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(AUTONOMOUS)

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July - December 2022
Volume - 1, Issue - 2

Department of COMPUTER SCIENCE AND ENGINEERING

Vision

- To become a centre of excellence in nurturing the quality computer science & engineering professionals embedded with software knowledge, aptitude for research and ethical values to cater to the needs of industry and society.

Mission

- The Department of Computer Science and Engineering is committed:
- Mould the students to become software Professionals, researchers and entrepreneurs by providing advanced laboratories.
- Impart high-quality professional training to get expertize in modern software tools and technologies to cater to the real-time requirements of the industry. Inculcate teamwork and lifelong learning among students with a sense of societal and ethical responsibilities.

Robotic Process Automation and Artificial Intelligence

Abstract

Taking into account the technological evolution of the last decades and the proliferation of information systems in society, today we see the vast majority of services provided by companies and institutions as digital services. Industry 4.0 is the fourth industrial revolution where technologies and automation are asserting themselves as major changes. Robotic Process Automation (RPA) has numerous advantages in terms of automating organizational and business processes. Allied to these advantages, the complementary use of Artificial Intelligence (AI) algorithms and techniques allows to improve the accuracy and execution of RPA processes in the extraction of information, in the recognition, classification, forecasting and optimization of processes. In this context, this paper aims to present a study of the RPA tools associated with AI that can contribute to the improvement of the organizational processes associated with Industry 4.0. It appears that the RPA tools enhance their functionality with the objectives of AI being extended with the use of Artificial Neural Network algorithms, Text Mining techniques and Natural Language Processing techniques for the extraction of information and consequent process of optimization and of forecasting scenarios in improving the operational and business processes of organizations.

Introduction

The availability of digital services is seen as a growing trend at a company-level, taking into account the greater use of the proliferation of information systems in society and the technological evolution that we are witnessing at various levels. The form of communication between citizens, companies and institutions started to be mostly through the exchange of digital information. In view of the high volume of information and digital documentation exchanged between entities, in general, it is humanly impossible to respond in a timely manner to the processing of all information and to follow up on processes internally. In this sense, we highlight the importance of Robotic Process Automation (RPA), which can be defined as a "technique that results in the automatic execution of administrative, scientific or industrial tasks" which uses robotics as a "set of techniques concerning the operation and use of automata (robots) in the execution of multiple tasks in place of man" for "how to do a thing; standard; method; system". In this context and in a nutshell, the RPA tools correspond to a set of techniques that aim to improve the work by reducing the number of repetitive tasks, automating them. In addition to the use of RPA, the complement with Artificial Intelligence (AI) - algorithms and techniques - allows to improve the precision of the execution of automated processes. Industry 4.0 reviews a set of technologies and sensors that allows an even greater advance in the processes and applications of automation of AI applications for organizational processes, contributing to a better performance and presenting new opportunities.

The main contribution of this paper is essentially in providing a review of AI and RPA contributions to Industry 4.0 as well as in the analysis and comparison of several proprietary and opensource tools regarding their functionalities. This document is structured as follows. In chapter two the general concept about Robotic Process Automation is presented and in section 3 the general concept of Artificial Intelligence.

Robotic Process Automation

Robotic Process Automation (RPA) is the automation of services tasks that reproduce the work that humans do. The automation is done with the help of software robots or AI workers that are able to perform, accurately, repetitive tasks. The task instructions are set by the developer using some form of screen recording and defining variables. These tasks include actions like logging into applications, copying and pasting data, opening emails, filling forms, among others. Van der Aalst et al. state that "RPA is an umbrella term for tools that operate on the user interface of other computer systems". Although traditional forms of process automation (like screen recording, scraping and macros) also rely on the computer's user interface, RPA's core function is via element identification and not by screen coordinates or XPath selections. This, in most cases, provides a more intelligent interaction with the user interface. Commercial vendors of RPA tools report a surge in demand since 2016, and we see some research where these tools are used for automating digital forensics, auditing and industry. The advent of the fourth industrial revolution is paving the way for new ways to automate mundane rules-based business processes, using RPA tools on information obtained from smart devices . For business processes, RPA is the extrapolation of a human worker's repetitive tasks by a robot (where those tasks are done quickly and profitably). This aims to replace people by automation in an outside-in manner. Unlike traditional methods, RPA is not part of the information infrastructure but rather sits on top of it, implying a low level of intrusiveness possibly reducing costs. Some reports present a 30% to 50% decrease in operational costs of transactional activities within shared services with the use of RPA technologies.

Artificial Intelligence

At one time AI was a concept divided into major fields of application. Some of those fields where natural language processing, automatic programming, robotics, computer vision, automatic theorem proving, intelligent data retrieval, etc. Nowadays these application areas are so extensive that each could be considered a field in and of itself. AI is now best described as a group of core ideas that underline many of these applications. The use of AI by machines to complete complex tasks, reduce costs and improve the quality of goods and services is the core principle of smart factories. AI technologies are permeating the manufacturing industry and merging the physical and virtual worlds with the help of cyber-physical systems. The use of AI makes the manufacturing industry smart and capable of addressing modern challenges like customizable requirements, reduced time to reach the market and increasing number of sensors used in equipment. The use of flexible robots combined with AI allows for easier manufacturing of different products. AI methods (like data mining) are capable of analyzing large volumes of real- time data gathered from various sensors.

RPA Tools with IA support

In recent years, AI algorithms and Machine Learning (ML) approaches have been successfully applied in real- world scenarios, such as commerce, industry and digital services. ML is used to "teach" machines how to deal with data more efficiently, simulating the learning concept of rational beings and can be implemented with AI algorithms (or techniques), reflecting the paradigms / approaches of rational characteristics such as connectionist, genetics, statistics and probabilities, based on cases, etc. With the AI algorithms and based on the ML approach, it is possible to explore and extract information to classify, associate, optimize, group, predict, identify patterns, etc. Given the scope of the applicability of AI, RPA has gradually been adding, to its automation features, implementations of algorithms or AI techniques applied in certain contexts (e.g.: Enterprise Resource

Planning, Accounting, Human Resources) to classify, recognize, categorize, etc. In recent years, some academic studies have been published as challenges and potential, as well as case studies of the applicability of RPA and AI, as are the cases of articles in the field of automatic discovery and data transformation, in the audit area, in the application of Business Process Management and in productivity optimization processes . Other studies on the intelligent automation of processes using RPA have been published, such as that of the consultancy Delloite , which presents the potentialities of the applicability of AI algorithms and techniques, but it should be applied in well-defined, stabilized and mature processes, like in strategic areas focused on customer tasks, increasing employee productivity (optimizing routine tasks), improving accuracy in categorizing and routing processes, improving the experience with customers and employees, enhancing the analytical data analysis, reduce fraud and payment of "fines" processes for non-compliance with dates or procedures defined by government institutions. In this context, and based on the above, if on the one hand there are challenges and potentialities of the concept of automation using RPA, these may be further enhanced with the application of algorithms and AI techniques. The following sections present commercial and open source tools that we consider representative of the recent applicability of RPA (ideally with the application and some AI techniques or algorithms).

UiPath

UiPath is a tool that allows the development of RPA functionalities in its framework to create and execute programming scripts, allowing it to be programmed with an interface of blocks and multiple plugins for the business process customizations. The RPA UiPath platform is currently structured in three modules, UiPath Studio, UiPath Robot and UiPath Orchestrator, in which the latter allows the possible orchestration of robots. The UiPath Studio module corresponds to a tool that allows to design, model and execute workflows and help in the creation and maintenance of the connection between robots, as well as to ensure the transfer of packages, management of queues. In turn, with the storage of log records and linked with Microsoft's Information Services Server and SQL Server, as well as with Elasticsearch (which is open source and built on the Apache License search engine) with a Kibana data visualization plugin also allows to potentiate the view of analytical information associated with the execution of RPA processes. Some Artificial Intelligence techniques or algorithms are currently available through the UiPath tool through its UIAutomation module and which are disclosed on its official page, of which the following stand out: recognition, optimization, classification and information extraction. In terms of AI algorithms, for the information consulted they use image and character recognition, optimization, classification.

• NAAC INSPECTION 4th & 5th JULY 2022 in CSE Department.
• Department of CSE Extends A Warm welcome to Dr.Vaidehi VijayaKumar (CHAIRPERSON), Dr.Dharmendra Sharma (MEMBER COORDINATOR AND Dr.Parikshat Sing Manhas (MEMBER) OF NAAC PEER TEAM
• NACC INSPECTION DATES 4th & 5th JULY 2022

Departement of CSE participated in MoU SIGNING CEREMONY NEC with EDUSKILLS FOUNDATION, ODISHA Date 07-07-2022.

• Dr.K.Lakshminadh published a paper in the scopus.
• R&D CENTER sanctioned for CSE Department.

Jawaharlal Nehru Technological University Kakinada
Kakinada – 533003, Andhra Pradesh

Recognizes

Department of Computer Science and Engineering
Narasaraopeta Engineering College, Narasaraopeta

As
RESEARCH CENTRE

For the
Academic Years 2021-22 & 2022-23

Kakinada
19th March, 2022

REGISTRAR

CSE Ist year students participated and won the prizes from Dist. Collector, Palnadu on the occation of World Youth Skills Day-2022.

• CSE teams shortlisted for Smart India Hackathon Grand Finale-2022.

SIH - 2022 SHORT LISTED TEAMS FOR GRAND FINALE

1. Team Name :Stpirit Angels
Team Leader Name:N. BHANU SRAVYA
Ministry:Department of Social Justice & Empowerment, Ministry of Social Justice and Empowerment
Domain:Smart Education
Title: Simplifying the selection process of financially weak students for granting aid for coaching for competitive exams.

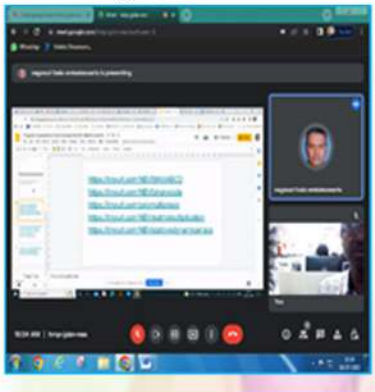
	Name	Gender (M/F)	Email Id	Mobile number	Stream	Year
Team leader	N.BhanuSravya	F	sravyanissankararao@gmail.com	9347669098	CSE	III
Team Member	T.Naga Mounika	F	nagamounikatadepalli@gmail.com	8186025952	CSE	III
Team Member	S.Neha	F	nehasatuluri@gmail.com	7680915699	CSE	III
Team Member	T.SumaDurga	F	sumadurgatalapaneni@gmail.com	7569880294	CSE	I
Team Member	B.Yasaswini	F	winbollineni25@gmail.com	8247626375	CSE	I
Team Member	G.Siva Anjali	F	gurramsivaanjali2004@gmail.com	9573369415	CSE	I
Mentor1 (optional)	Dr.S.N.Tirumla Rao	m	ngatinumlarao@gmail.com	9885271324		

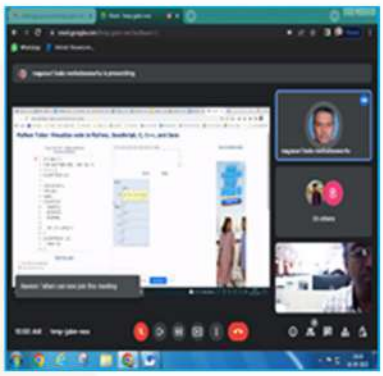
1. Team Name :EcoTechs
Team Leader Name:K.SAI CHARANI
Ministry:Ministry of Housing and Urban Affairs
Domain:Clean & Green Technology
Title:
Suggest a solution to help municipal bodies maximize solid waste collection with their given resources.

	Name	Gender (M/F)	Email Id	Mobile number	Stream	Year
Team leader	K.Sai Charani	F	kunisettysaicharani@gmail.com	7842849969	CSE	3rd
Team Member	G.Sai Keerthi	F	ammulu7887@gmail.com	8463910602	CSE	3rd
Team Member	M.Asritha	F	madduluriasritha@gmail.com	9959586361	CSE	3rd
Team Member	M.Mahidhar Reddy	M	mahidharreddym2002@gmail.com	7981456134	CSE	3rd
Team Member	A.Danush	M	danushakkala02@gmail.com	8008649582	CSE	3rd
Team Member	K.Krishna	M	ananthmech@gmail.com	8008600275	MECH	3rd
Mentor 1 (optional)	B.Siva Kanaka Raju	M	Skraju.battula@gmail.com	8919899291	CSE Dept.	
Mentor 2 (optional)	G.Veeranjaneyulu	M	Veeru.gottipati2009@gmail.com	8074135290	S/W Industry	

1. Team name:Cabin Full Of Thoughts
Team leader:Surya Teja
Ministry: ministry of housing and urban affairs
Domain:Agriculture Food Tech and rural development
Suggest a solution to help the ULBs/State/UT Governments to monitor or control the growth of slums in the country and develop a self-sustained environment to ensure affordable housing in order to avoid growth of slums in future.

Department of CSE conducted a Guest Lecture On Data Visualizing Code





• Department of CSE participated in Mou exchange with ExceleR On 30-07-22.

• Painting and Essay Writing Competition on the eve of Azadi Ka Amrit Mahotsav on 11-8-22.

• Dr S V N Srinivasu has participated in the Regional Meet, Institution's Innovation Council, MoE's Innovation Cell held on 12/8/22 at Sreenidhi Institute Of Science and Technology, Hyderabad.

Demo day organised for SIH Grand Finale- 2022 selected students with the association of IIC.

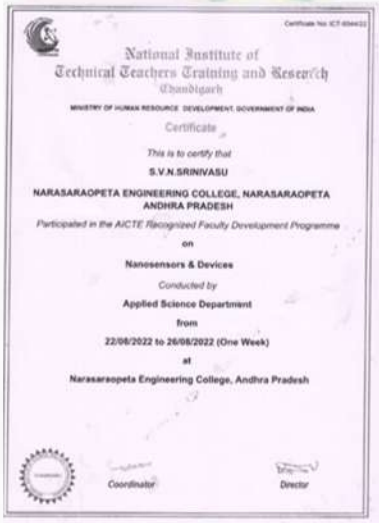
• One week national level FDP ON Amazon WEB Services in Association with (Brino Vision)from August 22nd to 27th, 2022.

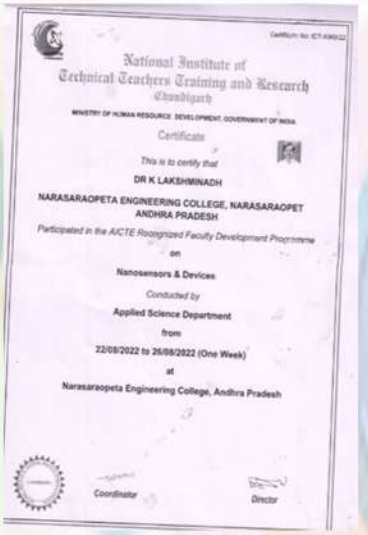
• Department of CSE conducted a 2-Day Bootcamp+32 hour Fullstack webdevelopment was organized to the students in association with BrainoVision solution India Pvt Ltd Hyderabad during 24th-27th August,2022. Hackathon on Fullstack webdevelopment was conducted to the students . Were students developed projects.

Two teams Eco Techs and Cabin Full Of Thoughts(each consisting of six members)from CSE Dept have attended SIH 2022 Grand Finale at Manipal University Jaipur, Rajasthan and one team,Sprit Angels (consisting of six members) from CSE Dept have attended SIH 2022 Grand Finale at Parul University Vadodara Gujarat during 25th-26th August ,2022.Mentors for three teams are.

Spirit Angels Team:
Mr.K.Jayaprakash (Assistant Prof CSE)
Eco Techs Team:
Mr.K.V. Narasimha Reddy (Assistant Prof CSE)
Cabinfull of Thoughts Team:
Mr.M.Satyam Reddy (Assistant Prof CSE)

• Two faculty members(Dr.S.V.N SRINIVASU, Dr.K.LAKSHMINADH) are participated in One week national level FDP ON Nanosensors Devices in Association with(National Institute of Technical Teachers Training and Research chandigarh)from 22/08/2022 to 26/08/2022.



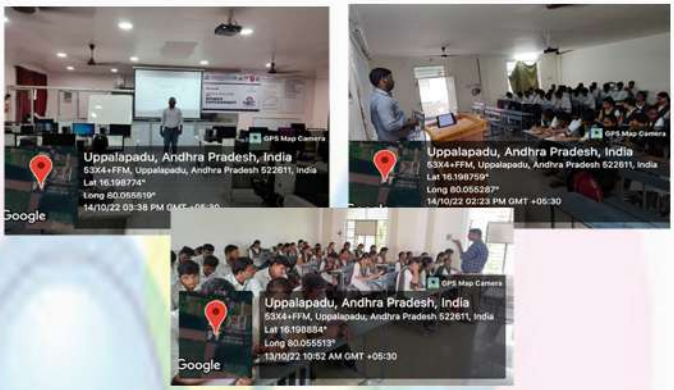


• A One Day Workshop on StartUp and Incubation Support Services by NSIC. One faculty member (D.Venkatreddy) are participated in One week FDP ON Faculty Enablement Programme(FEP) On "DevOps-CICD" in Association with (JNTUK) from 12/09/2022 to 16/09/2022.

• Build Self Confidence Programme Organised by IQAC,Department of CSE & IT on 13 sep 2022.

• Shanmukha Priyanka Jaladi 2023 Batch Dept of CSE For Being Placed in IBM Package 7.25 LPA.

• Honeywell Training Programmes conducted for students
• IV/I Honeywell training from 13/10/22 to 25/10/22.
• IV/I assignment from 13/10/22 To 15/10/22.
• III/I Bytexl training from 13/10/22 to 23/10/22.



• A CSR Initiative sponsored by Honeywell center of excellence for Women Empowerment Inauguration on 12/10/22.

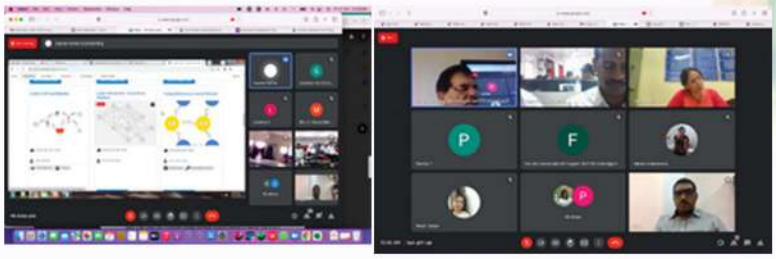
• On the occasion of Innovation Day, poster presentations conducted in cse department on 14/10/22.

• As part of innovation day competetions have conducted to the students on Clound computing ,AI&ML, Cyber Security,5g Technologies, Blockchain.

• III/I Bytexl training from 13/10/22 to 23/10/22

bootcamp+32 Hour hackathon Full Stack Webdevelopment inauguration and hackathon training pro A 2 Day gram.

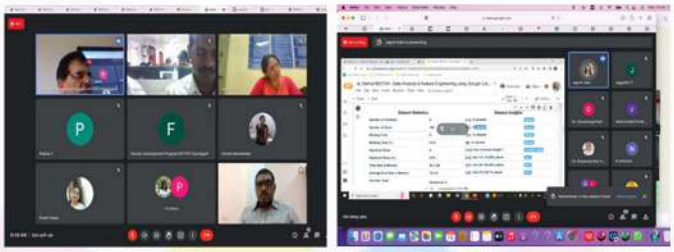
• A One Week National Level Faculty Development Program on Open Source Technologies(ICT 131) In Association with NITTTR, Chandigarh from 17th - 21st October, 2022.



A meeting was conducted on revision of academic audit report on 20/10/22 .Hods and nba criteria incharges from ECE and CSE department.

• A One Week National Level Faculty Development Program on Open Source Technologies(ICT 131) In Association with NITTTR, Chandigarh from 17th - 21th October, 2022.
Coordinator : Dr. S.V.N.Sreenivasu Prof. in CSE Dept.

• A One Week National Level Faculty Development Program on Open Source Technologies (ICT 131) In Association with NITTTR, Chandigarh from 17th- 21th October, 2022.



• IV/I Honeywell training from 17/10/22 to 1/11/22.

Mr. S.Akshay Kumar student of Narasaraopeta Engineering College has won 2nd prize in the event "CAREER YOJANA" organized by the department of CSE B.V Raju Institute of Technology in "A National Level Technical Symposium,PROMETHEAN 2k22" held on 12th & 13th of October 2022.

• HoneyWell CENTER OF EXCELLENCE FOR WOMEN EMPOWERMENT training program completed on 1/11/22.

• Alumni students Mr.Gopi and Mr.Ravi chaitanya of 2010-2014 batch(CSE) have visited the department 29/10/22 and interacted with 2nd year B.Tech students. Presently working as Software Engineer in TCS, Banglore.

• Alumni student M.Deepthi 2012-2-16 batch(CSE) is visited the department 4/10/22 and interacted with 2nd year B.TECH students.

ISO Meeting conducted on 11/11/22.

• Medha Servo placement exam conducted on 11/11/22.

D.Venkatareddy(Asst.Prof) Dept. of CSE Attended and completed NPTEL-AICTE FDP certification.

• Honeywell volunteering session on 19/11/22.

• Expert Intaractive Session On Industry Insights And Job-Readiness in AI&ML and DataScience.

II B.Tech I Sem CRT Bytexl training from 17/11/22 to 26/11/22.

• Prize distribution of Navayuva event organized by CSI-NEC STUDENT Branch during 8th-9th Sept ,2022.On the occasion of Expert Intaractive Session On Industry Insights And Job-Readiness in AI&ML and DataScience.

ISO file verification conducted on 19/11/22 in 201 lab.

ISO files verification conducted on 3/12/22.

II/I Foreign internship program conducted on 2/12/22.

Dr.K.Lakshminadh(Professor) awarded NPTL+Workshop Certificate.

• CSE students participated in JNTUK volleyball selections for boys held on 28. 11.22 at NEC

Dr.K.Lakshminadh (Professor) has participated in a One-week Online FDP on "Recent Trends In Application of Emerging Technologies organized by Dept Of Cse ,VVIT,Nambur,Guntur (Dt) in association with SOLETE, Vijayawada.

N.Ananthramireddy (Asst.Prof) has participated in a One-week Online FDP on "Recent Trends In Application of Emerging Technologies organized by Dept Of Cse ,VVIT,Nambur,Guntur (Dt) in association with SOLETE, Vijayawada

• I/I Students are visited spinning mills from 07/12/22 To 9/12/22.

II/I Bootstrap workshop from 10/12/22 to 12/12/22.. by K. Lingachari.. Resource person.

• Certificate Institution's Innovation Council(IIC) established at Narasaraopeta Engineering College, NARASARAOPET.

Dr.S.V.N Sreenivasu (Professor) has participated in a One-week Online FDP on "Recent Trends In Application of Emerging Technologies organized by Dept Of CSE, VVIT, Nambur, Guntur (Dt) in association with SOLETE, Vijayawada.

• Institutions innovation counciL presents National level ideathon-2022 on 16-12-2022(Friday).

An Expert Lecture on The Future Paradigm-Next Generation Technologies New Generation Jobs on 27/12/22,organized by IQAC,Dept of CSE&IT.
Resource Person:Srinivas Tatavarty, Founder&CEO,EDACE Pvt.Ltd., Chennai.

ICT Academy Bridge 2022-Hyderabad Industry-Institute Interaction Event 49th Edition on 28/12/22.

Student's Voice:

Narasaraopeta Engineering College is one of the best college in this region . It is a great honour to be a part of this institute . It is the best place for graduation. All the faculty here are highly educated. Their knowledge helps us to achieve many things. There is a friendly environment and we can clarify our doubts at any time . High quality and digital education is provided . Practical learning is preferred rather than theoretical learning so that we can learn the topic easily . Training programs and workshops are conducted frequently to increase our knowledge. Various Hackthons, coding competitions are conducted which helps us to enhance our skill and build compitative spirit.

A.Manvitha
21471A0572

Alumni Voice:

B. Vamsi Krishna
15471A05J9
IBM, 12D,
Raheja Mindspace,
Hyderabad

"I had the opportunity to collaborate with brilliant minds and professors who inspired me to think creatively and solve complex problems, experiences that have positively shaped my approach to work in the IT field. "In college, I actively participated in various tech-related clubs and workshops, which allowed me to stay updated with the latest industry trends and technologies. "I'm proud of my academic achievements, earning high grades and recognition for my contributions to class projects and research papers. "Throughout my college journey, I had the privilege of being mentored by professors who were not only experts in their fields but also deeply committed to their students' success. "College provided me with the perfect environment to develop essential soft skills such as teamwork, communication, and time management, which are crucial in the IT industry. "I had the chance to work on real-world projects during internships, which gave me valuable hands-on experience and prepared me for the challenges of the IT workplace.""One of the highlights of my college experience was being part of a team that won a prestigious tech competition, showcasing our ability to innovate and deliver results under pressure. "The college's networking opportunities allowed me to connect with industry professionals and alumni, opening doors to exciting career prospects within the IT sector. "I am grateful for the supportive and diverse community of peers I had in college, as they exposed me to different perspectives and helped me grow both personally and professionally. "As a result of my college education, I've developed a curious and adaptable mindset, enabling me to quickly learn new technologies and stay relevant in a rapidly evolving IT landscape. "My college encouraged me to pursue my passion for technology and provided access to cutting-edge resources and research facilities that enriched my academic journey.""Through industry guest lectures and workshops organized by the college, I gained insights from seasoned IT professionals, which proved invaluable in shaping my career path.""I feel fortunate to have had professors who encouraged critical thinking and innovation, fostering an environment where we were encouraged to push our boundaries and aim for excellence. "College taught me the importance of continuous learning, and I carry that mindset with me as I constantly seek opportunities for professional growth in the IT field."