



# SVNIT

# Newsletter

**COMPUTER ENGINEERING  
DEPARTMENT**  
Issue – 4

April 2021

## Department Mission

Impart education that encourages students to read critically, reason analytically, communicate persuasively, apply professionally and prepare them to excel in the field of computing.

## Department Vision

The vision of Computer Engineering Department is to recognize itself as globally renowned learning centre in the field of Computer Science & Engineering and foster the research and innovations for the global good.

## About the Department

Computer Engineering Department had been setup with an intake of 30 students in the year 1988 under the Electronics Engineering Department of Sardar Vallabhbhai Regional College of Engineering and Technology (SVRCET) offering the bachelor of engineering in Computer Engineering. SVRCET became the institute of national importance and designated as National Institute of Technology in the year 2002. The Computer Engineering Department has its own individual department identity in the year 2002 and offering the degree bachelor of technology in Computer Engineering. The department has started offering PhD degree from the year 2005. Post-graduation degree Master of Technology in Computer Engineering in 2006. The Master of Technology by Research M.Tech. (R) has been started in year 2007 to facilitate the higher education to working technical person in the industry and different organization. The B.Tech. intake strength is 135 as on today. The B.Tech. Computer Engineering degree name has been changed to B.Tech. in Computer Science and Engineering onwards 2019-20. The M.Tech. programme name is also changed to M.Tech. in Computer Science and Engineering from the next academic year 2021-22. The department has various specialization like information security, data mining, social network analysis, cloud computing, privacy preserving, cyber security, image processing, computer vision, software engineering. The department has executed several research projects sponsored by different agencies Department of Science and Technology, Ministry of Electronics and Information Technology, Indian Space Research Organization and Department of Science and Technology of Gujarat Government (GUJCOST). The department has also obtained the grant under Information Security Education and Awareness (ISEA) programme. The department is also beneficiary of TEQIP grant from phase I, II and III. The alumni of the department are now serving in various industries and few of them are entrepreneurs. The department is also planning to start the different specialization post graduate programmes in the area of Artificial Intelligence, Data Science and Information Security as a part of perspective development plan of the institute. The department has state of art computing desktop PCs, blade servers and super nodes for High performance computing. The department has availed two super nodes from C-DAC under the National Supercomputing Mission. The department has server wireless network simulator software and sensor motes. Different wireless sensor kits are also available in the department including aerial drones. Currently 40 number of students are pursuing PhD degree. The department faculty members are very much involved with different academic activities and organized various short term training programmes for faculty members and students from other institutes. The department has also signed MoU with different industries.

## Message from Head of the Department

The Computer Engineering department has progressed over last three decades in an excellent way. The faculty members are very enthusiastic and pursuing the research in various fields. Serval faculty members have completed different research projects successfully. Due to the COVID-19 pan epidemic situation it is really a challenging for not only teaching but research activities. The faculty members have done excellent efforts for delivering online teaching over last three semesters very actively. Faculty members are doing their best to maintain the interest of the students and providing the skills through online practical sessions. At the same time the research publication contribution is consistent. During last one year we have lost our loved one academic colleagues, professors and our alumni. Their loss is unbearable. Faculty members are also updating themselves with latest knowledge and pursuing the online courses.

## Research Focus Areas at the Department

The focus areas for the research and consultancy, in the department of Computer Engineering are as follows. These are the areas in which the department can take up the mentoring of the startup efforts, incubation projects, consultancy projects and sponsored research projects.

- Information Security and Privacy
- High Performance Computing
- Privacy Preserving Data Mining Techniques
- Social Network Analysis
- Cloud Computing technologies
- Image Processing & Computer Vision
- Machine Learning & Soft Computing
- Software Requirements Specifications
- Natural Language Processing

## Research Problems Addressed at more Depth - the PhD Level

At more depth, the department accepts the PhD research positions, with its faculty involved in actively supervising the PhD scholars. Currently, the department has 42 PhD scholars actively pursuing research, whereas till date 44 number of PhD scholars have graduated from the department. Some of the interesting topics on which the PhD research scholars & the faculty members work on and invite consultancy projects on, are as follows:

### Information Security & Privacy

- Security Protocols for Distributed Internet of Things
- Extending the existing state-of-the-art in Searchable Encryption (Simple/Inverted/Symmetric/Asymmetric key) and Key Aggregate Searchable Encryption schemes with Privacy Preservation in Cloud (w.r. to Query expressiveness/Result verification/other research gaps) with focus on HER applications
- Extending the existing state-of-the-art in Mitigating DoS Attacks on the RPL protocol in 6LowPAN for IoT with focus on applications in Environmental Monitoring, Cyber Physical Systems using Machine Learning and/or Generative Adversarial Networks
- Privacy Preserving Data Publishing Approaches for Online Social Media
- Security Protocols for 5G Networks
- Security Protocols for Low Power Wide Area Networks of Cyber Physical Systems
- Exploring the Security issues in Cloud computing, in Containerization
- Investigating the Location Privacy for Edge-Envisioned Environment item
- Investigating the issues in Security and Trust Management in Online Social Networks
- Exploring the issues in using the Blockchain technology for Healthcare Environment
- Exploring the issues in Forgery Detection

### Data Mining and Privacy Preserving Data Mining

- Exploring the issues in Imbalanced Data Mining
- Exploring the issues in Fake News and Text Mining
- Exploring the issues Health Data Mining
- Exploring the Scholarly Platform Data Mining
- Machine Learning, Natural Language Processing and Soft Computing
- Exploring the techniques for Skin cancer detection using Deep learning
- Exploring the Humor Identification and Question-Answer system analysis using NLP
- Devising the Deep learning models for sentiment analysis

### Exploring the issues in Cross Layer routing

## Research Problems Attempted at the UG/PG Level

The departmental faculty and students at Bachelors and the Master's level have attempted to address the following research problems in different affiliations (i.e. major projects, dissertations, summer internships, etc.):

### Applications of Block Chain Technology

- Leveraging Blockchain Technology for Decentralized Domain Name Broker Service
- Applications and resolution of issues in Textile Supply Chain through the Blockchain Technology

### Social Network Analysis

- Fake News Detection
- Emotion Prediction of Social media data
- Recommendation System
- Sentiment Analysis on Twitter
- Gender based Tweet Analysis

## Data Mining and Cloud Computing

- Legal Document Analysis
- News Data Analysis
- Improving the state-of-the-art in using Storage as a Service
- COVID-19 Data Analysis

## Information and Network Security

- Detection and Prevention of Distributed Denial of Service Attacks
- Abnormal Behaviour Detection
- Bot Account Detection
- Identifying Malicious URLs using Machine Learning techniques
- Secure Key Establishment and Authentication Techniques for Smart Grid Technology
- Authentication and Key Agreement Protocols for 5G/M2M Communication Networks
- Addressing the Security and Privacy Issues in the state-of-the-art in Blockchain Technology

## Image Processing and Computer Vision

- Vision based Sports and Exercise analysis tool
- Colorization of Gray Images
- Autonomous Navigation System

## Natural Language Processing

- Automatic Question Generation from Video Lectures.
- Quranic Speech Recognition



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### Exploring the issues in Cross Layer routing

## Open Research Problems Department is keen to Work on

Some of the open research issues that the department faculty members are keen to work on and/or invite the research collaborations and/or consultancy projects and/or sponsored research projects, including the cross-disciplinary research, are as follows:

### Software Requirements Specifications

- Extending the existing state-of-the-art in Identifying and Resolving Conflicts in the Non-functional Requirements specified by the user in Natural Language
- Extending the existing state-of-the-art in identifying the Security Vulnerabilities in the User Requirements Specifications using either Model-based approach or alternative approaches
- Investigating the application of Static Analysis (i.e. Software Design Verification) for detecting Security Vulnerabilities in the Cyber Physical System Application Designs.
- Extending the existing state-of-the-art in the Static analysis tools for Design verification and Dynamic testing tools with a focus on integration and on Security Vulnerabilities.



## Networks, Machine Learning & Soft Computing

- Vehicular routing and soft radio network for traffic management, Intelligent transportation and surveillance system
- Vision based Walkthrough application and Animation generation
- Machine learning and AI based research problem in the area of Location based services
- Machine translation and automatic question answer system for disabled people
- Video Analytics
- Intelligent transportation and surveillance system
- Audio and Speech Analysis

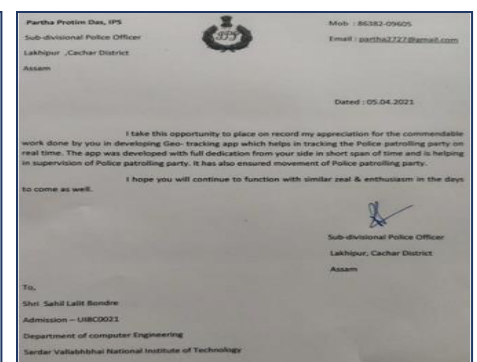
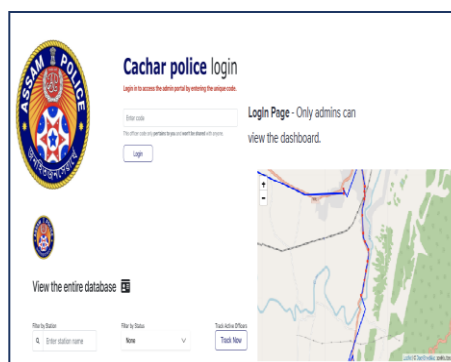
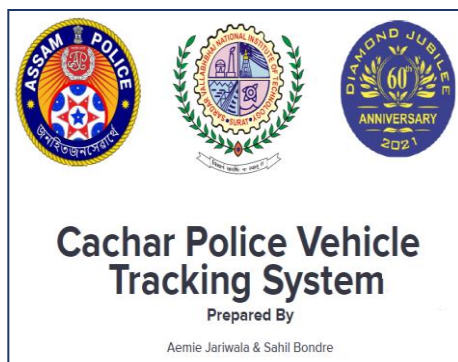
## Information Security and Privacy

- Cyber Security and Forensic Analysis
- Intrusion detection in Networks

## Data Mining and Applications

- Environment Data Mining

## Student Achievements



Sahil Bondre (U18CO021), Aemie Jariwala (U18CO059) and Yukta Shah (U18CO063), students of B.Tech-III developed a Police Vehicle Tracking System for SVNIT alumnus (2008 batch) Mr. Partha Protim Das, IPS, Dy SP for Cachar, Assam.

## Faculty Achievements



Prof. D. C. Jinwala has been appointed as Adjunct Professor in the Faculty of Technology & Engineering of Charotar University of Science & Technology (CHARUSAT) for Computer Engineering, Computer Science Engineering and Information Technology Programs at its constituent institutes.

## Expert Lectures Delivered by Faculty Members

- 1 Dr. Bhavesh N. Gohil delivered talk on "Cloud Computing" organized by G.H. Rasoni College of Engineering and Management, Pune, 12th February, 2021
- 2 Dr. Bhavesh N. Gohil delivered talk on "Malware" organized by DEPSTAR, Charusat University, Changa, 4<sup>th</sup> March, 2021.
- 3 Prof. Mukesh A. Zaveri delivered talk on "Artificial Intelligence and Machine Learning" during AICTE sponsored FDP on Artificial Intelligence Techniques with Machine Learning and Deep Learning for Engineering Applications (22-26 February, 2021) organized by Department of Electrical Engineering, Government Engineering College, Bhuj, Gujarat on 22 February 2021.

4. Prof. Mukesh A. Zaveri delivered talk on “Introduction to Machine Learning” during AICTE-ISTE sponsored Induction/Refresher One Week FDP Phase-II Program on Machine Learning for all (5 - 10 April, 2021) organized by Department of ECE & CRI, K.S.R.M. college of Engineering, Kadapa, Andhra Pradesh on 5 April 2021.
5. Prof. Mukesh A. Zaveri delivered talk on “Applications of Neural Network and Genetic Algorithms” during GUJCOST sponsored One Week Online STTP on “Artificial Intelligence: Techniques and Applications” (05 - 09 April, 2021) organized by Computer Engineering Department, Sardar Vallabhbhai Patel Institute of Technology, Vasad , Gujarat on 8 April 2021.
6. Dr. Udai Pratap Rao delivered talk on “Cyber Security Threats and Preventive Measures” during Five days FDP on Emerging Trends in Cyber Securities and Hands-On from 16-20 March 2021 at NRI Institute of Research and Technology Bhopal on 16th March-2021.
7. Dr. Udai Pratap Rao delivered talk on “Mathematics of Cryptography” during FDP on Modern Cryptography, BlockChain & IoT Security: Challenges, Solution & Future Prospects (MCB-IoTs-2021) Department of CSE, UIT- Rajiv Gandhi Prudyogiki Vishwavidyalaya (Technological University of Madhya Pradesh) on 26th March 2021.

## साइबर अटैक का सामना करने के लिए रहना होगा तैयार

### विज्ञान व प्रौद्योगिकी चुनौतियों पर कार्यशाला आयोजित

हिरदाराम नगर प्रतिनिधि

आरजीपीवी के यूनिवर्सिटी इंस्टिट्यूट ऑफ टेक्नोलॉजी के कंप्यूटर साइंस एंड इंजीनियरिंग विभाग द्वारा आयोजित पांच दिवसीय एफडीपी के चौथे दिन में विभिन्न क्षेत्रों से आये तीन सौ से अधिक प्रतिभागियों ने भाग लिया। चौथे दिन का पहला सत्र डॉ गोविंद पी गुप्ता द्वारा शुरू किया गया, जो वर्तमान में राष्ट्रीय प्रौद्योगिकी संस्थान, रायपुर के सूचना प्रौद्योगिकी विभाग में सहायक प्रोफेसर हैं। उन्होंने इस सत्र के विषय इंटरूजन डिटेक्शन सिस्टम फार फाग-बेस्ड आईओटी सिस्टम पर अपने विचार प्रस्तुत किए। उन्होंने आईओटी के पर होने वाले विभिन्न प्रकार के अटैक व उनसे जुड़े रोचक तथ्य व बचने के उपायों की जानकारी दी। सत्र के अंत में विशेषज्ञ और प्रतिभागियों के बीच प्रश्नोत्तर हुए, जिसने



सत्र को अधिक इंटरैक्टिव और रोचक बनाया। दिन के दूसरे सत्र में स्पीकर डॉ उदय प्रताप राव, प्रोफेसर, एसवीएनआईटी सुरत' ने क्रिप्टोग्राफी का गणित प्रधान और संबंधित अनुरूपता

समीकरण विषय पर अपना बहुमूल्य ज्ञान प्रदान किया। उन्होंने विभिन्न मॉडलों की व्याख्या के साथ शुरुआत की, और प्राइम नंबर के विवरण पर भी चर्चा की। लेक्चर के दौरान उन्होंने क्रिप्टोग्राफी, प्राइमलिटी टेस्ट एल्गोरिथम और उनके कार्यक्षमता, फैक्टराइजेशन एल्गोरिदम और क्रिप्टोग्राफी में उनकी सार्थकता के बारे में भी चर्चा की। तीसरे सत्र के वक्ता डॉ देवेश सी जिन्याला' ने सर्वेबल एन्क्रिप्शन इन क्लाउड इश्यूज एंड चैलेंजेज' पर अपने विचार साझा किए। उनके अनुसार किसी भी शोध के लिए एक समस्या का पता लगाना सबसे बड़ी चुनौती है क्योंकि आपको यह बताना होगा कि समस्या एक वैध समस्या है।



## Publications

1

A. O. Bang and Udai Pratap Rao, "Context-aware computing for IoT: History, Applications and Research Challenges," In the proceedings of Second International Conference on Smart Energy and Communication, Springer, 2021, pp. 719–726.

2

Sonal Patil and Krupa N. Jariwala, "Design of a Machine Learning Layer to Optimize Forgery Detection in images and Videos", Journal of Interdisciplinary Mathematics, Volume 23, 2020 - Issue 1: Interdisciplinary Applications for Sustainability, Taylor and Francis(ESCI) DOI: 10.1080/09720502.2020.1721653

3

Rasika Khade, Krupa N. Jariwala, Chiranjoy Chattopadhyay and Umapada Pal, "A Rotation and Scale Invariant Approach for Multi-oriented Floor Plan Image Retrieval", Pattern Recognition Letters, Elsevier 2021, <https://doi.org/10.1016/j.patrec.2021.01.020>

4

Kamalkumar Macwan and Sankita Patel, "Privacy Preserving Approaches for Online Social Network Data Publishing." In Digital Transformation and Challenges to Data Security and Privacy, pp. 119-132. IGI Global, 2021.

5

Shivangi Shukla and Sankita Patel, "Securing Fingerprint Templates by Enhanced Minutiae-based Encoding Scheme in Fuzzy Commitment." IET Information Security, Wiley, April 2021.

6

Himanshu K. Gajera, Mukesh A. Zaveri, and Deepak Ranjan Nayak, "Improving the Performance of Melanoma Detection in Dermoscopy Images using Deep CNN Features", Proceedings of 19th International Conference on Artificial Intelligence in Medicine (AIME 2021), (online) 15-18 June, 2021, Porto, Portugal. (accepted)

## PhD Completed



Padhya Mukti Bhavesh (DS15CO001) defended her PhD thesis titled "Analysis and Design of Approaches for Searchable Group Data Sharing in Cloud Storage using Key Aggregate Searchable Encryption" on 2<sup>nd</sup> March-2021. She worked under the supervision of Prof. Devesh C. Jinwala, Professor (HAG), Computer Engineering Department.

## STTP/Workshop/Seminar Organized

1. A Webinar on “Crypto for IoT Devices and Cryptanalysis” was organized by Computer Engineering Department, SVNIT Surat 26th February, 2021. Speaker: Dr. Andrea Visconti, Computer Science Department, University of Milan, Italy
2. TEQIP-III sponsored Short Term Training Program on “Cyber Threat Intelligence and Digital Forensics (CIDF-2021)” was organized by Computer Engineering Department, SVNIT Surat during 1-5 March, 2021. (Coordinators: Dr. Sankita J. Patel, Dr. Bhavesh N. Gohil, Dr. Mukesh A. Zaveri, Dr. Udai Pratap Rao)

### Brief Details:

The objective of the program was to train the participants in the area of Cyber Threat Intelligence and Digital Forensics. Total 35 participants were registered including Faculty Members, UG/PG/PhD students. Eminent speakers from IIT, NIT, National Forensics Sciences University, DAIICT Gandhinagar, HSBC Pune, TCS Netherlands, Cyber Expert and Lawyer from Surat, AWS solution architect were invited to share their expertise in the field.

The participants acquired the knowledge about Cyber Security, Information Security and Digital Forensics, Forensics and Penetration Testing Tools and Techniques, Web Application Tools and Techniques, Network Penetration Testing Tools and Techniques, Malware Analysis tools and Techniques, Drone Forensics, Cloud Forensics etc. The hands-on sessions were performed using various open-source forensics and malware analysis tools.



## Alumni Information



Dr. Ruchika Gupta got first prize for Application Security Track, ISEA Virtual Presentation Conclave (IVPC 2020) during 29-30 Jan 2021 at IIT Guwahati.

## GitHub Campus Program

GitHub conducted a full day online workshop on "Github & Azure - Code to Cloud" for the students of SVNIT as a part of GitHub Campus Program on 22nd March 2021. Total 36 students attended this workshop.

## Upcoming Events

1. Department is organizing the International Conference on Security, Privacy & Data Analytics (ISPDA-2021) during December 13-15, 2021 under the Diamond Jubilee Celebration of the Institute. The ISPDA-2021 aims to bring together researchers from industry and academia working in the field of security, privacy and data analytics to share ideas, techniques, tools and experiences. Original papers offering novel research contributions related to Security, Privacy, and Data Analytics are solicited for submission to ISPDA 2021. It is planned to publish the peer-reviewed and selected papers of the conference as proceedings with Springer in their prestigious, "Lecture Notes in Electrical Engineering (LNEE)" series. For more details please visit: <https://www.svnit.ac.in/conference/ispda2021/>
2. Department is organizing AICTE Training and Learning (ATAL) Academy sponsored 5 days online Faculty Development Programme (FDP) on "Cyber Threat Intelligence and Digital Forensics (CTIDF-2021)" during July 19, 2021 – July 23, 2021. The faculty members of the AICTE approved institutions, research scholars, PG Scholars, participants from Government, Industry (Bureaucrats/Technicians/Participants from Industry etc.) and staff of host institutions are eligible to participate. This online FDP is aimed to discuss the state-of-the-art research and development in the upcoming area of Cyber Threat Intelligence and Digital Forensics. Interested participants may register at: <https://atalacademy.aicte-india.org/login>