

CURRICULUM VITAE

PERSONAL DETAILS

Name : **Dr. Sanjay K. Sahay**

Designation : Associate Professor

Nationality : Indian

Qualification : Ph.D.

Address for Correspondence : Department of Computer Science and Information Systems
NH 17B, By Pass Road
Zuari Nagar - 403726
Goa, India
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E-mail: ssahay@goa.bits-pilani.ac.in
URL: <http://www.bits-pilani.ac.in/goa/ssahay/profile>

Research Interest: Information Security, Applied Artificial Intelligence, Malware Analysis, Applied Cryptography and Gravitational Waves

PUBLICATIONS:

Refereed Journals:

- 1) Are Malware Detection Classifiers Adversarially Vulnerable to Actor-Critic based Evasion Attacks? **[ESCI]**
Hemant Rathore, Sujay C Sharma, Sanjay K. Sahay and Mohit Sewak
Accepted in Transaction on Scalable Information, 2022
- 2) Advances in Secure Knowledge Management in the Artificial Intelligence Era. **[SCI]**
Sanjay K. Sahay, Nihita Goel, Murtuza Jadliwala and Shambhu Upadhyaya
Information Systems Frontiers, Vol. 23, No. 4, p. 807, 2021
- 3) Robust Malware Detection Models: Learning from Adversarial Attacks and Defenses. **[SCI]**
Hemant Rathore, Adithya Samavedhi, Sanjay K. Sahay and Mohit Sewak
Forensic Science International: Digital Investigation, Vol. 37, p. 301183, 2021
- 4) Privacy-Preserving Mutual Authentication and Key Agreement Scheme for Multi-Server Healthcare System. **[SCI]**
Trupil Limbasiya and Sanjay K. Sahay and Bharath Sridhar
Information Systems Frontiers, Vol. 23, No. 4, p. 835, 2021

- 5) DRLDO: A novel DRL based De-Obfuscation System for Defense against Metamorphic Malware. [SCI]
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
Defence Science Journal, Vol. 71, Issue 1, pp. 55-65, 2021
- 6) Robust Android Malware Detection System against Adversarial Attacks using Q-learning. [SCI]
Hemant Rathore, Sanjay K. Sahay, Piyush Nikam and Mohit Sewak
Information Systems Frontiers, Vol. 23, No. 4, p. 867, 2021
- 7) An overview of deep learning architecture of deep neural networks and autoencoders. [Scopus]
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
Journal of Computational and Theoretical Nanoscience, Vol. 17, No. 1, pp. 182-188, 2020
- 8) An effective approach for classification of advanced malware with high accuracy. [Scopus]
Ashu Sharma and Sanjay K. Sahay
International Journal of Security and Its Applications, Vol. 10, No. 4, pp. 249-266, 2016.
- 9) A Communication Efficient and Scalable Distributed Data Mining for the Astronomical Data. [SCI]
Aruna Govada and Sanjay K. Sahay
Astronomy and Computing, Vol. 16, pp. 166-173, 2016
- 10) On the independent points in the sky for the search of periodic gravitational wave. [SCI]
Sanjay K. Sahay
Romania Reports in Physics, Vol. 61, No. 2, 191, 2009.
- 11) Earth azimuth effect in the bank of search templates for an all sky search of the continuous gravitational wave. [SCI]
Sanjay K. Sahay
Int. J. Mod. Phys. D., Vol. 15, No. 2, p. 225, 2006.
- 12) Matching of the continuous gravitational wave in an all sky search. [SCI]
Sanjay K. Sahay
Int. J. Mod. Phys. D., Vol. 12, No. 7, p. 1227, 2003.
- 13) Data analysis of continuous gravitational wave: All sky search and study of templates. [SCI]
D.C. Srivastava and Sanjay K. Sahay
Mon. Not. R. Astron. Soc., Vol. 337, No. 1, p. 322, 2002.
- 14) Data analysis of continuous gravitational wave: Fourier transform-II. [SCI]
D.C. Srivastava and Sanjay K. Sahay
Mon. Not. R. Astron. Soc., Vol. 337, No. 1, p. 315, 2002.
- 15) Data analysis of continuous gravitational wave: Fourier transform-I. [SCI]
D.C. Srivastava and Sanjay K. Sahay
Mon. Not. R. Astron. Soc., Vol. 337, No. 1, p. 305, 2002.
- 16) Group-wise classification to improve the detection accuracy of Android malicious apps.
Ashu Sharma and Sanjay K. Sahay
International Journal of Network Security, Vol. 21, No. 3, pp. 409-417, 2019
- 17) Cluster labelling using chi-square-based keyword ranking and mutual information score: A hybrid approach.
R.K. Roul and Sanjay K. Sahay

Inderscience, Int. J. Intelligent Systems Design and Computing, Vol. 1, No. 1/2, pp. 145 - 167, 2017.

- 18) Extreme Learning Machines in the field of Text Classification
R.K. Roul, Ashish Nanda, Viraj Patel and Sanjay K. Sahay
International Journal of Computer & Information Science, Vol. 16, No. 3, p. 34, 2015.
- 19) A Novel Approach to Distributed Multi-Class SVM.
Aruna Govada, Shree S S. Ranjani, Aditi Viswanathan and Sanjay K. Sahay
Transactions on Machine Learning and Artificial Intelligence, Vol. 2, No. 5, p. 72, 2014.
- 20) Evolution and Detection of Polymorphic and Metamorphic Malware: A Survey.
Ashu Sharma and Sanjay K. Sahay
International Journal of Computer Applications, Vol. 90, No. 2, p. 7, 2014
- 21) An Effective Approach for Web Document Classification using the Concept of Association Analysis of Data Mining.
R.K. Roul and S.K. Sahay
International Journal of Computer Science & Engineering Technology, Vol. 3, No. 10, p. 483, 2012.
- 22) An effective web document clustering for information retrieval.
R.K. Roul and Sanjay K. Sahay
International Journal of Computer Science and Management Research, Vol. 1, No. 3, p. 481, 2012.
- 23) An Effective Information Retrieval for Ambiguous Query.
R.K. Roul and Sanjay K. Sahay
Asian Journal of Computer Science and Information Technology, Vol. 2, No. 3, p. 26, 2012.

Refereed Conferences Papers:

- 24) Are Malware Detection Models Adversarial Robust Against Evasion Attack. **[Core-A*]**
Hemant Rathore, Adithya Samavedhi, Sanjay K. Sahay and Mohit Sewak
Accepted, INFOCOM-2022, Proceedings in IEEE Xplore, 2022.
- 25) X-Swarm: Adversarial DRL for Metamorphic Malware Swarm Generation. **[Core-A*]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
Accepted, PerCom-2022, Proceedings in IEEE Xplore, 2022.
- 26) Image-based Android Malware Detection Models using Static and Dynamic Features. **[Core-C]**
Hemant Rathore, B Raja Narasimhan, Sanjay K. Sahay, Mohit Sewak
Springer, LNNS, ISDA-2021, Volume 418, pp. 1292–1305, 2022.
- 27) Are CNN based Malware Detection Models Robust? Developing Superior Models using Adversarial Attack and Defense **[Core-A*]**
Hemant Rathore, Taeab Bandwala, Sanjay K. Sahay, Mohit Sewak
ACM, Proceedings of the 19th ACM Conference on Embedded Networked Sensor Systems, p. 355 - 356, 2021.

- 28) Duplicates in the Drebin Dataset and Reduction in the Accuracy of the Malware Detection Models **[Core-C]**
Jyotiprakash Mishra, Sanjay K. Sahay, Hemant Rathore and Lokesh Kumar
 IEEE, 26th IEEE Asia-Pacific Conference on Communications (APCC), pp. 161-165, 2021.
- 29) Adversarial Robustness of Image based Android Malware Detection Models **[Scopus]**
Hemant Rathore, Taeab Bandwala, Sanjay K. Sahay and Mohit Sewak
 Springer, Communications in Computer and Information Science, Proceeding SKM-2021, Vol. 1549, pp. 3-22, 2022.
- 30) Deep Reinforcement Learning for Cybersecurity Threat Detection and Protection: A Review **[Scopus]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 Springer, Communications in Computer and Information Science, Proceeding SKM-2021, Vol. 1549, pp. 51-72, 2022.
- 31) DRo: A Data-Scarce Mechanism to Revolutionize the Performance of DL-Based Security Systems **[Core-B]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE, 46th Conference on Local Computer Networks (LCN), p. 581-588, 2021.
- 32) Identification of Adversarial Android Intents using Reinforcement Learning. **[Core-A]**
Hemant Rathore, Piyush Nikam, Sanjay K. Sahay and Mohit Sewak
 IEEE, International Joint Conference on Neural Networks (IJCNN), 1-8, 2021.
- 33) LSTM Hyper-Parameter Selection for Malware Detection: Interaction Effects and Hierarchical Selection Approach. **[Core-A]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE, International Joint Conference on Neural Networks (IJCNN), 1-9, 2021.
- 34) ADVERSARIALuscator: An Adversarial-DRL based Obfuscator and Metamorphic Malware Swarm Generator. **[Core-A]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE, International Joint Conference on Neural Networks (IJCNN), 1-9, 2021
- 35) Towards Robust Android Malware Detection Models using Adversarial Learning **[Core-A*]**
Hemant Rathore and Sanjay K. Sahay,
 IEEE, IEEE International Conference on Pervasive Computing and Communications Workshops, pp. 424 - 425, 2021
- 36) Designing Adversarial Attack and Defence for Robust Android Malware Detection Models **[Core-A]**
Hemant Rathore, Sanjay K. Sahay, Jasleen Dhillon and Mohit Sewak
 IEEE, 51st Annual IEEE/IFIP International Conference on Dependable Systems and Networks, pp. 29 - 32, 2021
- 37) Are Android Malware Detection Models Adversarially Robust? **[Core-A*]**
Hemant Rathore, Sanjay K. Sahay and Mohit Sewak
 ACM, 20th International Conference on Information Processing in Sensor Networks, pp. 408 - 409, 2021
- 38) Policy-Approximation based Deep Reinforcement Learning Techniques: An Overview. **[Scopus]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 Springer, Lecture Notes in Networks and Systems (ICTCS 2020), Vol. 191, pp. 493 - 507, 2021

- 39) Identification of Significant Permissions for Efficient Android Malware Detection. **[Core-B]**
Hemant Rathore, Sanjay K. Sahay, Ritvik Rajvanshi and Mohit Sewak
 Springer, LNICST, Vol. 355, pp. 33-52, Proceedings BROADNETS-2020, 2021
- 40) Detection of Malicious Android Applications: Classical Machine Learning vs. Deep Neural Network Integrated with Clustering. **[Core-B]**
Hemant Rathore, Sanjay K. Sahay, Shivin Thukral and Mohit Sewak
 Springer, LNICST, Vol. 355, pp. 109-128, Proceedings BROADNETS-2020, 2021
- 41) How Robust are Malware Detection Models for Android Smartphones against Adversarial Attacks? **[Core-A*]**
Hemant Rathore, Sanjay K. Sahay and Mohit Sewak
 ACM, Proceedings of the 18th Conference on Embedded Networked Sensor Systems (SenSys), pp. 683-684, 2020.
- 42) DOOM: A Novel Adversarial-DRL-based Op-Code Level Metamorphic Malware Obfuscator for the enhancement of IDS. **[Core-A*]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 ACM, Proceedings International Joint Conference on Pervasive and Ubiquitous Computing, pp. 131-134, 2020
- 43) DeepIntent: ImplicitIntent Based Android IDS with E2E Deep Learning Architecture. **[Core-B]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE 31st Annual International Symposium on Personal, Indoor and Mobile Radio Communications, p. 1-6, 2020
- 44) Assessment of the Relative Importance of different hyper-parameters of LSTM for an IDS. **[Core-C]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE, TENCON-2020, pp. 414-419, 2020
- 45) Value-Approximation based Deep Reinforcement Learning Techniques: An Overview. **[Scopus]**
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
 IEEE IEEE 5th International Conference on Computing Communication and Automation, pp. 379-384, 2020.
- 46) A Novel Spatial-Spectral Framework for the Classification of Hyperspectral Satellite Imagery. **[Scopus]**
Shriya TP Gupta and Sanjay K. Sahay
 Springer, International Neural Networks Society, Proceedings of the 21st Engineering Applications of Neural Networks, Vol. 2, pp. 227-239, 2020.
- 47) Secure and Energy-Efficient Key-Agreement Protocol for Multi-Server Architecture. **[Scopus]**
Trupil Limbasiya and Sanjay K. Sahay
 Springer, Communications in Computer and Information Science, Proceeding SKM-2019, Vol. 1186, pp. 82-97, 2020.
- 48) Secure communication protocol for smart transportation based on vehicular cloud. **[Core-A*]**
Trupil Limbasiya, Debasis Das, Sanjay K Sahay
 ACM, pp. 372-376, International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2019 ACM International Symposium on Wearable Computers, 2019.

- 49) A Survey on the Detection of Android Malicious Apps. [Scopus]
Sanjay K. Sahay and Ashu Sharma
Springer, Advances in Computer Communication and Computational Sciences, Vol. 924, pp 437-446, 2019, Proceedings in Springer, Proceedings ICCCCS, 2018.
- 50) An Efficient Detection of Malware by Naive Bayes Classifier Using GPGPU. [Scopus]
Sanjay K. Sahay and Mayank Chaudhari
Springer, Advances in Computer Communication and Computational Sciences, Vol. 924, pp. 255-262, 2019, Proceedings ICCCCS, 2018.
- 51) Evolution of Malware and its Detection Techniques. [Scopus]
Sanjay K. Sahay, Ashu Sharma and Hemant Rathore
Springer, Information and Communication Technology for Sustainable Development, Vol. 933, pp 139-150, 2019, Proceedings ICT4SD, 2018.
- 52) A Survey on the Detection of Windows Desktops Malware. [Scopus]
Sanjay K. Sahay and Ashu Sharma
Springer, Ambient Communications and Computer Systems (AISC), Vol. 904, pp. 149-159, 2019, Proceedings RACCCS, 2018.
- 53) Android Malicious Application Classification Using Clustering. [Core-C]
Hemant Rathore, Sanjay K. Sahay, Palash Chaturvedi, and Mohit Sewak
Springer, Intelligent Systems Design and Applications (AISC) Vol. 941, pp 659-667, 2019, Proceedings ISDA, 2018.
- 54) Malware Detection using Machine Learning and Deep Learning. [Scopus]
Hemant Rathore, Swati Agarwal, Sanjay K. Sahay, and Mohit Sewak
Springer, LNCS, Vol. 11297, pp. 402-411, 2018, Proceedings BDA-2018.
- 55) An investigation of a deep learning based malware detection system. [Core-B]
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
ACM, pp. 26, Proceedings of the 13th International Conference on Availability, Reliability and Security (ARES), 27-30 Aug., 2018, University of Hamburg, Germany.
- 56) Comparison of Deep Learning and the Classical Machine Learning Algorithm for the Malware Detection. [Core-C]
Mohit Sewak, Sanjay K. Sahay and Hemant Rathore
IEEE, pp. 293-296, 19th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD), 2018.
- 57) Detection of Advanced Malware by Machine Learning Techniques. [Scopus]
Sanjay Sharma, Rama Krishna and Sanjay K. Sahay
Springer, Advances in Intelligent Systems and Computing, Vol. 742, pp. 332 - 342, 2018, Proceedings Soft Computing: Theories and Applications (2017).
- 58) Categorizing Text Data using Deep Learning: A Novel Approach. [Scopus]
Rajendra Roul and Sanjay K. Sahay
Springer, Computational Intelligence in Data Mining (AISC), Vol. 711, pp. 793-805, , 2018, Proceedings ICCIDM-2017.
- 59) An investigation of the classifiers to detect android malicious apps. [Scopus]
Ashu Sharma and Sanjay K. Sahay
Springer, Information and Communication Technology, Vol. 625, p. 207-217, 2017, Proceedings, ICICT, 2016.

- 60) Distributed multi-class rule based classification using RIPPER. [Core-C]
Aruna Govada, Varsha S. Thomas, Ipsita Samal, Sanjay K. Sahay
IEEE Xplore, 978-1-5090-4314-9/16, pp. 303 - 309, IEEE Computer Society, 2016 IEEE International Conference on Computer and Information Technology, 2017.
- 61) Semi-supervised Clustering using Seeded-kMeans in the Feature Space of ELM. [Scopus]
Rajendra Roul and Sanjay K. Sahay
IEEE Xplore, DOI: 10.1109/INDICON.2016.7838892, Proceedings, India Conference (INDICON), 2016 IEEE Annual, 2017.
- 62) Combining Apriori Approach with Support Based Count Technique to Cluster the Web Documents. [Scopus]
Rajendra Roul and Sanjay K. Sahay
Springer, Computational Intelligence in Data Mining, Proceedings ICCIDM (2016), Vol. 556, pp 119-132, 2017.
- 63) Covariance estimation for Vertically partitioned data in a Distributed environment. [Core-C]
Aruna Govada and Sanjay K. Sahay
Springer, Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing, Studies in Computational Intelligence, Vol. 653, pp 151-164, 2016.
Proceedings, 17th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD), 2016.
- 64) Grouping the executables to detect malwares with high accuracy. [Scopus]
Sanjay K. Sahay and Ashu Sharma
Elsevier, Procedia Computer Science, Vol. 78, pp. 667 - 674, 2016.
- 65) Improving the detection accuracy of unknown malware by partitioning the executables in groups. [Scopus]
Ashu Sharma, Sanjay K. Sahay, Abhishek Kumar
Springer, Advances in Intelligent System and Computing, Vol. 452, pp. 421-431., 2016; Proceedings 9th ICACCT, 2015.
- 66) K-means and Wordnet based Feature Selection Combine with Extreme Learning Machines for Text Classification. [Scopus]
Rajendra Roul and Sanjay K. Sahay
Springer, LNCS, Distributed Computing and Internet Technology, Vol. 9581, p. 103, Proceedings 12th ICDCIT, 2016.
- 67) Extreme Learning Machines in the field of Text Classification. [Core-C]
Rajendra Roul, Ashish Nanda, Viraj Patel and Sanjay K. Sahay
IEEE Xplore, DOI: 10.1109/SNPD.2015.7176204, Proceedings 16th International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD), 2015.
- 68) Distributed Multi Class SVM for Large Data Sets. [Scopus]
Aruna Govada, Bhavul Gauri and Sanjay K. Sahay
ACM Digital Library, PP. 54-58, Proceedings of the Third International Symposium on Women in Computing and Informatics, 2015.
- 69) Centroid Based Binary Tree Structured SVM for Multi Classification. [Scopus]
Aruna Govada, Bhavul Gauri and Sanjay K. Sahay
IEEE Xplore, DOI: 10.1109/ICACCI.2015.7275618, Proceedings Fourth International Conference on Advances in Computing, Communications and Informatics, 2015.

- 70) Hybrid Approach for Inductive Semi Supervised Learning using Label Propagation and Support Vector Machine. **[Scopus]**
Aruna Govada, Pravin Joshi, Sahil Mittal, and Sanjay K. Sahay
 Springer, LNAI, Machine Learning and Data Mining in Pattern Recognition, Vol. 9166, p. 199; Proceedings 11th International Conference MLDM, Germany, 2015.
- 71) A Novel Modified Apriori Approach for Web Document Clustering. **[Scopus]**
Rajendra Kumar Roul, Saransh Varshneya, Ashu Kalra and Sanjay K. Sahay
 Springer, Smart Innovation Systems and Technologies, Vol. 33, p. 159-171, 2015, Proceedings ICCIDM
- 72) Automated Document Indexing via Intelligent Hierarchical Clustering: A Novel Approach. **[Scopus]**
Rajendra Roul, Sachin Joglekar and Sanjay K. Sahay
 IEEE Xplore, Proceedings ICHPCA-2014, DOI: 10.1109/ICHPCA.2014.7045347, 2014
- 73) Web Document Clustering and Ranking using Tf-Idf based Apriori Approach.
Rajendra Roul, O.R. Devanand and Sanjay K. Sahay
 International Journal of Computer Applications, Proceedings ICACEA, No. 2, p. 34, 2014
- 74) Analysis of noise free response of interferometric antenna to gravitational radiation from pulsars: I
D.C. Srivastava and Sanjay K. Sahay
 Pramana-J. Phys., Vol. 55, No. 4, p. 589, 2000, Proceedings of the Fourth ICGC, IIT Kharagpur, India, Jan. 04 - 07, 2000.
- 75) Analysis of noise free response of interferometric antenna to gravitational radiation from pulsars: II
D.C. Srivastava and Sanjay K. Sahay
 Pramana-J. Phys., Vol. 55, No. 4, p. 589, 2000, Proceedings of the Fourth ICGC, IIT Kharagpur, India, Jan. 04 - 07, 2000.

Contributed Conferences/arXiv:

- 76) An effective distributed data mining for Astronomical Data.
Aruna Govda and Sanjay K. Sahay
 21st Int. Conf. of FIMIMSCT, Punjab University, Chandigarh, Dec. 15 - 17, 2012.
- 77) An effective approach for web document clustering.
Rajendra Roul and Sanjay K. Sahay
 21st Int. Conf. of FIMIMSCT, Punjab University, Chandigarh, Dec. 15 - 17,
- 78) An Effective Approach for Web Document Classification using the Concept of Association Analysis of Data Mining.
Rajendra Roul and Sanjay K. Sahay
 ArXiv:1406.5616
- 79) Studies in gravitational wave data analysis.
Sanjay K. Sahay
 ArXiv:gr-qc/0209019, Ph.D Thesis

- 80) All Sky Search for Continuous Gravitational Waves.
D.C. Srivastava and Sanjay K. Sahay
21st Meeting of the Indian Association for General Relativity and Gravitation, Central India Research Institute, Nagpur, India, Jan. 30 - Feb. 01, 2001..
- 81) Data Analysis of CGW: Fourier Transform.
D.C. Srivastava and Sanjay K. Sahay
20th Astronomical Society of India Meeting and National Symposium on Multiwave- length Astronomy, DDU. Gorakhpur University, Gorakhpur, India, Nov. 15 - 18, 2000.
- 82) Data analysis of CGW signal: Fourier transform.
D.C. Srivastava and Sanjay K. Sahay
ArXiv:gr-qc/0009094
- 83) A Study of Number of Patches in the Sky for the Pulsar Search for Gravitational Radiation.
D.C. Srivastava and Sanjay K. Sahay
Conference on Recent Developments in General Relativity and Allied Topics, Aligarh Muslim University, Aligarh, India, Aug. 30 - Sept. 01, 1999.
- 84) Detection of CGW from Rotating Rigid Newtonian Body: Pulsars.
D.C. Srivastava and Sanjay K. Sahay
20th Meeting of the Indian Association for General Relativity and Gravitation and National Symposium on Currents Trends in Gravitation and Cosmology, DDU Gorakhpur University, Gorakhpur, India, Jan. 20 - 21, 1999.

PROJECT/WORKSHOP FUNDING:

- OptimusPrime: Transformer for Security.
Sponsor: SKM-2019
Grant: Rs. 2.5 Lakhs
- US-India collaborative Working Group on Secure Digital Financial Payment Systems and Financial Inclusion.
Sponsor: IUSSTF (IUSSTF/AUG/WS/162/2019)
Grant: Rs. 10 Lakhs
- Workshop on Gravitational Wave Data Analysis.
Sponsor: IUCAA, 2012
Grant: Rs. 4,30,450/-
- Neutron Stars as a Source of Potential Continuous Gravitational Wave Emitter.
Sponsor: BRNS, 2012
Grant: Rs. 18 Lakhs
Duration: 3 + 1 Years

Conferences/ Workshop Organization:

- Organizing Committee, International Conference on Advances in Data-driven Computing and Intelligent Systems, BITS, Pilani, K. K. Birla Goa Septmber 23-25, 2022.
- Scientific Chair, International Conference on Secure Knowledge Management in the Artificial Intelligence Era, San Antonio, Texas, October 08 - 09, 2021.
- General Chair, International Conference on Secure Knowledge Management in Artificial Intelligence Era, BITS, Pilani, K.K. Birla Goa Campus, Goa, December 21 - 22, 2019.
- Financial Chair and LOC, IX India Software Engineering Conference, BITS, Pilani, K.K. Birla Goa Campus, Goa, February 18 - 20, 2016.
- LOC, ACM India Annual Event, BITS, Pilani, K.K. Birla Goa Campus, Goa, Feb. 05 - 07, 2015.
- Financial Chair, XVI International Conference on Distributed Computing and Networking, BITS, Pilani, K.K. Birla Goa Campus, Goa, January 04 - 06, 2015.
- Co-ordinator/ Organizing Committee member of the Indo-Chile Workshop on Big Data, BITS, Pilani, K.K. Birla Goa Campus, Goa, June 04 - 07, 2014.
- Co-ordinator, BITS-IUCAA Workshop on Gravitational Wave Data Analysis, BITS, Pilani, K.K. Birla Goa Campus, Goa, Dec. 17 - 21, 2012.
Sponsor: IUCAA, Pune. Grant: Rs. 4,30,450/-
- Local organizing committee member for FTAG-V, BITS, Pilani, K.K. Birla Goa Campus, Dec. 18 - 23, 2006

MEMBER/ADVISOR

- Technical program committee, DFRWS-2022, USA, July 11 - 14, 2022.
- Technical program committee, International Conference on Secure Knowledge Management in The Artificial Intelligence Era, he University of Texas at San Antonio, October 08 - 09, 2021.
- Global advisory board, RAF Global, a non-denominational, not-for-profit international organization committed to improve the quality of life primarily in Africa and Asia.
- Technical program committee, International Conference on Secure Knowledge Management in Artificial Intelligence Era, BITS, Pilani, K.K. Birla Goa Campus, Goa, December 21 - 22, 2019.
- Institute Co-ordinator, Regional Academic Centre for Space, Joint Venture of MNIT Jaipur and ISRO, Bangalore

- Technical program committee, 2018 Artificial Intelligence and Cloud Computing Conference (AICCC 2019), 21-23 December, 2019, Kobe University, Japan.
- Technical program committee, 2018 Artificial Intelligence and Cloud Computing Conference (AICCC 2018), 21-23 December, 2018, Tokyo, Japan.
- National Advisory Board, International Conference on Chip, Circuitry, Current, Coding, Combustion and Composites (I7C), 16-17, Nov. 2017, Sri SaiRam College of Engineering, Bengaluru, India.
- Technical program committee, International Conference on Advances in Computing, Communications and Informatics, 13-16 Sept. 2017, Manipal Academy of Higher Education, Karnataka, India.
- Technical program committee, International Conference on Data Science Analytics and Applications (DaSAA 2016), 7-9, Dec. 2016, Chennai, India.
- Technical program committee, Third International Symposium on Women in Computing and Informatics (WCI-2015), Aug. 10-13, 2015, Kochi, India,
- International Scientific Board, 6th World Conference on Information Technology , 30 Aug. - 01 September 2015, Las Vegas, USA.
- Professional Member, Association for Computing Machinery, No. 1575867, 2015-16
- Member of the Indian Gravitational Wave Observatory Consortium.
- Local Committee Member of Square Kilometer Array (SKA) Telescope, BITS, Pilani, K.K. Birla, Goa Campus.

EMPLOYMENTS

- (i) **Associate Professor**, Birla Institute of Technology and Sciences, Pilani, K.K. Birla Goa Campus, Goa, India (July 2018 to present).
- (ii) **Lecturer/Assistant Professor (I and II)**, Birla Institute of Technology and Sciences, Pilani-K.K. Birla Goa Campus, Goa, India (December 2005 - June 2018).
- (iii) **Post-Doctoral Fellow**, Tel Aviv University, Israel (March - December 2005).
- (iv) **Project Associate**, Raman Research Institute, Bangalore, India (August 2003 - February 2005).
- (v) **Project Scientist**, Inter University Centre for Astronomy and Astrophysics, Pune, India (March 2002 - July 2003).
- (vi) **Junior/Senior Research Fellow**, DST sponsored project on Gravitational Wave Data Analysis, 1997 - 2001.
- (vii) **Graduate Trainee**, Research and Development, Sterlite Industries India Limited, Pune, India (June - December 1995).

Courses Taught/Teaching:

Network Security, Cryptography, Computer Networks, Advanced Data Mining, Operating System, Computer Programming, Development and Use of Computer Software, Study in Advanced Topics, Study Oriented Project, Lab Oriented Project, Computer Project & Design Project.

Graduated PhD Student:

- Trupil Limbasiya, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Design of Vehicular Communication Protocols for Secure and Efficient Smart Transportation.
- Ashu Sharma, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Group-wise Classification Approach to Improve Malware Detection Accuracy.
- Aruna Govada, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Study in Data Reduction and Multi-Class Classification for Distributed Data.
- Rajendra Roul, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Design and Investigation of Techniques to Improve Information Retrieval on the Web.

Current On-Campus PhD Students:

- Hemanat Rathore, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Design of a hybrid system to detect malicious applications of the smart devices.
- Lokesh Kumar, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Search of Gravitational Waves using Deep Learning Techniques in the Output of Laser Interferometer Gravitational Wave Detector.
- Ankush Soni, BITS, Pilani, K. K. Birla, Goa Campus.
Title: Efficient and secure authentication protocols using lightweight cryptography primitives for drones

Current Off-Campus (Industry) PhD Students:

- Mohit Sewak, Security and Compliance Research, Microsoft, Hyderabad
Title: Study and design of cognitive system for the detection of advanced malware.
- Akbar Kushanoor, General Electric, Bengaluru.
Title: Design of an effective computer aided diagnosis system using deep learning for the detection of melanoma cancer.
- Justin S Sam, Paladion Network Pvt. Ltd., Bengaluru.
Title: —

PhD Thesis Evaluation:

- *Investigating Approaches for Improving Security in Remote User Authentication for Internet of Things Paradigm* by Chintan Jayprakash Patel, Pandit Deendayal Energy University, Gandhinagar, 2021.
- *Network Event Based Model to Predict and Detect Insider Intrusion on Enterprise Network* by Nisha T. N., Symbiosis Centre for Information Technology, Pune, 2019.
- *Relativistic Studies of Compact Stars* by Abdul Aziz, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, 2019.
- *Design and Implementation of an Interoperable, Privacy Preserving Framework For Health Records* by Rohini R. Roa, Manipal Academy of Higher Education, 2017.

Master Thesis Supervision:

- (i) Machine Learning Approach to Detect Unknown Malware in Large Scale Data Using Opcodes.
Sanjay Sharma
- (ii) Efficient Malware Classification using General Purpose Graphics Processing Unit.
Indrajeet Khandekar
- (iii) Classification of Metamorphic Malware Using Data Mining Techniques.
Avi Bhargava
- (iv) Prevention of ARP Spoofing using Cryptographic Techniques.
B.G.K. Verma
- (v) A Study of the Performance of SHA-3 Candidate: BLAKE.
Yogini Prabhu
- (vi) ARP Spoofing and its Prevention Using Cryptographic Techniques
Bibin Mathews

Undergraduate Thesis Supervision:

- (i) Duplicates in malware data sets.
Saumya Singh
- (ii) Missing gravitational wave data imputation using LSTM.
Ranjit Singh
- (iii) Reinforcement learning based solution to the stock trading problem
Ishan Tyagi
- (iv) A study of metamorphic malware for the development of anti-malware.
Abhishek Kumar

- (v) Secutriy for local and cloud storage file systems.
Kunal Baweja
- (vi) Static analysis of advanced malware.
Amol Agarwal
- (vii) Application of Principal Component Analysis for Distributed Data Mining.
Devendra K. Didwaniya
- (viii) Study of SHA-3 and its Application for the Malware Detection.
Saurabh Khare
- (ix) Power spectrum analysis of highly modulated signal.
Siddharth J. Menaria
- (x) Matched filter analysis using Fast Fourier Transform.
Chiranjeev Singh Rao
- (xi) Reduction of Communication cost in Distributed Data Mining.
Suneel Kolluri
- (xii) Study of cross-correlation with Fast Fourier Transform.
Nishant Varma

Research Project/ Professional Practice - I & II Computer Project/ Study Oriented Project/ Lab Oriented Project

Supervised over 150 PG/UG students for Research Project/ Professional Practice - I & II Computer Project/ Study Oriented Project/ Lab Oriented Project on the topics viz. *Anti-Malware, Cryptography, Network Security, Data Analysis, Gravitational Waves, Distributed Data Mining, Scientific Computing*)

Books:

- (i) Secure Knowledge Management In Artificial The Intelligence Era, *Proceedings, 9th nternational Conference, SKM 2021, San Antonio, TX, USA, October 8–9, 2021.*
Editors: Ram Krishnan, H. Raghav Rao, Sanjay K. Sahay, Sagar Samtani and Ziming Zhao
Publisher: Springer, Communications in Computer and Information Science, 2022.
ISBN: 978-3-030-97532-6
- (ii) Special issue on Advances in Secure Knowledge Management in the Artificial Intelligence Era
Editors: Sanjay K Sahay, Nihita Goel, Murtuza Jadliwala and Shambhu Upadhyaya
Publisher: Springer, Information Systems Frontiers, 2021.
ISSN: 1387-3326

(iii) Secure Knowledge Management In Artificial Intelligence Era, *Proceedings, 8th International Conference, SKM 2019, Goa, India, December 21–22, 2019*.

Editors: Sanjay K. Sahay, Nihita Goel, Vishwas Patil and Murtuza Jadliwala

Publisher: Springer, Communications in Computer and Information Science, 2020.

ISBN: 978-981-15-3816-2

(iv) Data Analysis of Gravitational Waves.

Author: Sanjay K. Sahay

Publisher: Svenska fysikarkivet, Sweden, 2008.

ISBN: 978-91-85917-05-1

Fellowships/Awards:

- **K Shankar Meritorious Paper Award-2021 from IEEE Bombay Section** for the paper titled Robust Malware Detection Models: Learning from Adversarial Attacks and Defenses.
- **Visiting Associateship**, Inter-University Centre for Astronomy and Astrophysics, Pune, India (2012 - 2024, 2006 - 2009).
- **Post Doctoral Fellow**, Department of Astrophysics, Tel Aviv University, Israel, 2005.
- **Project Associate** in the multiwavelength astronomy project (ASTROSAT), Astronomy & Astrophysics, Raman Research Institute, Bangalore, India, Aug. 2003 - Feb. 2005.
- **Project Scientist**, Inter-University Centre for Astronomy and Astrophysics, Pune, 2002 - 2003.
- **Junior/Senior Research Fellow**, DST sponsored project on Gravitational Wave Data Analysis, 1997 - 2001.

Administrative Work:

- (i) Hostel Warden (Jan. 2014 - Continuing).
- (ii) Practice School-I Instructor at Hyderabad (2021), Pune (2019, 2015, 2014 and 2013), Goa (2011 and Goa 2017), Bokaro (2010).
- (iii) Department Research Committee Member (2014 - 2017, 2019 - 2021).
- (iv) Member/Convener of the Departmental Committee on Academics (2014-2016, 2018-2019, 2019-2022).
- (v) Department level short-listing committee memeber (2018 - Continuing).
- (vi) BITSAT (May 2006 and 2007), BITS-Pilani, K.K. Birla Goa Campus.
- (vii) Library Committee Member (2013 - 2014).

- (viii) Mess Committee Member (2016 - 2017 and 2018 - 2019).
- (ix) Institute level member of the Anti Ragging Committee and anti Ragging squads for the academic year (2014 - Continuing).
- (x) Co-ordinated/Mediated for Practice School-I station at IUCAA, Pune, 2012
- (xi) Cross-campus committee member to redefine the curriculum of B.S. and M.S. Programs related to CS & IS in order to provide options for students with different level of educations, 2014.
- (xii) Cross-campus committee member for the classification (Tier-I/II/II) of the HPC journals and conferences, 2014.
- (xiii) Member of Website Monitoring Committee of the BITS-Pilani, K.K. Birla Goa Campus, 2012.
- (xiv) Academic Registration and Counseling (Registration of students).

Visits:

- (i) Inter University Centre for Astronomy and Astrophysics (IUCAA), Pune, May 20 - June 21, 2019, July 01 - 15, 2019, June 02 - 17, 2018, Mar. 05 - 11, 2018; Dec. 21 - 30, 2016, May 19 - July 18, 2015; May 19 - July 18, 2014; India, May 19 - July 15, 2013; Nov. 11 - 18, 2012; Dec. 17 - 27, 2011, Oct. 17 - 21, 2011, June 16 - July 05, 2009; June 30 - July 14, 2007; Nov. 19 - 25, 2006; Feb. 07 - April 15 2001; June 22 - Aug. 22, 2000; Feb. 02 - Mar. 19, 2000; Dec. 08 - 26, 1999; July 01 - Aug. 27, 1998; Jan. 20 - Mar. 19, 1998; Aug. 09 - Sept. 30, 1997.
- (ii) Invited to visit and deliver a talk at Louisiana State University, USA, Mar. 08-14, 2004. However, unable to visit due to visa problem.
- (iii) Raman Research Institute, Bangalore, India, March 09 - 14, 2003.
- (iv) Centre for Theoretical Studies, I.I.T. Kharagpur, India Sept. 20 - 30, 2000.

Invited Talks/Seminar/Lectures:

- (i) *Evolution of Malware and its Detection Techniques*, Workshop on IoT, IoT Security and Malware Analysis, Rashtriya Raksha University, Gandhinagar, Nov. 26 -27, 2021.
- (ii) *Adversarial Artificial Intelligence and Cybersecurity*, Allenhouse Institute of Technology, Kanpur, April 30, 2021.
- (iii) *Continuous Gravitational Waves*, Workshop on Gravitational Wave Data Analysis, BITS, Pilani, K.K. Birla Goa Campus, Goa, Dec. 17 - 21, 2012
- (iv) *Optical wave-band to hard X-rays study of the cosmic sources by ASTROSAT*, Vith IAPS conference, Gorakhpur University, Gorakhpur, Feb. 06 - 08, 2004.

- (v) *Search for continuous gravitational wave sources*, Raman Research Institute, Bangalore, India, March 10, 2003.
- (vi) *Search for continuous gravitational wave sources*, 22nd Meeting of Indian Association of General Relativity and Gravitation, IUCAA, Pune, Dec. 2002.
- (vii) *Gravitational Waves and their Detection*, Introductory School on Astronomy & Astrophysics held at NES Science College, Nanded, India (December 2002).

Contributed Talks:

- (i) *A Survey on the Detection of Android Malicious Apps*, 3rd International Conference on Computer, Communication and Computational Sciences, Bangkok, Oct. 20-21, 2018.
- (ii) *A Survey on the Detection of Android Malicious Apps*, 3rd International Conference on Computer, Communication and Computational Sciences, Bangkok, Oct. 20-21, 2018.
- (iii) *Comparison of Deep Learning and the Classical Machine Learning Algorithm for the Malware Detection*, 19th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (IEEE/ACIS SNPD 2018), Busan, South Korea, June 27-29, 2018.
- (iv) *An investigation of the classifiers to detect android malicious apps*, International Congress on Information and Communication Technology, Bangkok, Thailand, Dec. 12-13, 2016.
- (v) *Grouping the executables to detect malware with high accuracy*, 1st International Conference on Information Security and Privacy, G. H. Rasoni College of Engineering, Nagpur, India, Dec. 11-12, 2015
- (vi) *Automated Document Indexing via Intelligent Hierarchical Clustering: A Novel Approach*, International Conference on High Performance Computation and Applications, C.V. Raman College of Engineering, Bhubaneswar, India, Dec. 22-24, 2014.
- (vii) *All sky search for continuous gravitational waves: Symmetries*, Young Astronomer Meet, IUCAA, Pune, India, Feb. 07-10, 2001.
- (viii) *All sky search for continuous gravitational waves*, 21st Meeting of Indian Association of General Relativity and Gravitation, Nagpur, India, Jan. 30 - Feb. 01, 2001.
- (ix) *Analysis of noise free response of interferometric antenna to gravitational radiation I & II*, International Conference on Gravitation and Cosmology, I.I.T., Kharagpur, India, Jan. 04 - 07, 2000.
- (x) *A study of number of patches in the sky for the pulsar search for gravitational radiation*, Conference on Recent Development in Relativity and Allied Topics, Aligarh Muslim University, Aligarh, India, Aug. 30 - Sept. 01, 1999.
- (xi) *Detection of continuous and nearly periodic gravitational wave from rotating and precessing Newtonian rigid bodies*, 20th Meeting of Indian Association of General Relativity and Gravitation and National Symposium on Current Trends in Gravitation and Cosmology, DDU Gorakhpur University, Gorakhpur, India, Jan. 20 - 21, 1999.

Symposia/Conferences/Workshops/Schools/Meetings attended:

- (i) Microsoft Research Academic Research Summit 2020, BITS, Pilani, K.K. Birla Goa Campus, Goa, India, Jan. 30-31, 2020.
- (ii) International Conference on Secure Knowledge Management in Artificial Intelligence Era, BITS, Pilani, K.K. Birla Goa Campus, Goa, India, Dec. 21-22, 2019.
- (iii) 3rd International Conference on Computer, Communication and Computational Sciences, Bangkok, Oct. 20-21, 2018.
- (iv) 19th IEEE/ACIS International Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (IEEE/ACIS SNPD 2018), Busan, South Korea, June 27-29, 2018.
- (v) National Cyber Defense Summit, BITS, International Conference on India, Dec. 15-16, 2017.
- (vi) 13th International IEEE India Conference (INDICON), IISc, Bengaluru, Dec. 16-28, 2016.
- (vii) International Congress on Information and Communication Technology, Bangkok, Thailand, Dec. 12-13, 2016.
- (viii) 9th India Software Engineering Conference, BITS, Pilani, K.K. Birla Goa Campus, Goa, India, Feb. 18-20, 2016.
- (ix) 1st International Conference on Information Security and Privacy, G. H. Raisoni College of Engineering, Nagpur, India, Dec. 11-12, 2015.
- (x) Workshop on High Performance Computing, ISM, Dhanbad, July 29-31, 2015.
- (xi) 16th International Conference on Distributed Computing and Networking, BITS, Pilani, K.K. Birla Goa Campus, Goa, India, Jan. 04-07, 2015.
- (xii) International Conference on High Performance Computation and Applications, C.V. Raman College of Engineering, Bhubaneswar, India, Dec. 22-24, 2014.
- (xiii) Indo-Chile Workshop on Big Data, BITS, Pilani, K.K. Birla Goa Campus, Goa, June 04 - 07, 2014.
- (xiv) *A meeting on Astronomy and Physics with LIGO-India*, IUCAA, Pune, India, Dec. 20, 2013.
- (xv) *Gravitational Wave Physics and Astronomy Workshop*, IUCAA, Pune, India, Dec. 17-20, 2013.
- (xvi) *Seminar on Anthropogenic Noise and Its Impact on Marine Species - An Indian Perspective*, MILIT, Pune, India, June 05, 2013.
- (xvii) *BITS-IUCAA Workshop on Gravitational Wave Data Analysis*, BITS, Pilani, K.K. Birla, Goa Campus, Goa, India, Dec. 17-21, 2012.

- (xviii) *ICTS Workshop on Gravitational Wave Astronomy*, Dec. 20-22, 20011, IUCAA, Pune.
- (xix) *Field Theoretic Aspects of Gravity-V*, BITS, Pilani, K.K. Birla Goa Cam-pus, Dec. 18-23, 2006
- (xx) *Workshop on Advanced Topics in Data Analysis in Cosmology and Gravitational Wave Astronomy*, Oct. 04-14, 2006, Delhi University, Delhi.
- (xxi) *Informal Discussion Group on Space Experiment*, Oct. 8-18, 2004, Tata Institute of Fundamental Research, Mumbai.
- (xxii) *Ind ASTROSAT Workshop on Black Hole Astrophysics*, May 10-16, 2004, BARC, Mumbai.
- (xxiii) *VIth IAPS conference*, Gorakhpur University, Gorakhpur, Feb. 06 - 08, 2004.
- (xxiv) *Advanced School and Conference on Sources of Gravitational Waves*, the abdu salam ICTP, Trieste, Italy, Sept. 15-26, 2003.
- (xxv) *Workshop on "The Provocative Universe*, IUCAA, Pune, India, June 30-July 02, 2003
- (xxvi) *School on Radio Interferometry and Aperture Synthesis*, NCRA-TIFR, Pune, India, June 02 -22, 2003.
- (xxvii) *Introductory School on Astronomy & Astrophysics*, NES Science College, Nanded, India, December 18-21, 2002.
- (xxviii) *22nd Meeting of Indian Association of General Relativity and Gravitation*, IUCAA, Pune, India, Dec. 11-14, 2002.
- (xxix) *School and Workshop on Distributed Computation for Physicists* held at Harish-Chandra Research Institute, Allahabad, India, April 11-19, 2002.
- (xxx) *Young Astronomer Meet*, IUCAA, Pune, India, Feb. 07-10, 2001.
- (xxx1) *21st Meeting of Indian Association of General Relativity and Gravitation*, Nagpur, India, Jan. 30 - Feb. 01, 2001.
- (xxx2) *IUCAA-CIRI Discussion Conference on Cosmology (Aspects of Standard Model vis-a-vis Alternatives)*, Nagpur, India, Jan. 28-29, 2001.
- (xxx3) *20th Astronomical Society of India Meeting and National Symposium on Multi-wavelength Astronomy*, DDU Gorakhpur University, Gorakhpur, India, Nov. 15 -18, 2000.
- (xxx4) *Workshop on Neutron Stars: Isolated and in Binary Stars*, IUCAA, Pune, India, July 15-16, 2000.
- (xxx5) *International Conference on Gravitation and Cosmology*, I.I.T., Kharagpur, India, Jan. 04 - 07, 2000.
- (xxx6) *Conference on Recent Development in Relativity and Allied Topics*, Aligarh Muslim University, Aligarh, India, Aug. 30 - Sept. 01, 1999.

- (xxxvii) *20th Meeting of Indian Association of General Relativity and Gravitation and National Symposium on Current Trends in Gravitation and Cosmology*, DDU Gorakhpur University, Gorakhpur, India, Jan. 20 -21, 1999.
- (xxxviii) *Orientation Meeting in Exact Solution*, DDU Gorakhpur University, Gorakhpur, India, Jan. 18 -19, 1999.
- (xxxix) *Mini School on Cosmology*, Lucknow University, Lucknow, India, Feb. 03 - 12, 1997.

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