Quality Education and to build high moral standards.

TGPCET develops the attitude towards equality, fraternity, liberty, justice and respect for all sections of society. TGPCET grows students in the domain of latest scientific and technological areas by introducing ATMEL, USA, ROBOTICS and embedded programs for enhancing inter disciplinary research fields.

College has continuously risen in popularity amongst the aspiring students and parents and has become a preferred choice for taking admissions due to availability of elegant and vast infrastructure facilities, dedicated staff members, who provides holistic quality education.

The college is guided by its Advisory Committee consisting of Eminent Academician from Prestigious Institutes and also by the Renowned Industrialists. The institute works towards excellence in imparting quality technical education by motivating students to become a trend-setter to acquire Global leadership. For implementing the quality policy, an action plan is collectively prepared by the Principal and HoDs as per the vision of the Management and the Management regularly interacts with the Principal to review the implementation process of the quality plans.

ABP News had honored with an Award to TGPCET as “An Outstanding Institute (West)” in the year 2015. It also got feather in the cap in Academics by getting an Award from Big Research as “A Most Promising Engineering College” in the Vidarbha Region of Maharashtra in the year 2012.

About DEPARTMENT

- Year of Establishment:-2021
- Intake:-120

In order to give students exposure to and competence regarding the paradigm of data science, which has basically become an inherent element of many sectors and organizations, the B.Tech in **Computer Science and Engineering (Data Science)** is offered in 2021.

Computing science, applied mathematics, computational statistics, management, and analytics come together to form the specialized multidisciplinary field known as data science.

The Data Science Engineers play a crucial role in the organization, working together with Data Scientists and Data Analysts to assist businesses solve complicated challenges and make decisions with a strong business sense.

The program's goal is to focus on fundamental topics in data science, such as analytics, visualization, modelling, knowledge representation, the internet of things, machine learning, and decision-making, with a strong emphasis on getting hands-on experience through practicals, real-world case studies, and exposure to the data science industry.

Head of The Department

Prof. Abhimanyu Dutonde
(HOD, CSE - Data Science)

I am pleased to address readers of our technical magazine's even semester edition. Data Science represents innovation and possibilities, and our department is dedicated to fostering curiosity and excellence. This magazine showcases the hard work of our students and faculty, highlighting interdisciplinary approaches to real-world problems. It features insightful articles and achievements from the CSE - Data Science community. Congratulations to the editorial team for their impressive compilation, inspiring all to pursue excellence. As we enter a new semester, I encourage students to learn with passion and resilience, upholding our department's values of innovation and integrity. Wishing everyone a fruitful semester ahead!

The Pillars of the Department

Prof. Renuka Naukarkar

Prof. Sudha Shende

Prof. Priyanka Kanoje

Prof. Premlata Sahare

Prof. Apeksha Raut

Dr. Dhiraj Karvatkar

Prof. Alex Dhoke

The Editorial Board

Prof. Priyanka Kanoje

Greetings to all readers of the even semester edition of our technical magazine. It is an honor to present this compilation of innovative ideas, research insights, and creative endeavors from the vibrant minds of the CSE - Data Science community.

This magazine reflects the dedication, teamwork, and intellectual curiosity of our students and faculty, showcasing their achievements and contributions to the ever-evolving field of Data Science. I extend my heartfelt appreciation to everyone who contributed to this edition, making it a valuable platform for knowledge sharing and inspiration.

I hope this magazine encourages deeper exploration and sparks new ideas in our readers. Wishing everyone continued success in their academic and professional pursuits.

The Student Content Editors

Ms. Devanshi Shingade
Student Coordinator

Ms. Nidhi Meshram
Student Coordinator

Mr. Shubham Ambhore
Student Coordinator

Ms. Samruddhi Bhamburkar
Student Coordinator

Content Directory

Industrial Visit

Visit to RRSC , Nagpur

Name of the event: Industrial Visit to RRSC, Nagpur.

Date of the event: 10 October, 2024

Event Coordinator: Prof. Apeksha Raut.

Aim of the event:

The program was designed to give second-year students hands-on experience in remote sensing technology through an industrial visit to the Regional Remote Sensing Center-Central.

Program Details:

- **Venue**: Regional Remote Sensing Center-Central
- **Participants**: 53, Second-year students.
- **Activities**: Informative sessions, live demonstrations, interactive workshops, guided tours.
- **Coordinator:** Dr. Sadhna Jain, scientist/ Engineer RRSC Nagpur Technology provided a comprehensive tour of required facilities and demonstrated the application of Indian Space Research organization.

Visit to RRSC , Nagpur

- The Expert here, explore the knowledge of satellite imaging, GIS (Geographic Information Systems), data processing techniques and technologies involved in remote sensing.
- They demonstrates information on forest cover mapping, flood monitoring with 3D image effect.
- They also provide hands-on session with remote sensing tools and software like QGIS, ENVI, and ERDAS and walkthrough of data acquisition and interpretation processes.

Outcomes of the Visit:

- Enhanced understanding of theoretical concepts through practical exposure.
- Awareness of the diverse applications of remote sensing technology in addressing societal and environmental challenges.
- Motivation to explore remote sensing as a career or research field.

Conclusion:

The industrial visit to the Regional Remote Sensing Center-Central proved to be highly successful, providing students with significant exposure to the field of remote sensing. It deepened their understanding, enhanced their skills, and motivated them to consider future pathways in geospatial technology.

Student Interaction at RRSC Organization

Acknowledgement:

We sincerely thank Dr. Sadhna Jain for her guidance and the RRSC for having us and offering students an enriching learning experience.

Industrial Visit AT RRSC, Nagpur

Visit to HCL , Nagpur

Name of the event: Industrial Visit to HCL, Nagpur.

Date of the event: 13 December, 2024

Event Coordinator: Prof. Alex Dhoke.

Aim of the event:

The event aimed to inspire students by highlighting HCL's initiatives, emphasizing key skills in programming, problem-solving, and communication, essential for career success.

Program Details:

- **Venue**: HCL, Mihan Nagpur
- **Participants**: 22, Third-year students.
- **Activities**: Engaging presentation, leader talks accompanied by tour of the office.
- **Coordinator:** Mr. Aniket Wadekar, Mr. Shailesh Awale, Mr. Prashant Pawar, Mr. Roshan Chouhan, Ms. Sonal Shimbhekar, Ms. Piyali Surkar, Mr. Abhishek Chatterjee, Ms. Vishakha T and Mr. Shreyas.

The purpose of HCL Technologies MIHAN Companies in Nagpur is to create a Hub for Engineering and R& D Services and to provide opportunities for local talents that useful for students.

Outcome:

- Understanding HCL's use of advanced technologies like AI, cloud computing, cybersecurity, or automation.
- Learning about tools and platforms the company uses for its operations and services.

Conclusion:

Mr. Aniket Wadekar highlighted HCL's initiatives, while leaders emphasized programming skills, foundational platforms, and problem-solving. Ms. Piyali Surkar discussed new tools for content creation, and Mr. Abhishek Chatterjee stressed the importance of communication and aptitude for graduates.

Acknowledgement:

We would like to thank HCLTECH team members including Center Head, Shailesh Awale, Swarnalatha Mam, Roshan Padole, Vishaka T, Aniket Wadekar, Prashant Pawar, Sonal Shimbhekar, Piyali Surkar, Rochan Chaihan, Shreyah.

Industrial Visit AT HCL, Nagpur

Workshop

Workshop on Seaborn Data Visualization Using Python

Name of the event: Workshop on Seaborn Data Visualization Using Python
Date of the event: 10 and 11 September, 2024

Aim of the event:

The aim of the event was to enable students to gain hands-on experience from an industry-level expert on Data Visualization using Python.

Program Details:

- Venue: AryaBhatta Hall, TGPCET
- Participants:42, Second-year students.

The Department of CSE-Data Science at Tulsiramji Gaikwad-Patil College of Engineering and Technology organized a workshop on "Seaborn Data Visualization using Streamlit Python" on September 10-11, 2024, under the "VEDA" forum. Experts Mr. Akshay Jain, Ms. Shubhangi Thakre, and Mr. Gaurav Bansod led the sessions, coordinated by Prof. Apeksha Raut. We thank Dr. P. L. Naktode (Principal), Dr. Pragati Patil (Vice-Principal), Prof. Ritesh Banpurkar (Dean IQAC), and Dr. A. H. Gade (Dean Academics) for their support.

Python Based Programming for app delovepment, Basically here using Streamlit for data Visualization in that project overview, Application of project, steps to develop a project using GGPloT , Seaborn and MatPlotLib.

Conclusion:

Mr. Aniket Wadekar highlighted HCL's initiatives, while leaders emphasized programming skills, foundational platforms, and problem-solving. Ms. Piyali Surkar discussed new tools for content creation, and Mr. Abhishek Chatterjee stressed the importance of communication and aptitude for graduates.

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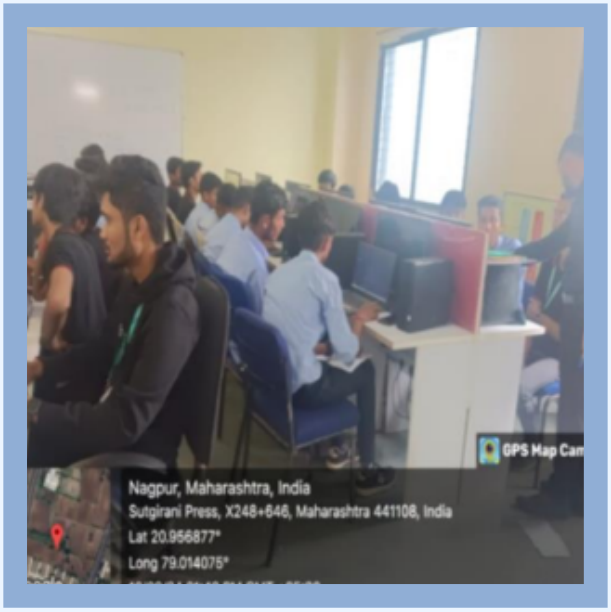


Practical session on python at Introduction to Data Science Lab

Practical session on python at Software Engineering Lab

NPTEL Certifications

The National Programme on Technology Enhanced Learning (NPTEL) continues to play a pivotal role in democratizing quality education for students across India. With its accessible format and industry-relevant courses, it has become a cornerstone of technical education. The 2023-2024 enrollment data provides fascinating insights into student engagement, performance, and certification outcomes.

Student Demographics and Participation

From the dataset, students from various academic years and semesters are actively participating in NPTEL courses. The distribution highlights significant representation from third-year and fifth-semester students, reflecting a trend where students engage with additional certifications to enhance employability and academic profiles.

Course Selection Trends

Among the diverse subjects available, courses like "Introduction to Industry 4.0 and Industrial Internet of Things" stand out as popular choices. This indicates a growing interest in cutting-edge technologies and their applications in modern industries. The emphasis on emerging fields demonstrates how NPTEL aligns its offerings with industry demands.

Performance Metrics:

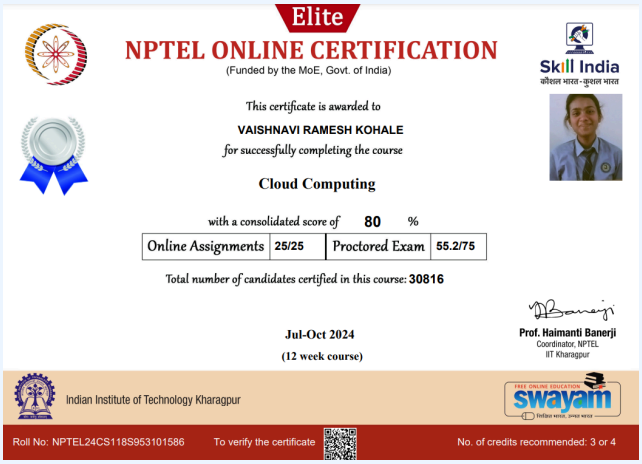
A noteworthy aspect is the high completion rate for assignments. The majority of students passed in the certificate examination, which correlates strongly with overall success in the program. This suggests that consistent engagement with coursework is a key driver of academic success.

Students participation in NPTEL Examination - 2024

Sr No.	Year/ Semester	Name of student	Name of Subjects Applied For
1	Third Year/ 5th Sem	Om Dattatray Navghare	Introduction to Industry 4.0 and Industrial Interest of Things
2		PRAN DAMODAR WASNIK	The Joy Of Computing Using Python
3		Nidhi Jayendra Sharnagat	1. Artificial Intelligence: Search Methods For Problem Solving 2. Learning Analytics tools
4		Nupur Mahore	Data science using python
5		AYUSHI AKASH MOON	PRIVACY AND SECURITY IN ONLINE SOCIAL MEDIA
6	Final Year/7th Sem	Vaishnavi Ramesh Kohale	Cloud Computing
7		Ritik Anil Naitam	Cloud Computing

Student's Spotlight

2.1 NPTEL Certifications



Elite

NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

Skill India

This certificate is awarded to

VAISHNAVI RAMESH KOHALE

for successfully completing the course

Cloud Computing

with a consolidated score of 80 %

Online Assignments	25/25	Proctored Exam	55.2/75

Total number of candidates certified in this course: 30816

Jul-Oct 2024

(12 week course)

Prof. Haimanti Banerji
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No: NPTEL24CS118S953101586 To verify the certificate No. of credits recommended: 3 or 4

Congratulations Ms. Vaishnavi Kohale, Final year student on excellent achievement!

NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

Skill India

This certificate is awarded to

OM DATTATRAY NAVGHARE

for successfully completing the course

Introduction to Industry 4.0 and Industrial Internet of Things

with a consolidated score of 53 %

Online Assignments	22.94/25	Proctored Exam	30/75

Total number of candidates certified in this course: 15725

Jul-Oct 2024

(12 week course)

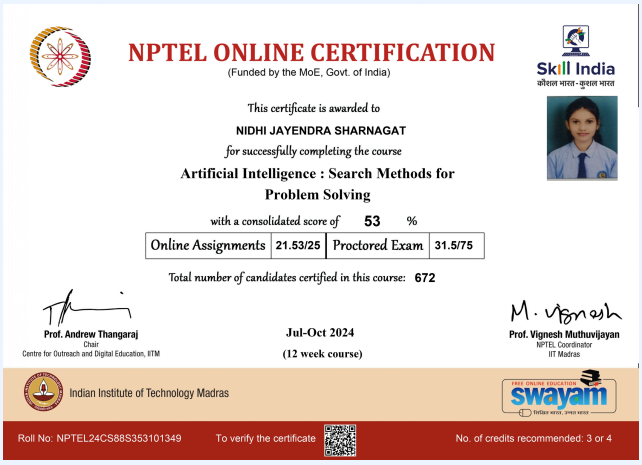
Prof. Haimanti Banerji
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No: NPTEL24CS95S353100059 To verify the certificate No. of credits recommended: 3 or 4

Congratulations Mr. Om Navghare, Third year student on excellent achievement!



NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

Skill India

This certificate is awarded to

NIDHI JAYENDRA SHARNAGAT

for successfully completing the course

Artificial Intelligence : Search Methods for Problem Solving

with a consolidated score of 53 %

Online Assignments	21.53/25	Proctored Exam	31.5/75

Total number of candidates certified in this course: 672

Prof. Andrew Thangaraj
Chair
Centre for Outreach and Digital Education, IITM

Jul-Oct 2024

(12 week course)

Prof. Vignesh Muthuvijayan
NPTEL Coordinator
IIT Madras

Indian Institute of Technology Madras

swayam

Roll No: NPTEL24CS88S353101349 To verify the certificate No. of credits recommended: 3 or 4

Congratulations Ms. Nidhi Sharanagat, Third year student on excellent accomplishment!

Skill Development activities under Eduskills

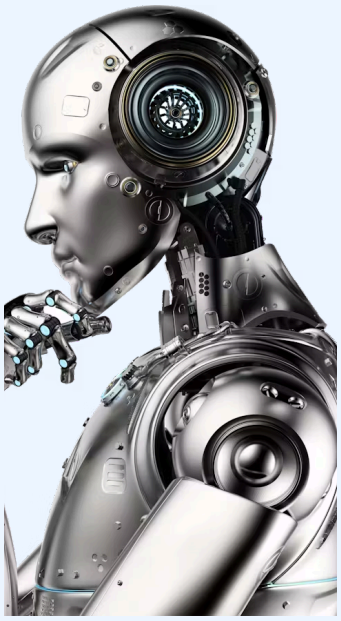
EduSkill is an initiative or concept aimed at enhancing student development through skill-building activities, often bridging the gap between academic knowledge and real-world skills. Activities under EduSkill focus on improving students' employability, entrepreneurial abilities, and overall personality.

EduSkill is an initiative or concept aimed at enhancing student development through skill-building activities, often bridging the gap between academic knowledge and real-world skills. Activities under EduSkill focus on improving students' employability, entrepreneurial abilities, and overall personality through following points:

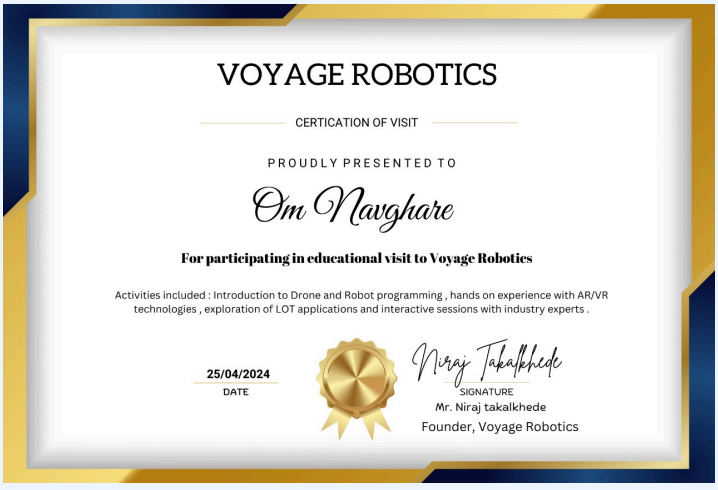
- Workshops and Seminars: Sessions on emerging technologies like AI, Data Science, Blockchain, IoT, and Cybersecurity.
- Coding Bootcamps: Programs to teach programming languages and software development skills.
- Hackathons: Events where students collaborate to solve real-world problems through coding and innovation.
- Certifications: Offering globally recognized certifications in tools and platforms like AWS, Google, Microsoft, or Cisco.

Eduskills Certifications of Students

Surplus skills of students



Congratulations, Mr.Tushar Gajkeshwar, Second year student on accomplishment!



Congratulations, Mr.Om Navghare, Third year student on accomplishment in the era of Robotics!

Student Research Papers

FAKE NEWS DETECTION using NLP

Fake News Detection: A Community Engineering Project

Abstract:
The rise of fake news on digital platforms poses significant risks to society, influencing public opinion, health, and democracy. This project explores methods to detect fake news using artificial intelligence (AI), machine learning (ML), and social network analysis. It also addresses ethical challenges and proposes scalable, real-time solutions to mitigate misinformation's impact on digital ecosystems.

Introduction:
Fake news detection is a critical field that combats the proliferation of false or misleading information. Rapid dissemination of fake news, often facilitated by social media, can manipulate public perception and disrupt societal stability. This study investigates methods such as Natural Language Processing (NLP), machine learning models, and social network analysis to identify and combat fake news. Challenges include data scarcity, evolving misinformation techniques, and ethical considerations.

Deep learning methods, including Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), outperform traditional techniques in identifying nuanced fake news patterns. Graph-based approaches analyze information propagation within networks to detect echo chambers.

The research explores:
1. Characteristics of fake news in content and dissemination.
2. AI and ML's role in automating detection.
3. Social and psychological factors influencing fake news spread.
4. Ethical and technical challenges in detection systems.

Conclusion:
This project underscores the multidisciplinary nature of fake news detection, blending technology, ethics, and public awareness. Collaborative efforts among researchers, policymakers, and industry leaders are essential to combat misinformation effectively and foster a trustworthy information environment. The proposed system advances detection accuracy while addressing ethical and technical challenges, contributing to a more informed and resilient society.

Submitted by: Mahesh Ingale, Keshav Chelmeti, Irfan Pathan, Manmadan Matte, Khemal Ureti, Mahamuni Kotangale

CREDIT RISK ASSESSMENT USING ML

Credit Risk Assessment Using Machine Learning: A Community Engineering Project

Abstract:
This project investigates the potential of machine learning (ML) to revolutionize credit risk assessment in the financial sector. Traditional methods for evaluating credit risk face limitations in handling large datasets and uncovering complex borrower behaviors. ML offers advanced techniques to improve predictive accuracy, scalability, and fairness. The proposed framework integrates modern ML algorithms with a focus on ethical and explainable AI, contributing to sustainable financial practices.

Introduction:
Credit risk assessment is fundamental to financial institutions, influencing lending decisions and risk management. Traditional approaches, such as logistic regression, are limited by static assumptions and insufficient handling of high-dimensional data. ML introduces dynamic models capable of analyzing vast datasets and identifying non-linear patterns. This project explores ML techniques to enhance credit risk prediction, reduce operational inefficiencies, and ensure fair lending practices. Key challenges include data quality, model interpretability, and regulatory compliance.

1. Traditional Models: Logistic regression and decision trees, though interpretable, struggle with non-linear patterns and large datasets.
2. Machine Learning Advances: Techniques like random forests, neural networks, and gradient boosting improve accuracy by capturing complex relationships.
3. Explainability Tools: SHAP (Shapley Additive Explanations) and LIME (Local Interpretable Model-Agnostic Explanations) address the black-box nature of ML, ensuring compliance with financial regulations.

Conclusion:
The integration of ML into credit risk assessment demonstrates significant potential to transform the financial landscape. By addressing challenges in data quality, fairness, and transparency, ML can ensure more equitable and efficient credit practices. Collaborative efforts between financial institutions, regulators, and technology providers are essential for successful adoption.

Submitted by: Prashant Kotangale, Prathamesh Chaudhari, Ram Dhote, Rohan Kalamkar, Rohan Tonge, Rohit Khadse

Faculty Research Papers

Machine Learning in Fake News Detection and Social Innovation Challenges

By: Prof. Dhiraj Karwatkar

Machine Learning in Fake News Detection and Social Innovation Challenges:

- Bias in Training Data: ML models may inadvertently reflect biases in the datasets used for training.
- Dynamic Nature of Fake News: Evolving tactics by fake news creators necessitate continuous model updates.
- Lack of Ground Truth: Limited access to verified datasets can hinder model accuracy.

Interconnection Between Fake News Detection and Social Innovation

- Restoring Trust: ML-based fake news detection bolsters trust in media, enabling better-informed communities.
- Policy Support: Insights from misinformation trends help governments craft effective regulations.
- Civic Engagement: Promoting accurate information empowers communities to participate meaningfully in societal progress.

Abstract:

Social media platforms have recently become a primary source of news and information (Wang et al., 2022; Li, Zhou & Huang, 2021). However, the ease of sharing and spreading information on social media has led to an increase in the spread of fake news, which can significantly impact public opinion, politics, and society (Apuke & Omar, 2021; Wang et al., 2023; Naeem, Bhatti & Khan, 2021; Meng, Xiao & Wang, 2022). Detecting fake news in email is challenging, as the content can be diverse, misleading, and constantly evolving (Zhang & Ghorbani, 2020; Huang, 2020; Li et al., 2022).

Conclusion:

This research proved that machine learning techniques, especially SVM-RBF and IB-KNN, can effectively identify bogus email forwards. The findings showed that SVM-RBF had a higher accuracy (97%) than IB-KNN (85%). Nonetheless, both the used datasets and classification algorithms might be enhanced. More comprehensive and varied datasets, such as data from different social media sites, should be investigated in future studies. This would allow for a more thorough analysis of the classifiers' performance on a broader range of data. Further performance improvements may be possible by studying and developing hybrid algorithms that combine the benefits of various classifiers, such as SVM-RBF and IB-KNN. The accuracy of email classification and the prevention of the transmission of fake news and other dangerous content could be enhanced by integrating predetermined directories into email servers and programs, such as user-defined and context-aware guides.

Image Text Detection and Conversion into Text Form

By: Prof. Sudha Shende

Image Text Detection and Conversion into Text Form Challenges:

ABSTRACT:

We are purposing a system by which we can detect the image text and convert into the text form for which we firstly apply MSER (Maximally Stable External Region) which is used as a method of blob detection in images, or to detect character candidates. After that some text features by which the text can be recognized. To recognize the text feature we apply some geometric filtration by which we can easily identified the character from the image. This is why all the character is formed by combination of geometric figures. After recognizing the text, reject the false positives i.e. background, figures, and many things expect character. Performing all these we apply OCR function by which Segmenting out the text from a cluttered scene helps with related tasks. Lastly after finding all these we have the text which is in text form which is easily modified and editable.

INTRODUCTION:

OCR optical character recognition is the recognition of printed or written text characters by a computer. This involves photo scanning of the text character. Optical character recognition (also optical character reader, OCR) is the mechanical or electronicconversion of images of typed, handwritten or printed text into machine-encoded text, whether from scanned document, a photo of a document, a scene-photo (for example the text on signs and billboards in a landscape photo) or from subtitle text superimposed on an image (for example from a television broadcast).

It is widely used as a form of information entry from printed paper data records, whether passport documents, invoices, bank

statements, computerized receipts, business cards, mail, printouts of static-data, or any suitable documentation. It is a common method of digitizing printed texts so that they can be electronically edited, searched, stored more compactly, displayed on-line. OCR can be used for a variety of applications.

Conclusion:

From earlier we can only detect the title of the document or the vehicles number plate and so on only. Now by this system the whole document is easily detect and can be modified as we want, (text can be added, removed and many other). In this method we can detect the approx. 80% of the image text. This project reduces the human effort to type a full document in conversion of digital form. And after the conversion we can easily modified as per our requirement.

Lung Cancer Prediction Using Convolution Neural Network

By: Prof. Abhay Rewatkar, Prof. Sudha Shende, Prof. Nilesh Nagrale, Arti Sondawale, Mr. Jayesh Fating, Ms. Pooja Patle

Lung Cancer Prediction Using Convolution Neural Network

ABSTRACT:

Past years have experienced increasing mortality rate due to lung cancer and thus it becomes crucial to predict whether the tumor has transformed to cancer or not, if the prediction is made at an early stage then many lives can be saved and accurate prediction also can help the doctors start their treatment. Computed tomography plays a vital role in ensuring the condition of tumor that by checking the size of tumor, location of tumor, etc. In this paper, we have proposed a framework for prediction of cancer at an early stage so that many lives that are in an endangered situation could be revived. Basically, our focus is on two domains of computer science that is Digital Image Processing acronym DIP and Machine Learning. Digital image processing is well-known for the phase of preprocessing the image. In the further stage, the pre-processed image is exposed to segmentation phase and then the segmented image is passed for feature extraction and finally the extracted features are trained using machine learning classification algorithms like SVM (Support Vector Machines), Random Forest, ANN (Artificial Neural Network). Based on the classification results obtained, prediction is made whether the tumor is benign or malignant. The inevitable parameters such as accuracy, Recall and precision are calculated for determining which algorithm has the highest predictive accuracy.

Conclusion:

Proposed techniques showed very good accuracy for lung cancer detection, The SMOTE model showed excellent performance with an overall accuracy of 99.42%.Where Class 1 is perfectly classified, demonstrating the model's strong capability in identifying instances of Class 1 without error and Class 2 also has near-perfect performance with very high precision and recall, indicating that the model is highly reliable for this class. Some improvements are needed for Class 0, where a few instances are misclassified as Class 2. Refining the model to reduce this misclassification could further improve its performance. The confusion matrix in class weighted provides a comprehensive view of how the classification model is performing for each class. The model has high accuracy and performs particularly well for Class 2, with minor improvements needed for distinguishing Class 0 and Class 1. The detailed analysis of precision, recall, and F1-scores highlights the model's strengths and areas for improvement, guiding future refinements and tuning efforts. The overall accuracy in data augmented technique is good (90.5%), but improvements are needed to handle misclassifications, particularly for Class 2. Where Class 0 showed high recalls but moderate precision, indicating good identification but some misclassification issues. Class Performed exceptionally well in terms of recall, but precision indicates the presence of some false positives. Class 2 needs significant improvement to reduce misclassifications and improve recall, ensuring more accurate identification.