TECH | TALES | TALENT

COMPENDIUM

harmonizing tech & talent

Department of Computer Engineering

PROLOGUE

Welcome to the world of Computer Engineering at Vishwakarma Institute of Technology, Pune - a place where innovation and technology come together. Our department has a strong reputation for producing competent and knowledgeable graduates who are well-equipped to tackle the challenges of the modern world. We pride ourselves on providing a comprehensive education that combines academic excellence with practical experience, ensuring that our students are prepared to succeed in their future careers.

At our department, our faculty members are experts in their respective fields, and they are committed to providing a nurturing and stimulating environment that encourages our students to reach their full potential. We offer a wide range of courses that cover a broad spectrum of topics, including computer programming, data structures, algorithms, computer networks, databases, artificial intelligence, and machine learning. Our curriculum is designed to equip our students with the skills and knowledge needed to succeed in a constantly evolving technological landscape.

In addition to our academic program, our department provides our students with numerous opportunities to participate in various extracurricular activities, including workshops, hackathons, coding challenges, and internships. These activities are designed to give our students a real-world experience and to help them build their confidence and skills. We also encourage research and innovation, and our students are actively involved in various projects and research initiatives.

PROLOGUE CONT.

The faculty members in our department are actively involved in research and development, and they are constantly striving to push the boundaries of knowledge and innovation. Our faculty members have published research papers in top-tier international journals, presented papers at international conferences, and secured research grants from prestigious funding agencies.

Our students are also making their mark in the world of computing. They have won numerous national and international coding competitions, published research papers in prestigious journals, and secured internships and job placements with leading companies in the industry.

This magazine is a testament to the passion, dedication, and excellence of the Computer Engineering Department at Vishwakarma Institute of Technology, Pune. It highlights the achievements, success stories, and innovations of our faculty and students. We hope that this magazine inspires you to join us in our journey towards excellence in the field of computing. Whether you are a prospective student, a current student, a graduate, or a member of the wider community, we invite you to be part of our vibrant and dynamic department.

STRAIGHT FROM THE HOD'S DESK

Dear readers,

It gives me great pleasure to welcome you to the Department of Computer Engineering of Vishwakarma Institute of Technology, Pune. As the Head of Department, I am delighted to present this magazine, which showcases the achievements and innovations of our faculty and students.

The field of computing is rapidly evolving, and the demand for skilled computer engineers is on the rise. At our department, we are committed to providing a comprehensive education that equips our students with the skills and knowledge needed to succeed in this dynamic and exciting field. Our curriculum is designed to provide a strong foundation in the fundamental concepts of computer engineering, as well as to give our students hands-on experience in cutting-edge technologies.

Our faculty members are experts in their respective fields, and they are passionate about teaching and guiding our students to reach their full potential. They are actively involved in research and development, and they are constantly pushing the boundaries of knowledge and innovation. Our faculty members bring their expertise to the classroom, providing our students with a stimulating and challenging learning environment.

At our department, we believe that hands-on experience is essential for effective learning. Therefore, we provide our students with ample opportunities to participate in various extracurricular activities, such as workshops, hackathons, coding challenges, and internships. These activities are designed to give our students real-world experience and to help them build their confidence and skills. With our students are our pride and joy, and they are making their mark in the world of computing. They have created history on various National and International stages and have made us . Our alumni are spread across the globe, making a positive impact in various industries.

I am proud to lead a department that is dedicated to fostering innovation, creativity, and excellence in the field of computing. I hope that this magazine inspires you to join us in our journey towards excellence in the field of computer engineering.

Thank you for your interest in the Computer Engineering Department of Vishwakarma Institute of Technology, Pune.

Warm Regards,
Sandip Shinde
HOD, Computer Engineering
Vishwakarma Institute of Technology, Pune.

FROM OUR FACULTY ADVISOR

PROF. SWATI JADHAV

Assistant Professor

Vishwakarma Institute Of Technology

We have great pleasure in releasing the technical magazine “Compendium” which brings the students and teachers of computer engineering disciplines on a common platform to share and display their ideas and talent. We wish all the students, who have been involved in bringing out the magazine, for their greater success and career ahead. We wish that this literature establishes to be a flint to ignite the enthusiasm and excite the minds of the students and inspire passion among the members of the faculty of computer Engineering.

This platform was established by students for the students. Every student and faculty member will gain knowledge about the department's good work, endeavors, and achievements. Along with this, we are launching a social media handle to update all of our stakeholders, including industries, alumni, parents, etc., about the great work being done by the departments.

With the help of this platform, we aim to cover all facets of the departments, including students, faculty research, Scopus and web science publications, patents, faculty serving as resource persons for different faculty development programs, students and faculty who attended workshops, FDP's and certification data, students and faculty achievements, and awards received, as well as technical articles written by faculty and students.

There is a designated area for the entrepreneur corner, student of the year corner, industry partner corner, and alumni corner to address the students.
With this thought we would like to conclude this addressing
Come together ...learn together ....share together ...progress together...fly together...until the sky is below you.

PROF. SANGITA LADE

Assistant Professor
Vishwakarma Institute Of Technology

FROM OUR FACULTY ADVISOR

Dear students,

I am extremely proud to announce the launch of "Compendium," the official magazine of the Computer Department of Vishwakarma Institute of Technology, Pune. I am thrilled to see the enthusiasm and hard work put in by the editorial team. It is truly their token of love to the department.

This magazine will serve as a platform for students to showcase their creativity, writing skills, and their technical knowledge. I encourage all students to actively participate in the magazine and contribute articles, news, and events related to the field of computer science and technology.

I would like to congratulate the editorial team for their efforts in bringing this magazine to life. Your dedication and passion towards this project are truly inspiring. I am confident that "Compendium" will be a great success and will become an important part of our department's culture.

I am looking forward to reading the articles and stories from our talented students in the upcoming editions of the magazine.

EDITOR' NOTE

Dear readers,

As I present to you the latest issue of 'COMPENDIUM,' I cannot help but feel emotional. This magazine is a celebration of the brilliance of the Department of Computer Engineering at Vishwakarma Institute of Technology, Pune, and the passion, dedication, and excellence of the faculty and students.

The stories inside this magazine will inspire you and fill you with hope. You will read about the brilliant minds behind the department, who have dedicated their lives to pushing the boundaries of knowledge and innovation. You will read about the students who have won national and international coding competitions, published research papers in prestigious journals, secured internships with leading companies in the industry, and made their mark in various industries across the globe.

As I read through the articles and interviews, I am moved by the passion and dedication of the faculty and students. They have faced challenges and obstacles, but they have never given up. They have worked hard, persevered, and achieved remarkable success.

This magazine is not just a celebration of academic excellence; it is a celebration of the human spirit. It is a testament to the fact that when we set our minds to something and work towards it with passion and dedication, we can achieve anything we want.

I hope that this magazine will inspire you, just as it has inspired me. I hope it will fill you with hope and the belief that you too can achieve anything you want. I hope it will encourage you to pursue your passion in the field of computer engineering and join the brilliant minds at Vishwakarma Institute of Technology, Pune, on their journey towards excellence.

Thank you for reading 'COMPENDIUM,' and I hope it fills you with the same emotion and inspiration that it has filled me with.

Tanmay Pol
Editor-In-Chief
Compendium (2023)

EDITOR' NOTE

To the B-Tech students of Vishwakarma Institute of Technology, Pune,

As you complete your college journey, we dedicate this edition of 'COMPENDIUM' to you. This magazine is a token of love and appreciation of the Department of Computer Engineering at Vishwakarma Institute of Technology, Pune, and you are an integral part of it.

The walls of this institute and the various eyes present here have watched you fail, learn and grow, and we are proud of the perseverance you have put into the making of your journey here at the institute which has shaped you into what you stand today. You have made your mark in various industries, and we have no doubt that you will continue to make us proud in the years to come.

As you conclude your journey at the institute, we hope that this magazine will remind you of your time here and inspire you to continue pursuing your passion in the field of computer engineering. We wish you all the best in your future endeavors and hope that you will stay in touch with us and continue to be a part of the Vishwakarma Institute of Technology family.

Congratulations on completing your college journey, and we wish you all the success in the world.

Warm regards,
Pushkaraj Bhor
Editor-In-Chief
Compendium (2023)

THE COMP CELL

The Comp Cell of Vishwakarma Institute of Technology (VIT), Pune is a vibrant community of students and faculty members who are passionate about computer science and technology. The cell aims to provide a platform for students to develop their technical and interpersonal skills and prepare them for the industry. The cell is dedicated to promoting excellence in computer science and technology, and providing students with opportunities to excel in their chosen field.

We are also the authors of the official Magazine and Newsletter of the Computer Department of the Institute. Through these we provide a great platform for students to showcase their achievements as well as create an impression over the readers which would then attract even more traction towards their content and needs.

In conclusion, the Comp Cell of Vishwakarma Institute of Technology, Pune is a dynamic and active community of students and faculty members who are dedicated to promoting excellence in computer science and technology. It provides students with opportunities to enhance their technical skills, participate in various competitions, and prepare for a successful career in the industry.

OUR FACULTIES

Rejoicing the likes of Vishwotsav - 2023

INTRODUCTION

Ladies and gentlemen, prepare to be amazed! We present to you the latest issue of 'COMPENDIUM,' a love letter to the world of tech that will take you on a journey of innovation, creativity, and excellence in the field of computer engineering.

Inside the pages of this composition, you will find the stories of the brilliant minds behind the department of computer engineering at Vishwakarma Institute of Technology, Pune. These individuals have dedicated their lives to pushing the boundaries of knowledge and innovation, and they have achieved remarkable success in their field.

Their achievements and success stories are too numerous to mention. From groundbreaking research that has been published in top-tier international journals to national and international coding competitions that have been won by the students, the department of computer engineering at Vishwakarma Institute of Technology, Pune, has made its mark in the world of computing.

But it's not just about academic excellence at this department. The faculty members are passionate about teaching and guiding their students towards their full potential. The students are intelligent, creative, and driven, and they have been given ample opportunities to participate in various extracurricular activities, such as workshops, hackathons, coding challenges, and internships. These activities have given them real-world experience and helped them build their confidence and skills.

The department's alumni are spread across the globe, making a positive impact in various industries. They are known for their skills, creativity, and leadership, and they are a testament to the quality of education provided by the department.

'COMPENDIUM' is a literature that showcases the department of computer engineering at Vishwakarma Institute of Technology, Pune. It showcases the passion, dedication, and excellence of the faculty and students, and it inspires others to join them on their journey towards excellence in the field of computing.

So, hold onto your seats and get ready to be amazed by the brilliance of the department of computer engineering at Vishwakarma Institute of Technology, Pune. 'COMPENDIUM' is a dramatic buildup to their success, and it's a must-read for anyone interested in the field of computer engineering.

Natural Language Processing (NLP) and Computational Linguistics (CL) are fields of study that deal with understanding and processing human language by computers. NLP and CL research require the ability to store intermediate state data because the mapping of input and output depends on the logic of the intermediate state. However, until recently, there were major issues in holding and processing intermediate-state data using available models.

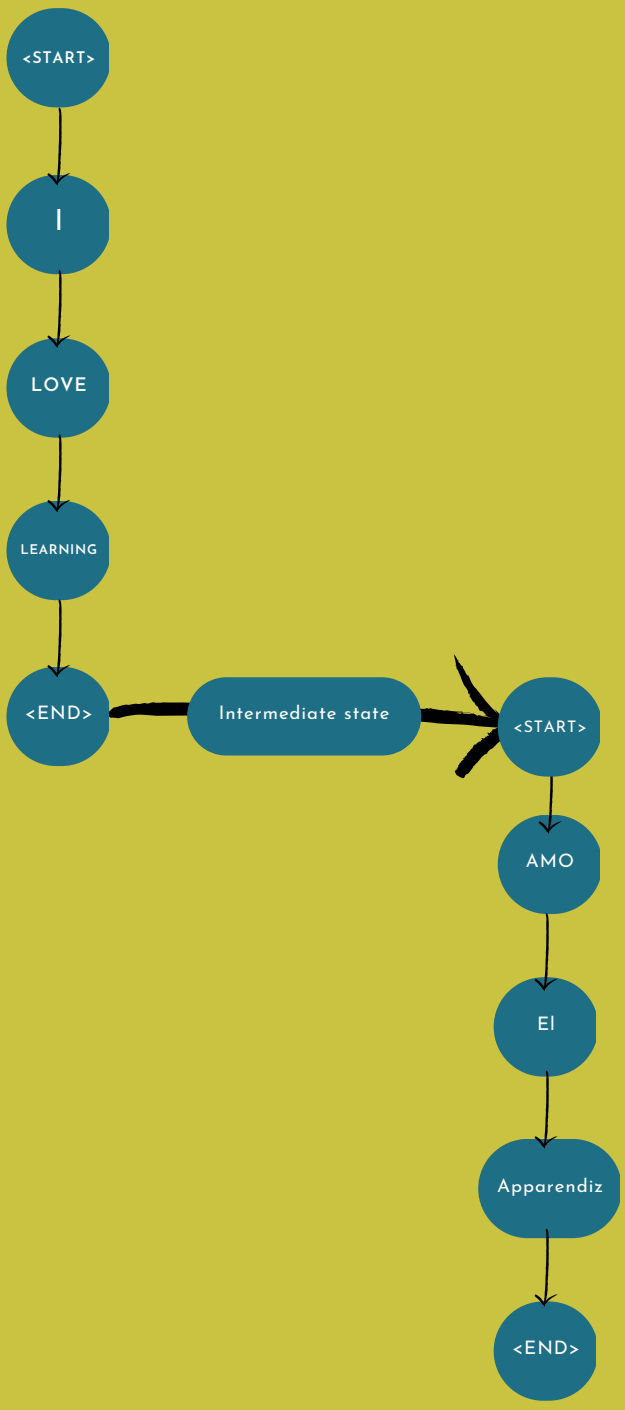
In their early stages, neural networks were unable to process linguistic research projects because there was no way to maintain an intermediate state. To overcome this limitation, researchers extended neural networks to include Recurrent Neural Networks (RNNs), which were further extended to include Long Short-Term Memory (LSTM) and an encoder-decoder model. These models, along with Convolutional Neural Networks (CNNs), were able to maintain and process intermediate state in a sequential manner. However, using a sequential approach for processing large amounts of natural language content did not provide optimal or required output.

In 2017, the Google team, under the leadership of Vaswani, developed the Transformer model, which uses an encoder-decoder structure that supports the processing of large amounts of natural language text using parallel chunks. This model is capable of processing 300 sentences at a time using parallel architecture, finding context among 300 sentences through six iterations, and providing better accuracy.
The Transformer model's ability to process parallel chunks makes it a powerful tool in the fields of NLP and CL, where establishing context among hundreds and thousands of sentences is a difficult task. The Transformer model is likely to become the de facto standard in most areas of research, and it is already being used in various domains, including NLP, computational linguistics, image processing, and computer vision.

PROF. M. L. DHORE

Professor at CSE, VIT Pune
2001-Present

"JOURNEY OF COMPUTATIONAL LINGUISTIC RESEARCH"



In fact, the Transformer model has already brought transformation in terms of ChatGPT, a large language model trained by OpenAI based on the GPT-3.5 architecture. ChatGPT is able to understand and respond to natural language input in a way that is becoming increasingly sophisticated and human-like, thanks in part to the advancements made by the Transformer model.

The Transformer model is detailed in the paper "Attention is All You Need" by Vaswani et al. (2017), which introduced a new architecture based solely on attention mechanisms, rather than RNNs or CNNs. The paper has been cited over 12,000 times and has had a significant impact on the field of NLP and CL.

In addition, the encoder-decoder architecture used in the Transformer model is further detailed in the paper "Sequence to Sequence Learning with Neural Networks" by Sutskever et al. (2014), which introduced a general framework for solving problems that require mapping an input sequence to an output sequence, such as machine translation and text summarization.

Overall, the Transformer model has proven to be a powerful tool in the field of NLP and CL, enabling researchers to process large amounts of natural language content and improve the accuracy of their models. It has already made significant contributions to the development of sophisticated language models such as ChatGPT, and it is likely to continue to drive advancements in the field for years to come.

Polynomial identity testing (PIT) is a fundamental problem in computer science and mathematics, which involves verifying whether a given polynomial is identically equal to zero or not. The problem has a wide range of applications in various areas such as complexity theory, algebraic geometry, and cryptography.

One of the significant applications of PIT is primality testing, which involves checking if a given number is prime. This can be done using polynomial identities, and the accuracy of the test can be improved by using more advanced techniques.

Polynomial identities can also be used to test the equality of strings. By representing strings as polynomials, it is possible to determine if two strings are equal by checking if their corresponding polynomials are the same.

It can also be used in derandomizing probabilistically checkable proofs (PIT). This involves verifying a proof of a computational problem in polynomial time using a small number of random bits. By using polynomial identities, the randomness can be eliminated, making the process more efficient and reliable.

PIT also has many other applications. To read more about it in detail please scan the QR to read the complete research article written by sir.

PROF. PUSHKAR JOGLEKAR

Asst. Professor at CSE, VIT Pune
2013-Present

"VERIFYING POLYNOMIAL IDENTITIES: A FUNDAMENTAL PROBLEM WITH DIVERSE APPLICATIONS"

Graph Neural Networks (GNNs) are a type of neural network architecture used for pattern recognition and data mining where there is a need for relationships between vertices. Unlike traditional neural networks, GNNs work on graphs, which have arbitrary and complex topology, making it difficult to represent them in Euclidean space.

GNNs have been used in various applications such as LinkedIn, drug discovery, and molecule property prediction. In LinkedIn, GNNs are used to find mutual connections between two users by representing the users as nodes and their connections as edges. In drug discovery, GNNs are used to predict molecular properties such as toxicity, solubility, and activity against specific targets by representing molecules as graphs with atoms as nodes and chemical bonds as edges.

Node embeddings in GNNs are vector representations of nodes in a graph, learned during the training process, which capture the structural and semantic properties of the nodes and their relationships in the graph.

There are mainly three types of GNNs:
Recurrent GNNs, Spatial Convolutional Networks, and Spectral Convolutional Networks.

GNN has a lot of applications in fields like social network analysis, recommender system, material science, Computer Vision and many more which leads to its growing popularity.

DEVANSHU KISHOR DALAL

Student, TY-CS-A

"GRAPH NEURAL NETWORKS"

Scan QR code to read more

TANMAY POL

Student, TY-CS-C

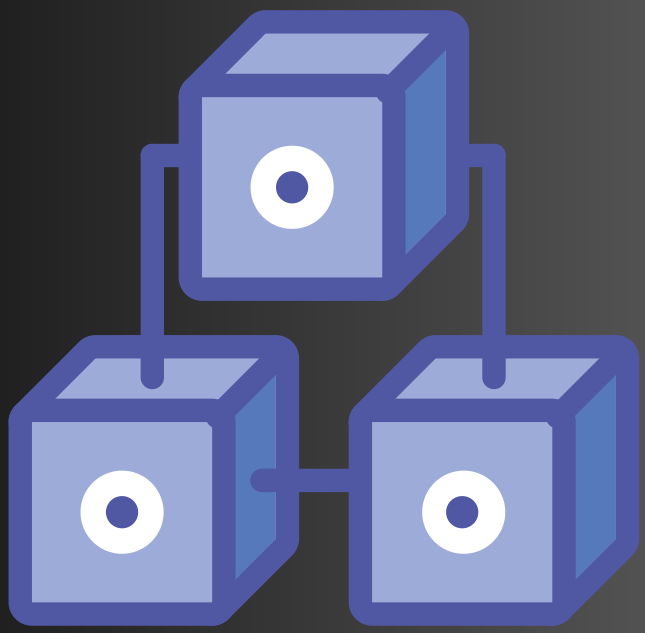
"USE CASES OF BLOCKCHAIN IN CYBER SECURITY"

Scan QR code to read more

The growing use of technology has led to an increase in cybersecurity threats. The Internet of Things (IoT) is becoming more common and connected devices are becoming more vulnerable to cyberattacks. Connected cars and autonomous vehicles are another area of concern, as they present an opportunity for hackers to exploit vulnerabilities in insecure systems and steal sensitive data or harm drivers. State-sponsored attacks are also a concern, as they can target both government-run systems and private sector organizations.

Private blockchains have emerged as a solution to cybersecurity threats. They offer a fully private network that is highly efficient, scalable, and has a robust architecture. Blockchain technology also saves resources, offers low transactional fees, and provides advanced network regulations, making it a preferred choice over other technologies.

Metaverse, a domain of emerging technology, is also vulnerable to cyberattacks and phishing. Its vulnerable nature is due to the hype created among tech enthusiasts, which makes it more prone to cyberattacks that may include data theft, privacy breaches, or hardware access. Built on blockchain technology, the metaverse is still in its nascent stage, and serious security gaps have already been identified in NFT marketplaces and blockchain platforms.



Blockchain technology can offer solutions for cybersecurity in the metaverse. Protected Edge Computing with Authentication is one solution for securing IoT-relied industries, while Advanced Confidential Computing can help in securing data confidentiality. Decentralized Identity Management can offer better privacy and security, and Secure Interoperability through smart contracts can prevent unauthorized access.

Overall, the use of blockchain technology can enhance cybersecurity and mitigate cybersecurity threats. However, its adoption requires a change in the mindset of organizations and individuals, and it also requires investment in technology infrastructure and talent.

Every day a huge amount of data is generated. This data can even vary in nature and structure. A business, for example, can have data on sales revenue, marketing performance, customer interactions, inventory levels, production metrics, staffing levels, costs, etc. But with so much data to sift through, it can be difficult for people to see the story it tells.

Data visualization helps you turn all that granular data into easily understood, visually compelling—and useful—business information. Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data. In the world of Big Data, data visualization tools and technologies are essential to analyse massive amounts of information and make data-driven decisions.

Hidden within your data lie important insights that can help drive the business forward. But the challenge is that you can't always connect the dots by looking at raw numbers alone. When you look at your data presented in a visual format, patterns, connections, and other insights emerge that would otherwise remain out of sight.

Our eyes are drawn to colours and patterns. We can quickly identify red from blue, and a square from a circle. Our culture is visual, including everything from art and advertisements to TV and movies. Data visualization is another form of visual art that grabs our interest and keeps our eyes on the message. When we see a chart, we quickly see trends and outliers. If we can see something, we internalize it quickly. It's storytelling with a purpose.

Student, TY-CS-C

"DATA VISUALIZATION AND POWER BUSINESS INTELLIGENCE"

Scan QR code to read more

If you've ever stared at a massive spreadsheet of data and couldn't see a trend, you know how much more effective a visualization can be.

It's hard to think of a professional industry that doesn't benefit from making data more understandable. Every STEM field benefits from understanding data —and so do fields in government, finance, marketing, history, consumer goods, service industries, education, sports, and so on. While we always increasing talk about data visualization there are practical, real-life applications that are undeniable. And, since visualization is so prolific, it's also one of the most useful professional skills to develop. The better you can convey your points visually, whether in a dashboard or a slide deck, the better you can leverage that information. Skill sets are changing to accommodate a data-driven world. It is increasingly valuable for professionals to be able to use data to make decisions and use visuals to tell stories of when data informs the who, what, when, where, and how. While traditional education typically draws a distinct line between creative storytelling and technical analysis, the modern professional world also values those who can cross between the two.

Today, data visualization tools run the gamut from free versions you can access with a browser to feature-rich platforms that integrate with a wide variety of mainstream business applications. One such tool is Power BI, an interactive data visualization software product developed by Microsoft with a primary focus on business intelligence (BI). Power BI offers cloud-based services for interactive visualizations with a simple interface for end-users to create their own reports and dashboards.

Power BI was first conceptualized by Ruler and Dhers Netz of the SQL server coverage services team at Microsoft. It was further designed by West Chadic George in the year 2010 and named Project Crescent. In 2011, It was bundled with SQL Server Codenamed Mount McKinley. Microsoft unveiled the first preview to Power BI in September 2014. And finally, the first version of Power BI was released on 24 July 2015. It was based on Excel Based Add-ins like Power Query, Pivot, view, and Map.

Today Power BI comes across as one of the most powerful and efficient data visualization and analytical tool. Some of the many advantages it offers include pre-built dashboards, real-time updates, secure and reliable connection to your data sources in the cloud or on-premises, integration with both Python and R coding, etc. Moreover, it is backed by artificial intelligence and machine learning.
This tool, however, currently has some disadvantages in terms of sharing the reports made and certain types not being compatible with it. These are likely to be overcome in the future as Power BI is further developed.

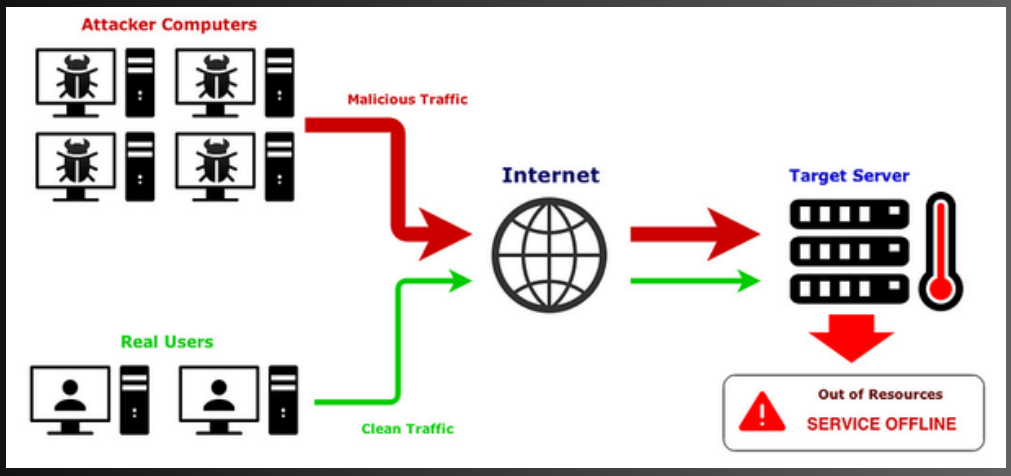
Authors:
Rohan Deshmukh
Laxmi Chavan
Kanchan Chaudhari
Satviki Pathak

"UNDERSTANDING DDOS AND ITS PREVENTION"

Scan QR code to read more

DDoS (Distributed Denial of Service) is a type of cyber-attack that aims to crash a website or online system by overwhelming it with data, thus making it inoperable for legitimate users. The attack requires an attacker to gain control of a network of online machines, infected with malware that turns them into bots or zombies, forming a botnet. Once established, the attacker can direct the botnet to send a flood of traffic to the targeted server, causing it to overflow capacity and result in a denial-of-service to normal traffic. DDoS attacks are similar to DoS attacks but on a larger scale, using multiple computers and internet connections, often distributed via botnets. DDoS attacks come in four types: protocol attacks, application attacks, volume-based attacks, and fragmentation attacks.

To prevent DDoS attacks, companies can take quick action by using anti-DDoS services to recognize legitimate spikes in network traffic and DDoS attacks. They should also configure their firewalls and routers to reject bogus traffic and keep them updated with the latest security patches. Artificial intelligence can also be considered to detect and prevent DDoS attacks.



Furthermore, companies can opt for cloud-based hosting services that have built-in DDoS protection, use Content Delivery Networks (CDNs) to reduce server load, and implement rate-limiting measures to limit the number of requests that a server can handle. Additionally, companies should conduct regular vulnerability assessments and educate their employees on safe online practices.

In summary, DDoS attacks are attempts to crash websites or online systems by overwhelming them with data, using a network of infected machines called botnets. DDoS attacks can be prevented by taking quick action, configuring firewalls and routers, using artificial intelligence, using cloud-based hosting services, CDNs, and implementing rate-limiting measures. Companies should also conduct regular vulnerability assessments and educate their employees on safe online practices.

Last year, I was offered an SWE internship with Microsoft India after participating in the Intern Engage Program and going through several interviews. I wanted to share my experience with this program to help other students who may not know about it. The program is specifically designed for second-year engineering students in India and lasts for four weeks. The goal is to allow students, regardless of their area of study, to apply their development skills to problem-solving while being mentored by leaders from Microsoft. Students who demonstrate strong performance are provided with the chance to interview and intern at Microsoft India.

During the program, participants work on individual projects and are evaluated on various aspects, including code organization, innovation, and use of available libraries and methods to create something new. The Engage Program application form is typically released in April or May, and students should check the program's website frequently for any updates. The online challenge for the program consisted of two elimination rounds: multiple-choice questions related to DSA and solving a single question with a detailed explanation.

The program includes an introductory session, mentor meetings, workshops, and doubt-clearing sessions. This year's program included three problem statements, and I chose to develop a two-way job recommendation website called SeeKers based on recommendation algorithms. I focused on revising basic DSA and mock interviews before the first round and avoided learning anything new to prevent getting stressed out.

All interviews were conducted online on the Teams platform. After receiving the offer letter, I realized that many students are not aware of this program and may miss out on a great opportunity.

MANDAR PATIL

Student, TY-CS-C

"HOW I GOT MICROSOFT INTERNSHIP IN 2ND YEAR"

Scan QR code to read more

What is Intel Corporation and what are its contributions to the computing industry?
Intel Corporation is an American multinational technology company and the world's largest semiconductor chip manufacturer in terms of revenue. Its headquarters are located in Santa Clara, California. Intel processors have been on the cutting edge of technology for over half a century, underpinning the creation of today's digital global economy. Intel is the developer of the most widely used personal computer (PC) processor series, the x86 series of microprocessors, which powers most of the computers in the world today.

Intel has played a significant role in the computing sector by being the dominant force in growing the worldwide computing industry, the boom of the internet and modern-day reliance on cloud services. Over the past five decades, Intel has helped shrink the size of processors with today's products made using process technologies of just 10 nanometers. Intel now offers four processor ranges, from the affordable Celeron to the network-focused Xeon. Intel has been instrumental in the development of modern technology, and its processors have revolutionized the world, powering arguably the greatest innovation on earth.

PUSHKARAJ BHOR

Student, TY-CS-C

"INTEL'S DECADE - THE GOOD, THE BAD AND THE DARK TIMES"

Scan QR code to read more

PRATEEK PURANIK

Student, TY-CS-C

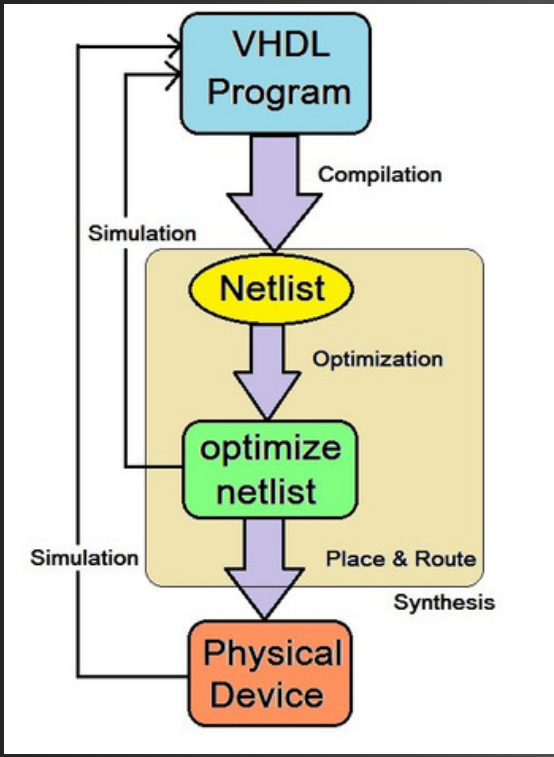
"SILICON COMPILERS"

Scan QR code to read more

In today's world, new smartphones are getting manufactured and coming out every week. New innovations are being made in integrated circuit (IC) development and hardware technology at a rapid pace. How long do you think developing a new IC for a smartphone takes? Well, even the most qualified IC designers take months to design a chip. There are just too many factors to consider. The processor, operating system which will run the process, speed, what components will be used in the processors (adders, registers), battery life, etc. Not to mention the constant need to surpass competitors.

In order to tackle this problem we have the silicon compilers. Silicon compilers are software tools that are used to design and ICs for electronic devices. These compilers take a high-level description of the desired IC, written in a hardware description language (HDL) such as Verilog or VHDL, and convert it into a lower-level representation that can be used to physically manufacture the IC.

The process of creating an IC begins with the creation of a hardware description, which is a high-level representation of the desired IC. This description is written in an HDL, which is a programming language that is specifically designed for describing digital logic circuits. Once the hardware description is complete, it is passed through a silicon compiler, which converts the description into a lower-level representation that can be used to physically manufacture the IC. The process of compiling the hardware description into a lower-level representation involves several steps. First, the compiler performs a series of analyses on the hardware description to ensure that it is correct and complete. Next, the compiler performs a series of optimizations on the description to reduce the number of gates required to implement the IC.



Finally, the compiler generates a netlist, which is a representation of the IC in a format that can be used to physically manufacture the IC.

Silicon compilers are critical tools in the IC design process because they enable the efficient and accurate conversion of high-level hardware descriptions into a lower-level representation that can be used to physically manufacture the IC. Without these compilers, the process of creating an IC would be much more time-consuming and error-prone. With the help of silicon compilers, IC designers can quickly and easily create and test new IC designs, which helps to speed up the development and introduction of new electronic devices. In addition to their role in the IC design process, silicon compilers also play a critical role in the field of computer-aided design (CAD) for ICs. CAD tools allow designers to create and simulate IC designs before they are physically manufactured, which helps to identify and resolve any design errors before the IC is produced. Silicon compilers are an integral part of these CAD tools, as they are used to convert the high-level hardware descriptions of the IC into a lower-level representation that can be used to simulate the IC's behavior.

In conclusion, silicon compilers are essential tools in the IC design process. They enable the efficient and accurate conversion of high-level hardware descriptions into a lower-level representation that can be used to physically manufacture ICs. Additionally, they play a critical role in the field of computer-aided design for ICs, allowing designers to create and simulate IC designs before they are physically manufactured.

Magnetic Resonance (MR) images are used in the early phases of medicine to diagnose the regions of the brain that are contaminated with tumor cells.

The accuracy of the classification of the various forms of brain tumors is completely reliant on the radiologists' experience
It is an intricate and difficult task to manually classify brain tumors using MR images as they have quite identical structures; it eventually depends on the radiologist's availability and level of expertise in correctly identifying and diagnosing brain tumors.

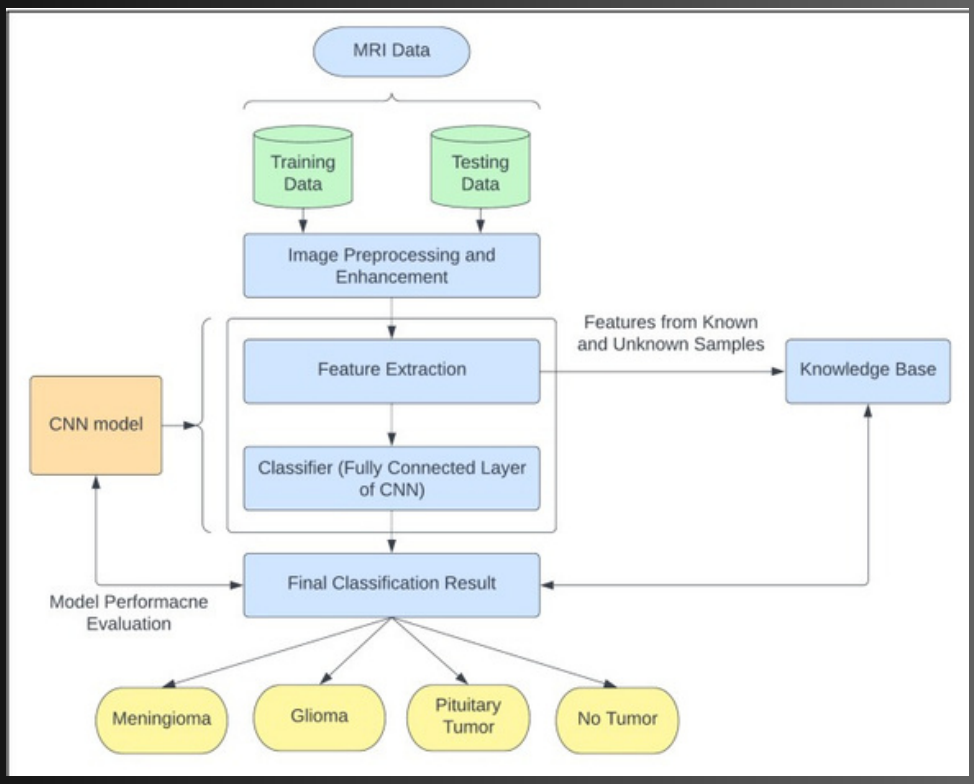
This issue might be resolved by developing an efficient and reliable system, which would classify MR images of brain tumors with the least possible amount of human intervention.
South East Asia is a significant region since it is home to more than a quarter of the world's population.

This section discusses the complete process of development of the proposed Brain Tumor Classification System.
The inferences drawn out from the study of related literature are used for the selection of dataset, data pre-processing, designing of the proposed CNN architecture and its training along with evaluation of its performance.

RAJAT HARNE

Student, TY-CS-C

"AI TECHNIQUE FOR CLASSIFICATION OF BRAIN TUMOR MRI IMAGES FOR GENERAL PHYSICIANS"



The brain tumor dataset is retrieved from Kaggle, and is a labeled dataset categorized based on tumor location and tumor type/category.
It consists of about 7023 MRI images, which are split into training and testing datasets.

The proposed CNN model utilizes an Adam optimizer during the training process. It is a highly effective optimization approach used for deep neural network training that incorporates the advantages of both AdaGrad (Adaptive Gradient Algorithm) and RMSProp (Root Mean Square Propagation) The loss function utilized in the model is categorical cross entropy. To ensure an efficient and optimal training process methods like EarlyStopping and ReduceLRonPlateau are used. The EarlyStopping method monitors the value of loss function and has a patience of 12 epochs before stopping early if the value of the model performance metrics to be monitored doesn't improve.

The ReduceLRonPlateau method monitors the validation loss and reduces the learning rate to ensure improved model performance. As a conclusion, convolutional Neural Networks time and again have been used for image classification tasks.

The proposed approach is used to address a number of issues, including accuracy, tumor quality, and tumor detection time. The model is trained and tested using MRI scans in the axial, coronal, and sagittal planes and gives an accuracy of 98.93% for 1311 testing images.

RISHAB KHANDELWAL

Student, TY-CS-C

"AI IN SUPPLY CHAIN AND LOGISTICS"

Scan QR code to read more

Managing supply chains has become more challenging due to increased complexity and product portfolio, as well as the impact of the pandemic on market volatility. There is a growing emphasis on supply chain resilience and the need for adaptability and agility. AI-based supply chain solutions are expected to be a powerful tool in overcoming these challenges, as AI can analyze large amounts of data, provide visibility, and support smarter decision-making. The global market for AI in supply chain includes solutions for demand forecasting, product scheduling, warehouse management, product segmentation, shipment monitoring, quality control, and security. AI helps solve these challenges by improving efficiency, accuracy, and speed in supply chain operations.

A few of the main challenges that AI solves are:

1. Product Scheduling

Traditional planning techniques such as material requirements planning can create a schedule that seems logical but may not be realistic. Advanced planning and scheduling (APS) software can overcome these limitations by trading off priorities and alternatives to create a more workable plan that balances resources and material dates and amounts. However, APS also has its limitations and requires evaluation and insight to apply recommendations in the context of the shop floor and consumer world. Artificial intelligence (AI) in production planning systems uses data analysis and what-if scenarios to learn and improve the model, leading to more effective plant functioning, higher quality products, and lower expenses. AI can create better plans and timetables than humans, resulting in increased efficiency and cost savings.

Below is the difference between the traditional forecasting methods and machine learning forecasting methods

	Traditional forecasting	Machine Learning forecasting
Ability to consider numerous variables and data sources	Adding extra variables and sources requires substantial effort	Multiple variables and sources can be smoothly incorporated thanks to the high level of automation
Volume of manual work	High	Low
Amount of data required	Small	Large
Maintenance complexity	Low	High
Technology requirements	Low	High
Best fit	**Mid / long-term planning Established products Stable demand**	**Short / mid-term planning New products Volatile demand scenarios**

2. Warehouse automation and management

The use of AI in warehouse automation and management can reduce labor-intensive tasks, improve productivity, and save costs. AI technologies can help in inventory management and data collection, and some essential use cases of AI in warehousing processes are Goods-to-Person systems, Automated Guided Vehicles (AGVs), and Voice Picking and Tasking. Goods-to-Person systems use shuttles to deliver or retrieve items from specific locations, while AGVs are self-guided mechanized vehicles that use sensors or wires to transport materials. Voice picking and tasking use mobile headsets and speech recognition software to guide warehouse workers in picking and storing products without the need for handheld devices, increasing efficiency and order accuracy.

Aaʊva

Prakhar Rai
Founder

Aaʊva, an initiative to promote the true essence of Spirituality with the help of sacred knowledge of Vedas & Upanishads.
We at Aathva believe that Spirituality can be a way to tackle all sorts of mental problems. Thus, our vision is to spread the spiritual knowledge and create a forum where the discussion of spirituality can take place, which one may want to apply in their daily lives.
Follow us at : youtube.com/@aathva

This project aims to spread spiritual knowledge, which people may want to apply in their day-to-day lives. People nowadays are mentally stressed and are always trying a way to get out of it. We believe that Spirituality can be a way for them to tackle all types of problems including depression. We do not claim to be superior in this domain and also are on a journey to explore the "True essence of Spirituality". We'll promote whatever knowledge we have with the help of AATHVA

Virat Tiwari
Co-Founder

INTERVIEWS

Aniruddha Kulkarni
Honorary Convener / Ex-Convener
E-Cell, VIT Pune /
Vice - Chairperson - EPEC /
Head SATLAB - Trident Labs

VIT has been like a second home for me. It has not only been a place for me to make memories but also has been a constant place of growth and improvement. However, when asked of my achievements in academia I often relate them to my association with the Computer Engineering Department of VIT.

The department has been nothing but helpful in letting me grow in terms of academics, extra-curricular and co-curricular activities. Whether it be hackathons or workshops or even extra-curriculars like the Student Council, E-Cell Activities or my contribution to Trident Labs, the professors and supporting staff have been extremely supportive and understanding.

No where else would a student be encouraged to explore domains like tech, social networking and management. The same experience has helped me grow these past few years and I consider it an honour being a student of the Department of Computer Engineering of VIT Pune.

Again, I would like to express my gratitude to HOD sir, the professors, the supporting staff and most importantly my peers for being an integral part of my journey in academia.

Interviews

As the chairperson of the organizing committee of our college, I'd like to take a moment to express my sincere gratitude to all the members of EPEC. Your hard work and dedication have been instrumental in making this year a grand success, and I'm immensely proud of everything we've achieved together.

Whether it was the relentless sprints of Vishwotsav or the tiring nights of Vishwakarandak, each member of our committee demonstrated exceptional talent and creativity that contributed to the success of the events. Your contributions were invaluable, and I look forward to collaborating with each one of you in the future.

I'd also like to take this opportunity to thank the Computer Department for their unwavering support throughout my journey at college. I owe a debt of gratitude to all the faculty members for making my four years an amazing experience. My time in the computer department has given me a unique perspective that I've applied to the work culture in our organization.

I'm constantly seeking new ways to use technology to improve our output and increase fulfillment. This is one of the most significant takeaways from my time in the department, and I'm grateful for the opportunity to have learned and grown under their guidance. Once again, thank you all for your incredible contributions, and I'm excited to see where our future endeavors take us.

Anmol Warikoo
Chairperson, EPEC

Enthusiastic and a versatile leader

Interviews

As the chairperson of the organizing committee of our college, I would like to extend my heartfelt appreciation to all the members of EPEC for their hard work and dedication in making the year a grand success.

All our tireless efforts and commitment to excellence have truly paid off, and all the work we pulled off be it during the relentless sprints of Vishwotsav or the tiring nights of Vishwakarandak was a testament to the exceptional talent and creativity that exists within our committee. Your contributions were invaluable in ensuring all the event's success. I would be looking forward to collaborating with each one of you in the future in each chapter of life.

I would also like to extend my thanks to the Computer Department for supporting me throughout my journey in the college and my deepest appreciation goes to all the faculty members for making my 4 years as amazing as they have been. I feel that my experiences in the computer department have given me a unique perspective that I applied to the work culture in the organization. Constantly seeking new ways to use technology and improve the output in terms of fulfilment is one of my takeaways from this department.

Anushka Shinde
Chairperson, EPEC

Ambitious and a benevolent personality

Interviews

Ved Kaudge
Chairperson, ABVP

As the head of Akhil Bhartiya Vidya Parishad or ABVP for short, I would like to extend my heartfelt regards to all the members as well as the entire student body for always being in support of our activities. It could not be without the help of the students that large scale activities such as the Tiranga Rally event, which was the first ever rally event in the college as well as a gesture of gratitude towards those who were a part of the freedom struggle, a "Patriotic Prabhat Pheri" was organised to carry our magnificent 300 feet tiranga which depicted the unity and power of our nation amidst varied beliefs. Another such event which was the Torna fort trek in which nearly 300 students participated to understand our History and Culture by exploring the first fort which is won by Chatrapati Shivaji Maharaj.

Such large scale events would not be possible without the help and co-operation of the students and faculty alike and for this we are extremely thankful to the Computer department as well as the entire staff faculty of VIT.

Interviews

Greetings, I am honored to introduce myself as the Director of Curation at VishwaConclave. I would like to express my gratitude to the entire team for their sleepless nights and hardwork in making all the events at VishwaConclave a grand success.

Our mission was to present the lineup for the college with leaders in the all different domains. Also includes the to provide the attendees with an engaging talk that will be thought-provoking and enlightening. All this comes down to the execution of each mini event, the lives and the main event.

This would definitely have been impossible to pull off without the support of Computer Department faculties. The constant support always pushed me through my limits and bring the best of my abilities for VishwaConclave. This was an amazing year with a lot of experiences I'll be taking further in my life. I cherish every moment of it and wish to be in touch with everyone. The connections I have made has surely made me a better version of myself. This major part will always lie with the department.

Samiksha Hiran
Director of Curation,
VishwaConclave

Interviews

Rohit Patil- Club Head, Eksutram

Being a Club Head of Ekasutram and leading this community has been an incredible platform for my growth and development. I will be eternally thankful to VIT for having such an incredible culture of Clubs and Communities.

The Department of Computer Engineering has been great in support for all the extracurricular activities of clubs and communities. The Department always strives to consistently deliver the best academic insights as well as thorough exposure to technological contests and events to its students. The qualities of leadership and team management that I learned from activities and experiences with the Department aided me much in leading Ekasutram. Because of the Department's ongoing support, I have multiple opportunities to look into various technical, social, and managerial areas.

It's an honour for me to be a student at the Computer Department, and I'm grateful to the HOD sir, all faculty members, and support personnel for making my academic journey so enjoyable.

Interviews

My experience of Ekasutram has been marvellous as a club head. While we started as a small club with only 7 people, the expansion it had within the span of 1 year is astounding. Everyone in the club is passionate about one thing or the other and this has helped Ekasutram reach newer heights. It was always fun to put it all together to bring out the fun aspect of maths in front of everyone. Ekasutram's motto has always been to display the unseen side of mathematics - and everyone, right from the leading members to the respective domain heads to the coordinators and volunteers have made sure to uphold it till date.

The department of Computer has been consistently supportive of our club and objective providing us enough resources whenever required. During the time when things were returning back to normal post-pandemic, it was difficult to accomodate the sudden change. However, with the support from department, college and the internal mutual cooperation between all the team members, the transition was super smooth. One of my seniors from Ekasutram once mentioned - "Ekasutram is like my child". Today I relate with the statement. Somewhere deep down, it feels like a huge achievement to see so many math non-lovers turn around and be influenced due to our activities as a club. Ekasutram stands strong, Always!

OM CHAKANE

Naatki

Our team bagged the runner up position in the event Naatki
(Viswakarandak 2023)

DRAAMEBAAZ FOLKS!!!!

RangManch!

The RangManch founded by Virat Tiwari, Sameer Mudawadkar, and Vaishnavi Deshpande, is the first filmmaking club in VIT. To be launched on 27th April, the club is ideated to promote a sense of Participation and culture of theatre and filming. Though the club is new, with less than one month of official work, the team is already 41 strong. The Idea of the club is to make frequent original short films, with a new team of students, from writing to performing to cinematography, each time. The Team is enthusiastic and ready to deliver what the present college culture lacks.

Basically pappa ne bola pehle Engineering kar lo. Acting-wacting baad me kar lena.

Street Play!

ACTING se khaas hi lagaav hai hume!!

Bagged 3rd place in Street Play At Vishwakarandak (2023)

Cricket (girls)

Mhari chhoriya chhoro se kam hai k?

Our girls bagged 1st place in Cricket At Vishwakarandak (2023)

Achievements

Saharsh Samir - a curious budding software developer who loves making computers do magic

Unscript Rookies Hackathon 2022 - national level hackathon - 1st place

This was a hackathon my teammates and I participated in our second year. This was an annual national level hackathon exclusively for Second year students all over india. The problem statement was to build an "Online Education platform" with multiple features for teachers to upload video courses and for students to buy and rate courses. I got the opportunity to learn to make decisions on the fly and how to communicate with my teammates. The toughest part was learning the razorpay integration on the spot. It was exhausting and there were many moments where we felt like giving up but our competitive nature kept us going.

Codebreak 3.0 - national level hackathon - 2nd place

This was our first offline hackathon. It took place in MIT ADT. The problem statement was to develop solutions in the environmental sustainability space. We made a website to help people find paying guests who are willing to take care of their plants and pets when they are out of town. The toughest part about this hackathon was the fact that it was offline, sitting in uncomfortable chairs for 48hrs, staying awake in a humid room, hacking away definitely was one of the toughest part of the hackathon. Although this was the toughest part, it was also the best part, as us being together made it really easy for us to communicate. It made us easy for us to come up with ideas and help each other solve bugs and come up with solutions. In the end it was our perseverance and unwillingness to rest until the very end which won us the 2nd price.

Achievements

Mayuresh Joshi - Final Year Computer engineering student who has a knack for cybersecurity and sarcasm

Roof Cleaning device using AI ML

The present invention relates to a roof cleaning device which is developed
in a manner to aid in cleaning of the roofs in accordance to the monitored portion
5 of the roof by allowing the user to input time and type of cleaning in a userdefined manner in order to reduce the manual efforts

An objective of the present invention is to develop a device which is capable
of providing efficient cleaning of the roof by monitoring the orientation of the
roof in order to align different cleaning tools in an automated manner.
Another objective of the present invention is to develop a device which is
capable of allowing the user to input command regarding the time and type of
cleaning and accordingly provides the cleaning of the roof in a user-defined
manner.

Achievements

Smart India Hackathon 2022 - National Level Hackathon – First place

This hackathon was conducted by AICTE at the national level and consisted of around 500 problem statements. The problem statement assigned to the software edition was to build an application that would decentralize dairy supply chain management.

The hackathon was 36 hours long and had multiple evaluation rounds. Out of the 50 teams, Team Airavat secured the first prize. Our mentors, Sandeep Shinde Sir and Ashwini Shingare Ma'am, accompanied us throughout the journey.

Siddhant Pawar and Team

Rajat Harne and Team

This hackathon, namely Xperiments 6.0 was organised by UST and Over a span of one month, we developed a prototype based on the idea of developing a Metaverse/VR application for defence personnel and won the "Best Prototype" Award and cash prize. I would like to thank Vishwakarma Institute of Technology as well as the Department of Computer Engineering for providing us with this opportunity as well as the resources required to participate. Lastly, like to thank Team Xperiments from UST Product Engineering for organising such a great competition and giving us a platform to work on our ideas. It was a pretty good experience of learning, innovating, developing and Product Engineering.

OUR TEAM

EDITOR IN CHIEF

Tanmay Pol

Pushkaraj Bhor

OUR TEAM

CONTENT TEAM

Swaraj Puri

Prateek Puranik

Parikshit Pohane

Vishrut Kshirsagar

OUR TEAM

MULTIMEDIA TEAM

Yukta Pedhavi

Waidehi Gautam

OUR TEAM

WEBSITE TEAM

Yash Shejwal

Amey Joshi

OUR TEAM

NEWSLETTER EDITORS

Aditya Warghane

Anoushka Mudkhedkar

OUR TEAM

SOCIAL MEDIA

Jay Pawar

PUBLICITY

Preeti Wagh

THANK YOU!!

vit_comp_cell