

# DR. SUNNY BEHAL

Dept of Computer Science and Engineering  
Shaheed Bhagat Singh State University  
Ferozepur-152004, Punjab, India

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## PARTICULARS

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### EDUCATION

Ph. D. in Computer Science and Engineering, *June 2018*  
I.K.G. Punjab Technical University, Kapurthala, Punjab, India

M. Tech. in Computer Science and Engineering (Part Time), *May 2010*  
Guru Nanak Dev Engineering College, Ludhiana  
I.K.G. Punjab Technical University, Kapurthala, Punjab, India  
*69.50 %*

B. Tech. in Computer Science and Engineering, *July 2002*  
Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur  
I.K.G. Punjab Technical University, Kapurthala, Punjab, India  
*68.75 %*

### RESEARCH INTERESTS

My research interests span the areas of network security, DDoS attacks and Botnets. I have a specific interest in algorithms for Network traffic analysis, Defending from DDoS attacks, Malware detection, IoTs and software defined networking.

### DISSERTATION

- Doctorate of Philosophy (Ph.D.)  
Title: "Defense of Internet from DDoS attacks: A Real-Time Experimentation"  
Advisor: Dr. Monika Sachdeva and Dr. Krishan Kumar
- Master of Technology (M.Tech.) Title: "Signature-based detection and prevention of Botnets"  
Advisor: Mr. Amanpreet Singh Brar, Dr. Krishan Kumar

### TEACHING EXPERIENCE

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- **August 2002 to 25<sup>th</sup> July 2005** Lecturer, Bhai Maha Singh College of Engineering, Muktsar, Punjab, India.
- **29 July 2005 to 01 Jan 2006** Lecturer, CSE Deptt, Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur.
- **01 Jan 2006 to 26 July 2018** Assistant Professor, CSE Deptt, Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur.
- **27 July 2018 to 31 March 2021** Associate Professor, CSE Deptt, Shaheed Bhagat Singh State Technical Campus, Ferozepur.
- **1 April 2021 to till date** Associate Professor, CSE Deptt, Shaheed Bhagat Singh State University, Ferozepur.

### PostDoc Invitation

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PostDoc Invitation from Sacred Heart University, Connecticut, USA for the session Jan-Dec 2019.

## SPONSORED RESEARCH PROJECTS AND PATENTS

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- Completed one **Research Promotion Scheme (RPS)** project Sponsored by All India Council for Technical Education (AICTE), New Delhi entitled "Development of testbed facility for the evaluation of defense techniques against DDoS attacks", sanctioned under Research Promotion Scheme (RPS) scheme of worth Rs. 7.5 Lakhs in the capacity of **Co-Principal Investigator**.
- Completed AICTE Sponsored 2-weeks FDP on "Big Data Analytics using Machine Learning Techniques" of amount 3.35 Lakhs as **Co-Principal Investigator** in collaboration with Dr. Gulshan Ahuja [Principal Investigator] of SBS State Technical Campus, Ferozepur, India.
- Applied one Research Promotion Scheme (RPS) project to AICTE, New Delhi as **Principal Investigator** of amount 20 Lakhs on the topic "Development of a scalable and Intelligent testbed for validating IoT research for Smart Cities"
- Applied as Mentor a Research Project on "Security and Resilience to IoTs in Federated Cloud" of amount Rs. 25 Lakhs to DST under WOS-A scheme with Mrs. Monica Chowdhary as PI.
- Applied one AICTE MODROB project entitled "Upgradation of Web and Open Source Technologies Lab" of amount 11 Lakhs in year 2018.
- Applied one AICTE MODROB project entitled "Upgradation of Networking Lab" of amount 18 Lakhs in year 2019.
- Granted Patent on "Bird Recognition Method based on DEEP Learning", Patent Number: 2021100097, Australian Govt., March 2021.

## IMPORTANT ADMINISTRATIVE RESPONSIBILITIES

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- Dean Academics, SBS State University, Ferozepur from August 2019 to Nov 2021.
- HOD CSE, SBS State University, Ferozepur from 06-08-2021 to till date.
- HOD B.Tech CSE (Data Science) from June 2020 to till date.
- Board of Studies Chairman, Department of CSE, SBS State University, Ferozepur from Feb 2020 to till date.
- Member, Institute Complaint Cell (ICC) from Aug 2020 to till date.
- Member Secretary, IQAC, SBS State University, Ferozepur from August 2019 to Nov 2021.
- Warden, Ganga Hostel (Boys) from Jan 2019 to Aug 2020.
- Training and Placement Officer from 28-03-2011 to 25-07-2014 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, India.
- Board of Studies Member, Department of CSE, IKGPTU, Kapurthala from May 2021 to till date.
- Board of Studies Member, Humanities and Social Studies, MRSPTU, Bathinda from 2016 to 2018.
- Board of Studies Member, Department of Applied Sciences and Humanities, SBS State Technical Campus, Ferozepur from 2018 to till date.
- Board of Studies Member, General Fitness, IKGPTU, Kapurthala from Feb 2012 to 2015.
- Single Point of Contact (SPoC) for Campus Connect program of Infosys Technologies Ltd from 2012 to 2015 and December 2017 to July 2023.
- Alumni President of SBS State Technical Campus, Ferozepur, India from 2010 to 2014.
- Asstt Training and Placement Officer from Jan 2006 to July 2011 and from Jan 2017 to March 2018 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, India.
- Coordinator, Skill Development Initiative (SDI) Scheme of Punjab Govt. from 2010 to 2012 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, India.
- Member, Office of External Affairs from 16-9-2012 to 25-2-2016 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, India.

## Extra-curricular activities Organized FDP/STC programs/Workshops/Session Chair/Conferences

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1. Organized as Convener a one day Hands-on workshop on "ORANGE-Data Mining tool" on dated: 22-03-2023 at SBS State University, Ferozepur.

2. Expert talk in one week online AICTE-MRSPTU Sponsored FDP on "Emerging Trends in Teaching & Research" organized by Punjab Institute of Technology, Rajpura, Punjab on 10-02-2022.
3. Session chair in International Conference on Computational Methods in Science & Technology (ICCMST 2021) organized by Department of CSE on 17/18 Dec 2021 at Chandigarh Group of Colleges, India.
4. Session chair in International Conference on Applications of AI and Machine Learning (ICAML-2021) organized by Department of CSE on 2/3 Dec 2021 at Punjabi University, Patiala, India.
5. Expert talk in one week online FDP on "Technology Innovation, Applications and Challenges" organized by Amity Institute of Technology, Noida on 13-08-2021 [Live on YouTube].
6. Session chair in IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021) at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021.
7. Organized as Coordinator of a Special Session in IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021) at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021.
8. Resource Person in 1-Week AICTE Sponsored online Short Term Training Course (STTC) on "Wireless Sensor Networks" from Jan 18-23, 2021 organized by Department of Computer Science and Engineering, MRSPTU, Bathinda.
9. Resource Person in Online Webinar on "Cyber Attacks" held on Oct 22, 2020 organized by Department of Computer Science, Shri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab, India.
10. Resource Person in Online Webinar on "Cyber Attacks: A Severe Threat to Humanity" held on Aug 24, 2020 organized by Department of Computer Science, DM College, Moga, Punjab, India.
11. Session chair in International Conference on Applications of AI and Machine Learning (ICAML-2020) organized by Department of CSE on 21st and 22nd May 2020 at Punjabi University, Patiala, India.
12. Reviewer of International Conference on Applications of AI and Machine Learning (ICAML-2020) organized by Department of CSE on 21st and 22nd May 2020 at Punjabi University, Patiala, India.
13. Organized as Coordinator AICTE Sponsored 2-Weeks Faculty Development Program on "Big Data Analytics using Machine Learning Techniques" from 09-20 Dec 2019 at SBS State Technical Campus, Ferozepur.
14. Resource Person in AICTE Sponsored 2-Weeks Faculty Development Program on "Big Data Analytics using Machine Learning Techniques" from 09-20 Dec 2019 at SBS State Technical Campus, Ferozepur.
15. Resource Person in CDC sponsored National Seminar on "Trends and Challenges in Computer and Communication Technology" on Feb 9, 2019 held at S.D. College for Women, Moga, Punjab, India.
16. Organized as Co-coordinator of two State Level Job fairs under "Ghar Ghar Rozghar" Scheme of Punjab Government in Aug 2017 and Feb 2018 respectively.
17. Session chair in *National Conference on Communication, Computing & Electrical Systems (NCCCES-2017)*, Nov. 2017 at SBS State Technical Campus, Ferozepur.
18. Organized as Co-coordinator of two weeks joint project on "Cultural differences" from May 19th to June 1st, 2017 under faculty/students academic exchange program between NHL university of Applied Sciences, Netherlands and SBSSTC, Ferozepur.
19. Organized as Co-coordinator of 1st International Conference on Communication, Computing and Systems (ICCCS-2014) held at SBSSTC, Ferozepur from August 8-9, 2014.
20. Organized as Session Coordinator of 1st International Conference on Communication, Computing and Systems (ICCCS-2014) held at SBSSTC, Ferozepur from August 8-9, 2014.
21. Organized as Coordinator of AppsFluxus-2014 National Android Apps Championship Workshop held from 18th - 19th March 2014 at SBSSTC, Ferozepur.
22. Organized as Co-coordinator of FDP on "New Computing and Emerging Trends in ICT" held from 26-30 August 2013 at SBSSTC, Ferozepur.

## RESEARCH CREDENTIALS

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ResearchGate (RG) Interest Score - 1270

Scopus Author ID: 56901110700, h-index=21

ResearcherID: P-7215-2016

ORCID id: <https://orcid.org/0000-0002-9701-4358>

Google Scholar: Total citations as on date 1900, h-index =23 and i-index = 32

Scopus: Total Scopus citations as on date 1020, h-index=16 and Documents=48

## JOURNAL PAPERS

1. Jasmeen Kaur Chahal, Abhinav Bhandari, Sunny Behal, "DDoS Attacks & Defense mechanisms in SDN-Enabled Cloud : Taxonomy, Review and Research Challenges", *Elsevier Computer Science Review*, ISSN 1574-0137, **SCI-E, IF-13.3**, Vol. 53, pg no- 100644, May 2024, DOI: <https://doi.org/10.1016/j.cosrev.2024.100644>.
2. Bindu Bala, Sunny Behal, "AI Techniques for IoT-Based DDoS Attack Detection: Taxonomies, Comprehensive Review and Research Challenges", *Elsevier Computer Science Review*, ISSN 1574-0137, **SCI-E, IF-13.3**, Vol. 52, pg no- 100631, March 2024, DOI: <https://doi.org/10.1016/j.cosrev.2024.100631>.
3. Meenakshi, Krishan Kumar, Sunny Behal, "DL-2P-DDoSADF: Deep Learning-Based Two-Phase DDoS Attack Detection Framework ",*Elsevier Journal of Information Security and Applications*, ISSN: 2214-2134 , **SCI-E, IF-5.6**, Vol. 78, pp. 103609, Nov 2023, DOI: <https://doi.org/10.1016/j.jisa.2023.103609>.
4. Parnika Bhat, Sunny Behal, Kamlesh Dutta,"Machine Learning and Deep Learning techniques for detecting malicious android applications: An Empirical Analysis", *Springer Journal of Proceedings of the Indian National Science Academy*, **E-SCI, SCOPUS, IF=1.2**, Vol 89(3), Sept 2023, pp: 429-444, ISSN: 0370-0046, DOI: 10.1007/s43538-023-00182-w.
5. Parnika Bhat, Sunny Behal, Kamlesh Dutta,"A System Call-based Android Malware Detection Approach with Homogeneous & Heterogeneous Ensemble Machine Learning", *Elsevier Computers & Security* , **SCI-E, IF-4.8**, Vol 130 (2023) pp. 103277, DOI: 10.1016/j.cose.2023.103277, ISSN: 1872-6208.
6. Meenakshi, Krishan Kumar, Sunny Behal, "DDoS-AT-2022: A Distributed Denial of service Attack Dataset for Evaluating DDoS Defense System",*Springer Journal of Proceedings of the Indian National Science Academy*, ISSN: 0370-0046, **E-SCI, SCOPUS, IF=1.2**, Vol 89(2), pp:306-324, March 2023, <https://doi.org/10.1007/s43538-023-00159-9>.
7. Neelam Gupta, Sarvesh Tanwar, Sumit Badotra, and Sunny Behal, "Performance Analysis of SDN Controller", *International Journal of Performability Engineering*, 2022, 18(8): 537-544, DOI: 10.23940/ijpe.22.08.p1.537544, **SCOPUS**, ISSN: 0973-1318.
8. Meenakshi, Krishan Kumar, Sunny Behal, "Deep Learning approaches for detecting DDoS attacks: A Systematic Review",*Springer Soft Computing*, ISSN 1433-7479, **SCI-E, IF-3.1**, Jan 2022, pp 1-37, DOI: 10.1007/s00500-021-06608-1.
9. Jagdeep Singh, Sunny Behal,"Detection of DDoS attacks in SDN: A Comprehensive Review, Research Challenges and Future Directions", *Elsevier Computer Science Review*, Vol 37, 100279, Pg No. 1-25, ISSN 1574-0137, **SCI-E, IF-13.3**, DOI: <https://doi.org/10.1016/j.cosrev.2020.100279>
10. Jagdeep Singh, Navjot Jyoti, Sunny Behal, "On the use of Information Theory metrics for detecting DDoS attacks and Flash Events", *Kuwait Journal of Science*, 48(4), 2021, ISSN: 2307-4116, **SCI-E, IF-1.4**
11. Abhinav Bhandari, Krishan Kumar, AL Sangal, and Sunny Behal ,"An anomaly based distributed detection system for DDoS attacks in Tier-2 ISP networks", *Springer Journal of Ambient Intelligence and Humanized Computing*, vol. 12, no. 1, pp. 1387-1406, 2021 **SCI-E, IF-3.662**, ISSN: 1868-5137, DOI: 10.1007/s12652-020-02208-3.
12. Sunny Behal, Krishan Kumar, Monika Sachdeva, "D-FACE: An anomaly based distributed approach to detect DDoS attacks and Flash Events", *Elsevier Journal of Network and Computer Applications*, vol. 111, pp. 49-63, 2018, **SCI-E, IF-7.7**, DOI: <https://doi.org/10.1016/j.jnca.2018.03.024>, ISSN: 1084-8045.
13. Sunny Behal, Krishan Kumar, "Detection of DDoS attacks and Flash Events using Novel Information Theory metrics", *Elsevier Computer Networks*, vol. 116, pp. 96-110, 2017, **SCI-E, IF-4.4**, ISSN: 1872-7069.
14. Sunny Behal, Krishan Kumar, "Detection of DDoS attacks and Flash Events using Information Theory metrics - An empirical investigation", *Elsevier Computer Communications*, vol. 103, pp. 18-28, 2017, **SCI-E, IF-4.5**, DOI: <https://doi.org/10.1016/j.comcom.2017.02.003>, ISSN: 0140-3664.
15. Sunny Behal, Krishan Kumar, Monika Sachdeva, "Characterizing DDoS attacks and Flash Events: Review, Research Gaps and Future Directions", *Elsevier Computer Science Review*, vol. 25, pp. 101-114, 2017, **SCI-E, IF-13.3**, DOI:10.1016/j.cosrev.2017.07.003, ISSN: 1574-0137.
16. Sunny Behal, Krishan Kumar, Monika Sachdeva "A Generalized Detection System to detect Distributed Denial of Service attacks and Flash Events for Information Theory Metrics", *Turkish Journal of Electrical and Computer Sciences*, vol. 26, No. 4, pp. 1759-1770, 2018, **SCI-E, IF-1.2**, DOI:doi:10.3906/elk-1706-340, E-ISSN: 1303-6203, ISSN: 1300-0632.
17. Nilesh Patil, C. Rama Krishna, Krishan Kumar, Sunny Behal, "E-Had: A Distributed and Collaborative Detection Framework for Early Detection of DDoS Attacks", *Elsevier Journal of King Saud University-Computer and Information Sciences*, Vol. 34 (4), pp. 1373-1387, 2022, **SCIE, Open Access, IF-5.2**.

18. S. Behal, K. Kumar, M. Sachdeva, "D-FAC: A novel  $\phi$ -Divergence based distributed DDoS defense system", *Elsevier Journal of King Saud University-Computer and Information Sciences*, Vol. 33, No. 3, Pg No. 291-303, March 2021, **SCI, Open Access, IF-5.2**, ISSN: 1319-1578, DOI:https://doi.org/10.1016/j.jksuci.2018.03.005.
19. Jasmeen Kaur Chahal, Abhinav Bhandari, Sunny Behal, "Distributed Denial of Service Attacks: A Threat or Challenge", *Journal of New Review of Information Networking*, Vol. 1, Issue 2019, pp. 31-103, May 2019, **Taylor and Francis, SCOPUS**, ISSN: 1361-4576, DOI: https://doi.org/10.1080/13614576.2019.1611468.
20. Sunny Behal, Krishan Kumar, "Characterization and Comparison of DDoS Attack Tools and Traffic Generators- A Review", *International Journal of Network Security*, pg no: 383-397, vol. 19, No. 3, May 2017, (DOI: 10.6633/IJNS.201703.19(3).07), **SCOPUS**, ISSN: 1816-3548.
21. Sunny Behal, Krishan Kumar, Monika Sachdeva "Discrimination of Flash Events from DDoS Attacks - A Comprehensive Review", *International Journal of Network Security*, pg no: 734-741, vol. 19, No. 5, Sept 2017, (DOI: 10.6633/IJNS.201709.19(5).11), **SCOPUS**, ISSN: 1816-3548.
22. Gautam Sallan, Sunny Behal, "PREDICTION OF STUDENT DROPOUT USING ENHANCED MACHINE LEARNING ALGORITHM", *Advances in Mathematics: Scientific Journal*, 2020 (DOI: 10.37418/amsj.X.Y.Z), e-ISSN: 1857-8438, **SCOPUS**, Vol. 9(6), pp: 3821-3826.
23. Sunny Behal, Krishan Kumar, "Trends in Validation of DDoS Research", *Elsevier Journal of Procedia Computer Science*, vol. 85, pp. 7-15, 2016, **SCOPUS**, DOI: https://doi.org/10.1016/j.procs.2016.05.170, ISSN: 1877-0509.
24. Kiranjot Kaur, Sunny Behal," Designing a Secure Text-Based CAPTCHA", *Elsevier Procedia Computer Science Journal*, vol. 57, Pg no. 122-125, doi:10.1016/j.procs.2015.07.381, **SCOPUS**, ISSN: 1877-0509.
25. Pratibha, Sunny Behal, Pritpal Singh, "Face Recognition system using Genetic Algorithm", *Elsevier Procedia Computer Science Journal*, Pg no: 410-417, vol-85, 2016, doi:10.1016/j.procs.2016.05.183, ISSN: 1877-0509, **SCOPUS**, ISSN: 1877-0509.
26. Nikhil Goyal, Sunny Behal, "An Improved LBP Blockwise Method For Face Recognition", *IGI International Journal of Natural Computing Research (IJNCR)*, vol. 7, no. 4, pp. 45-55, 2018, ISSN: 1947-9298, DOI: 10.4018/IJNCR.2018100103.
27. Ajitpal Kaur, Daljeet Kaur, Krishan Kumar, Sunny Behal, "Performance Analysis of Web Services Under HTTP Attack Using GENI Testbed", *International Journal of Control Theory and Applications (IJCTA)*, Pg no. 67-74, Vol. 9, No. 22, Oct 2016. ISSN: 0974-5572,**SCOPUS (2010-2016)**.
28. Shifali, Monika Sachdeva, Sunny Behal, "Having an Eagle eye on GENI", *International Journal of Control Theory and Applications (IJCTA)*, Pg no. 433-474, Vol. 9, No. 20, Oct 2016, ISSN: 0974-5572,**SCOPUS (2010-2016)**.
29. Harjeet Kaur, Krishan Kumar, Sunny Behal, "Analysis of Web Services under HTTP attack Using Real Time Testbed", *International Journal of Control Theory and Applications (IJCTA)*, Pg no. 279-292, Vol. 9, No. 22, Oct 2016, ISSN: 0974-5572, **SCOPUS (2010-2016)**.
30. Gursharan Singh, Sunny Behal," Advanced Memory Reusing Mechanism for Virtual Machines in Cloud Computing", *Elsevier Procedia Computer Science Journal*, vol-57, pg no. 91-103 doi:10.1016/j.procs.2015.07.373, **SCOPUS**, ISSN: 1877-0509.

## CONFERENCE PAPERS

1. Jasmeen Kaur Chahal, Abhinav Bhandari, Sunny Behal, "An Investigation to Distinguish the features of DDoS Attacks and Flash Events", *14th IEEE International Conference on Computing Communication and Networking Technologies (ICCCNT-2023)*, at IIT Delhi during 6-8 July 2023, **SCOPUS**.
2. Neelam Gupta, Sarvesh Tanwar, Sunny Behal,"Software Defined Network Implements Realtime Detection and Mitigation of DDoS attacks",*14th IEEE International Conference on Computing, Communication and Networking Technologies (ICCCNT)* at IIT Delhi during 6-8 July 2023, **SCOPUS**.
3. Neelam Gupta, Sarvesh Tanwar, Sunny Behal, Sumit Badotra, "DDoS attack defence mechanism using sFlow" *IEEE International Conference on Data Analytics for Business and Industry (ICDABI)-2022* at Sakhir, Bahrain, pp 302-308, Oct 25-26, 2022, DOI: 10.1109/ICDABI56818.2022.10041563, ISBN: 9781665490580 , **SCOPUS**.
4. Meenakshi, Krishan Kumar, Sunny Behal, "Distributed Denial of Service Attack Detection Using Deep Learning Approaches" *IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), pp 491-495, March 17-19, 2021, ISBN:978-93-80544-43-4 , **SCOPUS**.

5. Jagdeep Singh, Sunny Behal, "A novel approach for the detection of DDoS attacks in SDN using information theory metric" *IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021, pp 512-516 , **SCOPUS**.
6. Amardeep Chopra, Sunny Behal, Vishal Sharma, "Evaluating Machine Learning Algorithms to Detect and Classify DDoS Attacks in IoT" *IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021, pp 517-521 , **SCOPUS**.
7. Navjot Jyoti, Sunny Behal, "A Meta-evaluation of Machine Learning Techniques for Detection of DDoS Attacks" *IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021, pp 522-526, **SCOPUS**.
8. Anil Katiyar, Sunny Behal, Japinder Singh, "Automated Defect Detection in Physical Components using machine learning " *IEEE 8th International Conference on Computing for Sustainable Global Development (INDIACom2021)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), March 17-19, 2021, pp 527-532, **SCOPUS**.
9. Parvinder Singh Saini, Sunny Behal, Sajal Bhatia, "Detection of DDoS attacks using Machine Learning Algorithms", in *IEEE 7th International Conference on Computing for Sustainable Global Development (INDIACom2020)* at Bharati Vidyapeeth Institute of Computer Applications and Management (BVICAM), New Delhi (INDIA), pp. 16-21, 2020 DOI: 10.23919/INDIACom49435.2020.9083716, ISBN: 978-93-80544-38-0, **SCOPUS**.
10. Sunny Behal, Parvinder Singh, "LeCAM: A novel metric for detecting DDoS attacks ", in *IEEE 3rd International Conference on Electronics and Communication and Aerospace Technology (ICECA 2019)* held on 12-14 June 2019 at Coimbatore, India, **SCOPUS**, IEEE Conference ID: 45616, DOI: 10.1109/ICECA.2019.8821875, Pg No : 1400–1405, IEEE Xplore ISBN: 978-1-7281-0167-5.
11. Shipra Bharti, Sunny Behal, Vishal Sharma, "Security Enhancements for high quality image transaction with hybrid Image Steganography Algorithm, in *2nd IEEE International conference on Computing Methodologies and Communication (ICCMC2018)* , Pg No. 162–169 held on 15-16 Feb 2018 at Surya Engineering college, Erode, India, **SCOPUS**, ISBN: 978-1-5386-3452-3, DOI: 10.1109/ICCMC.2018.8488111.
12. Gursharanjit Kaur, Sunny Behal, Shifali, "An information divergence based approach to detect Flooding DDoS attacks and Flash Crowds", *IEEE 3rd International Conference on Applied and Theoretical Computing and Communication Technology (iCATccT-2017)*, held on 21-23 December 2017 at SSIT, Karnataka, India, **SCOPUS**, Pg No. 251-258, ISBN: 978-1-5386-1144-9.
13. Pritpal Singh, Sunny Behal, Krishan Kumar, "Performance Enhancement of a Malware Detection System using Score Based Prioritization of Snort Rules", *IEEE International Conference on Green Computing and Internet of Things (ICGCIoT)*, 2015, 8-10 Oct 2015 at Noida, Pg no. 1150-1155, DOI: 10.1109/ICGCIoT.2015.7380636, **SCOPUS**, ISBN: 978-1-4673-7910-6.
14. Harjeet Kaur, Sunny Behal, Krishan Kumar, "Characterization and Comparison of DDoS Attack Tools", *IEEE International Conference on Green Computing and Internet of Things (ICGCIoT)*, 2015, 8-10 Oct 2015 at Noida, Pg no. 1139-1145, DOI: 10.1109/ICGCIoT.2015.7380634, **SCOPUS**, ISBN: 978-1-4673-7910-6.
15. Sunny Behal, Krishan Kumar, "An Experimental Analysis of Extrusions to detect Malware", *Proceedings of 2nd IEEE International conference on ICCCT-2011*, Sept 2011. Page-474-478, DOI: 10.1109/IC-CCT.2011.6075135, ISBN: 978-1-4577-1385-9, **SCOPUS**.

## BOOKS AND BOOK CHAPTERS

1. Sunny Behal, Krishan Kumar, "Signature Based Detection and Prevention of Botnets", *"LAMBERT Academic Publishing, Germany"* ISBN: 978-620-0-23128-4.
2. Sajal Bhatia, Sunny Behal, Irfan Ahmed, "Distributed Denial of Service Attacks and Defense Mechanism: Current Landscape and Future Directions" *"M. Conti et al. (eds.), Versatile Cybersecurity, Advances in Information Security 72"* Publisher Springer, pp. 55-97, 2018, DOI: 10.1007/978-3-319-97643-3\_3, ISSN: 2512-2193, **SCOPUS**
3. Nikhil Goyal, Sunny Behal, "FACE RECOGNITION USING LOCAL BINARY BLOCKWISE PATTERN", book on *Intelligent Engineering Informatics-2018*, Publisher: Springer Singapore, e-ISBN: 978-981-10-7566-7, pp 111-118, **SCOPUS**.

4. EDITORS Krishan Kumar, Sunny Behal, Abhinav Bhandari, Sajal Bhatia, Edited Book on *Security and Resilience of Cyber Physical Systems*, Publisher, CRC Press, Taylor and Francis, ISBN: 9781003185543, <https://doi.org/10.1201/9781003185543>, **SCOPUS**.
5. Jagdeep Singh, Sunny Behal (2023),” Impacts of DDoS Attacks in Software-Defined Networks” In: Choudrie, J., Mahalle, P., Perumal, T., Joshi, A. (eds) *ICT with Intelligent Applications*. Smart Innovation, Systems and Technologies, vol 311, pp: 123-132. Springer, Singapore. DOI: [https://doi.org/10.1007/978-981-19-3571-8\\_14](https://doi.org/10.1007/978-981-19-3571-8_14), **SCOPUS**.
6. Meenakshi, Krishan Kumar, Sunny Behal, ”DDoS attack detection using a Deep Neural Network Model”, *International Advanced Computing Conference (IACC-2022)* pp: 169-182 in Springer Communications in Computer and Information Science Book Series (CCIS), Editors: Garg D., Narayana V.A., Suganthan, P.N., Anguera J. Koppula V.K., Gupta S.K., Vol 1782, pp. 169-182, 2023, DOI: 10.1007/978-3-031-35644-5\_13.

## PHD DISSERTATIONS

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1. **Neelam Gupta, A model to detect and prevent threats in Software Defined Networking, Year of Registration - 2020, Status: Completed May 2024.**
2. **Meenakshi, A Deep Learning approach for detection of DDoS attacks, Year of Registration - 2018, Status: Completed June 2024.**
3. Jasmeen Kaur, Detection and mitigation of DDoS attacks in a SDN based Cloud, Year of Registration - 2018, Status: Presubmission.
4. Bindu Bala, A Deep Learning technique to detect IoT based DDoS attacks, Year of Registration - 2021, Status: Synopsis defended.
5. Amardeep Chopra, Detection of DDoS attacks in IoT networks, Year of Registration - 2019, Status: Synopsis defended
6. Pawan Luthra, DDoS defense in P4 Networks, Year of Registration - 2020, Synopsis defended.

## PG DISSERTATIONS GUIDED

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1. Ritika Arora, Phishing Defense Mechanisms using LinkGuard Algorithm, 2012.
2. Amandeep Singh, Ant Colony Optimization for Improving Network Lifetime in Wireless Sensor Networks, 2013.
3. Jagdeep Kaur, An improved Method of Biorthogonal Wavelet families for Image Compression, 2013.
4. Manpreet Kaur, An improved Median Filter for Denoising Grey Scale Images, 2013.
5. Gagandeep, Detection and Prevention of Sink Hole Attacks on MANET Reactive Protocols, 2013.
6. Navneet Kaur, Multistage Steganography for secure Data communication using Least Significant Bit Edge Detection (LSB-ED), 2014.
7. Arshdeep Singh, Efficiency Measurement for Stress Management in Heterogenous 2D Mesh Processor, 2014.
8. Gursharan Singh, Advanced Memory Reusing Mechanism for Virtual Machines, 2014.
9. Richa Sawhney, Detection of IRC based Botnets, 2014.
10. Navjot Sharma, Optimization of Wireless Sensor Networks using Bacteria Foraging Optimization, 2014.
11. Pritpal Singh, Performance Enhancement of a Malware Detection system using score based Prioritization of snort rules, 2015
12. Abhishek Patial, RSA Algorithm Achievement with Federal Information Processing Signature for Data Protection in Cloud Computing, 2015.
13. Kiranjot Kaur, Designing a Secure Text based Captcha, 2015.
14. Navjot Kaur, P2PBDS: Peer to Peer Botnet Detection System, 2015.
15. Kulvir Singh, An improvement of Network Life time using DLQAR protocol in Wireless Sensor Networks, 2015.
16. Pratibha, Face Recognition system using Genetic Algorithm, 2016.
17. Shifali, Co-DFEDD: Correlation based DDoS attack and Flash Events Detection and Discrimination, 2016.
18. Harjeet Kaur, Analysis of web services under HTTP attacks using Real Time Testbed, 2016.
19. Rinkel Mehto, Analysis of web services under UDP attacks using GENI Testbed, 2016.

20. Ajitpal Kaur, Analysis of web services under HTTP attacks using GENI Testbed, 2016.
21. Gursharanjit Kaur, Detection of Flooding DDoS attacks using information distance, 2017.
22. Nikhil Kumar, Face Recognition using Local Binary Pattern-Blockwise method, 2018.
23. Shipra Bharti, A Hybrid LSB technique to secure image using steganography, 2018.
24. Anil Behal, Detection of DDoS attack in Vehicular Adhoc Networks, 2019
25. Parvinder Singh, LeCAM: A novel metric for detecting DDoS attacks, 2019
26. Parvinder Singh Saini, Detection of DDoS attacks using Machine Learning, 2020
27. Gautam Sallan, Prediction of student dropout using Machine Learning, 2020
28. Anil Katiyar, Defect Prediction in Spare parts using Machine Learning, 2020
29. Parambir Singh, Drug Discovery using Hyper parameter Tuned VAE, 2024

## **SHORT TERM COURSES / FACULTY DEVELOPMENT PROGRAMS ATTENDED**

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1. One Week online Short term Course (STC) on “Exploring the Future: Cutting-edge Trends in Industry” held online from 28th June to 2nd July 2023 organized by Department of Computer Science and Engineering, Dr. B R Ambedkar National Institute of Technology, Jalandhar, Punjab, India.
2. One Week online Short term Course (STC) on “Security in Artificial Intelligence: Strategies and Best Practices” held online from 14th to 18th June 2023 organized by Department of Computer Science and Engineering, Dr. B R Ambedkar National Institute of Technology, Jalandhar, Punjab, India.
3. One Week Faculty Development Program on ”Cyber Security” from 12-17 April 2021 organized by EICT Academy, IIT Kanpur in Online Mode.
4. One week AICTE Sponsored online Short Term Training Course (STTC) on ”Wireless Sensor Networks” from Jan 18-23, 2021 organized by Department of Computer Science and Engineering, MRSPTU, Bathinda.
5. One week Online FDP on ”Penetration Testing using Metasploit” from 31 Aug to 04 Sept 2020 organized by NITTTR, Chandigarh.
6. Two-Weeks Online FDP on ”Data Science for all” from 27 July to 08 Aug 2020 jointly organized by Electronics and ICT Academics - NIT Warangal, IIITDM Jabalpur and NIT Patna.
7. One Week Online Short Term Course (STC) on ”Data Analytics using Python” from 18-05-2020 to 22-05-2020 from NITTTR, Chandigarh.
8. AICTE Sponsored 2-Weeks Faculty Development Program on ”Big Data Analytics using Machine Learning Techniques” from 09-20 Dec 2019 at SBS State Technical Campus, Ferozepur.
9. One week AICTE sponsored Short Term Training Programme (STTP) on ”Virtual Instrumentation in Academics, Research and Industry” from 8 July to 13 July 2019 at Shaheed Bhagat Singh State Technical Campus, Ferozepur.
10. One week AICTE sponsored Short Term Training Programme (STTP) on ”Mathematical Methods and Computations in Engineering” from 1 July to 6 July 2019 at Shaheed Bhagat Singh State Technical Campus, Ferozepur.
11. One week Infosys Sponsored ICT based Faculty Enable Program on ”Lex based Foundation program” from 18 Jan to 23 Jan 2019 at Shaheed Bhagat Singh State Technical Campus, Ferozepur.
12. One week AICTE/ISTE Sponsored Induction/Refresher course on ”Mobile Application Development” from July 9th to July 14th 2018 at Baba Banda Singh Bahadur Engineering college, Fatehgarh Sahib, Punjab.
13. One week Infosys Sponsored FEP on ”Cloud Computing” from Dec 4th to Dec 8th, 2017 at UIET, Chandigarh.
14. One week NITTTR Sponsored FDP on ”Energy, Environment and Sustainable Development through ICT” from July 24th to July 28th 2017 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
15. One week NITTTR Sponsored FDP on ”Optimization using MATLAB” from July 17th to July 21st 2017 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
16. One week MRSPTU Sponsored FDP on ”Effective Technical writing using Latex” from June 3rd to June 7th 2017 at Baba Banda Singh Bahadur Engineering college, Fatehgarh Sahib, Punjab.
17. Two weeks AICTE Sponsored FDP on ”Research Techniques”, from May 25 to June 5 2015 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.



18. One week TEQIP-II sponsored FDP on "Recent Computing Paradigms" from July 7-11, 2014 at GNDEC, Ludhiana.
19. One week Faculty Enablement program on "Mobile Application Development" from 6 Jan - 10 Jan 2014 at RK University, Rajkot organized by Infosys.
20. One week NITTTR Sponsored FDP on "Cloud Computing" from Oct 28th to Nov 1, 2013 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
21. One week FDP on "Recent Trends in Optical & Wireless Communication systems design" from Sept 9-13, 2013 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
22. One week FDP on "Soft Skills for Technical Teachers" from Sept 2 - 6, 2013 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
23. One week FDP on "Network Security Administration" from 21 Oct 2013 to 25 Oct 2013 at ESCI, Hyderabad.
24. one week FDP on "Effective Time & Stress Management" from 24-Sept 2013 to 28 Sept 2013 at National Productivity Council, Udaipur.
25. One week TEQIP-II sponsored FDP on "New Computing and Emerging Technologies in ICT" from 26 Aug to 30 August 2013 at SBS State Technical Campus, Ferozepur.
26. Two weeks AICTE sponsored FDP on "Nature Inspired Computational Intelligence" from May 6th - May 17th 2013 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
27. One week TEQIP (phase-II) STC on "Research Methodology Tools & Techniques" from Dec 3rd - Dec 7th 2012 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
28. One week TEQIP (phase-II) STC on "Applied Soft Computing" from Nov 26th - Nov 30th 2012 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
29. Two weeks AICTE sponsored SDP on "Multi Criteria Optimization tools in Research" from May 21st - June 1st 2012 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
30. One week STC on "Cloud Computing" from May 14th - May 18th 2012 at NITTTR, Chandigarh.
31. Two weeks AICTE sponsored SDP on "Intelligent Computational Techniques" from July 4th - July 15th 2011 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab.
32. One week FDP on "Development of faculty in Teaching methodology and Education management" from July 26th - July 30th 2010 at BMS college of Engg, Muksar, Punjab.
33. One week FDP on "Entrepreneurship" from Dec 27th - Dec 31st 2004 on behalf of Deptt of Science and Technology, Govt. of India, Delhi, organized by North India Technical Consultancy Organization Ltd. (NIT-CON).

## PROFESSIONAL TRAINING / WORKSHOPS ATTENDED

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1. Online course on Software Defined Networking Made Simple in August 2018.
2. Two days workshop on Android Apps Development from 22<sup>nd</sup> - 23<sup>rd</sup> March 2018, at SBSSTC, Ferozepur, India.
3. One and a half Day Tutorial on "Introduction to Mobile systems and Wireless Sensor Networks" on 05-06-2014 to 06-06-2014 at Indian Institute of Technology, Ropar, India.
4. Three Days Technical course on "Botnet Analysis" from 10-07-2013 to 12-07-2013 at Infysec, Bangalore, India.
5. One day TEQIP (Phase-II) workshop on "ROLE OF COMMUNICATION, MOTIVATION & TEAM BUILDING IN ENHANCING THE PERFORMANCE OF TEACHERS" on May 25<sup>th</sup> 2013 at Shaheed Bhagat Singh State Technical Campus, Ferozepur, Punjab, India.
6. One week Training in IBM SEED program on Rational Software Architect from 15-04-2013 to 18-4-2013 at SBSSTC, Ferozepur.
7. One day workshop on "A-View Basics" Workshop on 20-5-2011 at PTU, Kapurthala in collaboration with National Mission on Education through ICT (NMEICT) of MHRD, Govt. of India.
8. CCNA 1: Networking Basics from Aug-Dec 1999 at Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur, Punjab, India.
9. CCNA 2: Router and Routing Basics Jan-May 2000 at Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur, Punjab, India.

10. CCNA 3: Switching Basics and Intermediate Routing Aug-Dec 2000 at Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur, Punjab, India.
11. CCNA 4: WAN Technologies Jan-May 2001 at Shaheed Bhagat Singh College of Engineering and Technology, Ferozepur, Punjab, India.

## APPRECIATIONS / AWARDS

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1. Appreciation Certificate from Director, PIT, Rajpura for delivering an Expert Talk in one week online FDP sponsored by AICTE and MRSPTU on "Emerging Trends in Teaching & Research" held on Feb 10, 2022.
2. Nation Builder Award-2020 from Rotary International-3090, Ferozepur on the occasion of International Teacher's Day.
3. Appreciation Certificate from Director, SBSSTC, Ferozepur for organizing AICTE Sponsored 2-Weeks FDP on "Big Data Analytics using Machine Learning Techniques" held from Dec 09-20, 2019 at SBS State Technical Campus, Ferozepur.
4. Received "**Best Teacher**" award from students and faculty of CSE Department, SBS State Technical Campus, Ferozepur in Sept 2018.
5. Appreciation Certificate from Director, SBSSTC, Ferozepur for organizing two State Level Job fairs under "Ghar Ghar Rozghar" Scheme of Punjab Government in 2017 and 2018 respectively.
6. Received "**Best Paper**" award in *National Conference on Communication, Computing & Electrical Systems (NCCCES-2017)*, Nov. 2017 at SBS State Technical Campus, Ferozepur.
7. **Silver Level** Faculty Award from Infosys for 2017.
8. Appreciation certificate from Director, SBSSTC, Ferozepur to act as Co-coordinator for Coordinating two weeks joint project on "Cultural differences" from May 19th to June 1st, 2017 under faculty/students academic exchange program between NHL university of Applied Sciences, Netherlands and SBSSTC, Ferozepur.
9. **Bronze Level** Faculty Award from Infosys for 2016.
10. Appreciation Certificate in Lok Sabha Elections-2014 from DC, Ferozepur.
11. Appreciation Certificate from Director, SBSSTC, Ferozepur for Coordinating 1st International Conference on Communication, Computing and Systems (ICCCS-2014) held at SBSSTC, Ferozepur from August 8-9, 2014.
12. **Coordinator** of AppsFluxus-2014 National Android Apps Championship Workshop held from 18th - 19th March 2014 at SBSSTC, Ferozepur.
13. Appreciation Certificate from Director, SBSSTC, Ferozepur for Coordinating FDP on "New Computing and Emerging Trends in ICT" held from 26-30 August 2013 at SBSSTC, Ferozepur.
14. Appreciation Certificate in Lok Sabha Elections-2009 from DC, Ferozepur.
15. Appreciation Certificate in Vidhan Sabha Elections-2007 from DC, Ferozepur.

## PROFESSIONAL ACTIVITIES AND SERVICE

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- Editorial Board Member of Research Reports on Computer Science (RRCS) journal, Publisher: Universal Wiser, Singapore.
- Advisory Board member of Sabudh Foundation - A Data Science organization, Mohali, India from Dec 2020 to till date.
- Technical Program Committee Member of *International Conference on the theme of Applications of AI and Machine Learning (ICAML 2020)* to be held on 21-22 May 2020 at Punjabi University, Patiala.
- Technical Program Committee Member of 5<sup>th</sup> *International Conference on VLSI and Applications (VLSIA-2019)*, November 30 - December 01, 2019, Dubai, UAE.
- Reviewer of Springer International Conference on Intelligent Machines (ICIM'19) held on 15-16 March 2019 at Baba Farid group of institutions, Bathinda, Punjab, India.
- Technical Program Committee Member of 3<sup>rd</sup> *International Conference on Green Computing and Engineering Technologies (ICGCET-2017)*, Ireland on, August 8-10, 2017.
- Technical Program Committee Member of 3<sup>rd</sup> *International Conference on Recent Trends in Computer Science and Electronics (RTCSE-2018)* held on 02-03 January 2018 at Thailand.

- Technical Program Committee Member of 4<sup>th</sup> *International Conference on Green Computing and Engineering Technologies (ICGCET-2018)* and 10<sup>th</sup> *IEEE International Conference on Computational Intelligence and Communication Networks (CICN)*. The conference will be held on 17 Aug - 19 Aug 2018 at Denmark.
- Board of Governors Member, SUWIDHA Centre, Distt. Ferozepur in 2009-10.
- Distt. System Administrator, Nodal Officer IT for different Assembly and Lok-Sabha Elections held from 2007 to 2015 and 2019 at Ferozepur.
- ISTE Life Member LM-35455
- IEEE Membership No.: 92722266
- Computer Science Teachers Association (CSTA), Member No.: 41765715
- Internet Society Global Member No.: 139195
- IAENG -International Association of Engineers, Membership No. 174235
- Member of The Society of Digital Information and Wireless Communications (SDIWC): 21718
- ACM membership ID: 6059933
- Technical Reviewer of
  - Elsevier ADHOC Networks, Thomsen Reuters, SCI
  - Elsevier Computers and Security, Thomsen Reuters, SCI
  - IEEE Communication Surveys and Tutorials, Thomsen Reuters, SCI
  - Security and Communication Networks, Thomsen Reuters, SCI
  - Australasian Journal of Information Systems, Thomsen Reuters, E-SCI
  - Elsevier Computer Science Review, Thomsen Reuters, E-SCI, Scopus
  - Journal of King Saud University - Computers and Information Sciences, Thomsen Reuters, E-SCI, Scopus
  - Taylor & Francis- International journal of Review on Information Networking, Scopus, Thomsen Reuters, E-SCI
  - International Journal of Network Security, SCOPUS, DBLP Indexed
  - Journal of Bulletin of Electrical Engineering and Informatics, Indonesia, SCOPUS Indexed.
  - International Journal of Electrical and Computer Engineering, Indonesia, SCOPUS Indexed.
  - Journal of Computational Methods in Sciences and Engineering (JCMSE) of IOS Press, Thomsen Reuters, E-SCI, SCOPUS Indexed.
  - International Journal of Bio-Inspired Computation (IJBIC), Inderscience, SCOPUS Indexed.

## LANGUAGES

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Proficient in English, Hindi and Punjabi.

## SUBJECT TAUGHT

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### PhD Coursework

Advanced Information Security  
 Advanced Internetworking  
 Network Security and Cryptography

### PG Level

Ethical Hacking  
 Advanced Database Systems  
 Compiler Design  
 Digital Image Processing  
 Research Methodologies  
 Distributed Systems

## UG Level

Introduction to Data Science  
Introduction to AI & ML  
Computational Data Analytics  
Web Data Mining  
Applying Data Science with Python  
Ethical Hacking  
Python programming  
Mobile Application Development using Android  
Object Oriented Programming using C++  
System Programming  
Operating System  
Programming Languages  
Symbolic Logic and Logic Programming  
Computer Graphics  
Data Communication  
Database Management System  
Design and Analysis of Algorithms

## TECHNICAL PROFICIENCY

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Programming languages : Turbo C++, Prolog, Python, R, Android Studio, Eclipse  
Front ends : Visual Basic, Power Builder  
Back ends : SQL server, Microsoft access, MySQL  
Simulators : MATLAB, CORE  
Networking : LAN/WAN Designing, Configuration and troubleshooting on CISCO products, SDN-Mininet  
Operating systems : Windows variants, Linux Ubuntu  
Analysis tools : Gnuplot, Weka, ACID, BASE, Wireshark, Tshark, Monosek, WAMP, LAMP, Snort, etc.  
Machine Learning using WEKA

## REFERENCES

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### FROM ACADEMIA

Dr. Krishan Kumar Saluja  
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