

Curriculum Vitae

Personal Information

Name: Nishchal K. Verma, PhD

Date of Birth: September 9th, 1973

Mailing Address:

107, ACES Building,
Department of Electrical Engineering,
Indian Institute of Technology Kanpur, Kanpur - 208016, India
Phone: +91 9936336699
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Education

Ph.D.

Dept. of Electrical Engineering, Indian Institute of Technology, Delhi, New Delhi, 110016, India (2007)

M.Tech.

Dept. of Electrical Engineering, Indian Institute of Technology Roorkee, Roorkee, 247667 India (2003)

B.Sc. (Engineering)

Dept. of Electrical Engineering, Faculty of Engineering, DEI Dayalbagh, Agra, 282005, India (1996)

Professional/ Research Experience

Professor

Department of Electrical Engineering, Indian Institute of Technology Kanpur, Kanpur-208016, India (November 2018 - onwards)

Visiting Professor

Queen's University, Kingston, Canada (May 2018 - June 2018)

Associate Professor

Department of Electrical Engineering, Indian Institute of Technology Kanpur, Kanpur-208016, India (May 2014 - November 2018)

Visiting Professor

Center for Integrative and Translational Genomics, University of Tennessee Health Science Center, Memphis, TN 38163 USA (June 2010 - July 2010)

Assistant Professor

Department of Electrical Engineering, Indian Institute of Technology Kanpur, Kanpur-208016, India (March 2009 – May 2014)

Post-Doctoral Research Fellow

Center for Integrative and Translational Genomics, University of Tennessee, Memphis, TN 38163 USA (Sep. 2008 – Mar. 2009)

Post-Doctoral Research Associate

Department of Computer Science, Louisiana Tech University, Ruston, LA 71270 USA (Jan. 2008 – Sep. 2008)

Engineer (Electrical)

Central India Machinery Manufacturing Company (CIMMCO) BIRLA Limited, Bharatpur, Rajasthan, India (May 1996 – June 2000)

Research Interests: Artificial Intelligence, Machine Learning, Deep Learning, Blockchain, Cyber Security, Intelligent Control, Condition Based Monitoring/ Prognosis and Health Management of UAVs, UGVs and Rotating Machines, Fuzzy Systems Modelling & Control, Industrial Automation and Control, Computer Vision and Image Processing, Soft-Computing in Modelling and Control, Internet of Things/ Cyber-Physical Systems, Cognitive Science, and Intelligent Fault Diagnosis Systems.

Teaching

Courses (UG/PG) Taught

- **EE617A** - Industrial Automation & Control
- **EE658A** - Fuzzy Sets, Logic & Systems and Applications
- **EE671** - Neural Networks
- **ESO210** - Introduction to Electrical Engineering
- **EE455** - Transducers and Instrumentation
- **EE680** - Intelligent Instrumentation
- **MECH842** - Deep Learning Approaches for Condition-based Health Monitoring of Rotating Machines (Queen's University, Kingston, Canada)
- **EE380A**: Control Systems Lab
- **EE210/EE203A** - Introduction to Electrical Engineering
- **EE698Y** - Industrial Instrumentation for Process Control
- **EE698B** - Intelligent Informatics

New Courses Introduced

- **EE98L** - Artificial Intelligence, Machine Learning, & Its Applications
- **EE659** - Computational Intelligence for Machine Vision, Automation and Control
- **MECH842** - Deep Learning Approaches for Condition-based Health Monitoring of Rotating Machines (Queen's University, Kingston, Canada)
- **EE698B** - Intelligent Informatics in Electrical Engineering
- **EE617A** - Industrial Automation and Control

Supervision of Bachelor's/Master's thesis

M.Tech.

1. Mr. Saurabh Agrawal (Y8104058)
Co-Supervisor - Prof. P. Sircar
Thesis Title: Image and Video Classification using Histogram based Support Vector Machine
Status: Thesis defended, 2010
2. Ms. Sheela Meena (Y4187408)
Thesis Title: Mining of Hippocampus Data Set Using t-test, Biclustering and Bayesian Approach
Status: Thesis defended, 2010
3. Mr. Prateek Tamrakar (Y8104048)
Co-Supervisor - Prof. P. Sircar
Thesis Title: Generation of Future Satellite Image Sequence using Artificial Neural Network Model
Status: Thesis defended, 2010
4. Ms. Payal Gupta (External Student)
Thesis Title: Medical Image Segmentation Using Improved Mountain Clustering Approach
Status: Thesis defended, 2010
5. Mr. Neeraj Kumar Soni (Y9104046)
Co-Supervisor - Prof. P. Sircar
Thesis Title: Future Image Frame Prediction of an Image Sequence Using ANN with Selected Features
Status: Thesis defended, 2011

- 6.** Ms. Isha Kapoor (External Student)
Thesis Title: Generation of Future Image Frames using artificial neural Networks with Feature selection
Status: Thesis defended, 2012
- 7.** Ms. Shimaila Hai (External Student)
Thesis Title: Generation of Future Image Frames using GANFIS Model with Feature selection on Spatiotemporal Framework
Status: Thesis defended, 2012
- 8.** Mr. Bhuwan Mehta (Y5827144)
Thesis Title: Instrument Sound Separation in Monaural Music Signals
Status: Thesis defended, 2012
- 9.** Mr. Sumit Sarkar (Y7027453)
Thesis Title: Intelligent Real-Time Fault Diagnosis of Air Compressors Using Android Smartphone
Status: Thesis defended, 2012
- 10.** Mr. Tarun Maini (External Student)
Thesis Title: Study of Feature Selection Techniques
Status: Thesis defended, 2012
- 11.** Mr. Cherukupally Chakradhar (10104026)
Thesis Title: Prediction of satellite image sequence using ANFIS: adaptive network-based fuzzy inference system with feature selection
Status: Thesis defended, 2012
- 12.** Mr. Ashish Kaushal (Y8127142)
Thesis Title: Implementation of Vehicle to Grid Concept Using ANN and ANFIS
Status: Thesis defended, 2013
- 13.** Ms. Sreevidya Khatravath (Y8127506)
Thesis Title: Cost-Benefit Analysis for Maintenance of Machines
Status: Thesis defended, 2013
- 14.** Ms. Shikha Singh (External Student)
Thesis Title: Future Image Frame Generation
Status: Thesis defended, 2013
- 15.** Ms. Priyanka Sahu (External Student)
Thesis Title: Finding Gene expression level using IMC-2 clustering technique for DNA microarray data
Status: Thesis defended, 2013
- 16.** Mr. Rama Kiran (11104085)
Co-Supervisor - Prof. P. Sircar
Thesis Title: Soft Computing Approaches for Two Dimensional Beamforming
Status: Thesis defended, 2013
- 17.** Ms. Amrita Tirkey (Y8068)
Thesis Title: Minimization of within-class dissimilarities in multi-class CSP for Brain-Computer Interfaces
Status: Thesis defended, 2014
- 18.** Mr. Prabhankar Porwal (12104053)
Co-Supervisor - Prof. Saikat Chakrabarti
Thesis Title: Measurement-Based Recursive Methods for Monitoring of Power System Oscillations
Status: Thesis defended, 2014
- 19.** Ms. Sakshi Goel (External Student)
Thesis Title: Study of Transforms and Methods for their Comparison
Status: Thesis defended, 2014

- 20.** Mr. Harshavardhan Annepu (Y9329105)
Thesis Title: Object Matching Based on Speeded Up Robust Features
Status: Thesis defended, 2015
- 21.** Mr. Akhilesh Raj (14104007)
Thesis Title: Computer Vision Aided Automated Guided Vehicle
Status: Thesis defended, 2016
- 22.** Mr. Aquib Mustafa (14104019)
Thesis Title: Vision-Based Object Grasping and Optimal Path Routing for Automated Guided Vehicle with Robotic Manipulator
Status: Thesis defended, 2016
- 23.** Ms. Teena Sharma (EXY1514)
Thesis Title: Study of Vision-Based Object Recognition Algorithms
Status: Thesis defended, 2016
- 24.** Ms. Ocean Yadav (EXY1513)
Thesis Title: Study of Vision-Based Navigation in Indoor Environment
Status: Thesis defended, 2016
- 25.** Mr. Piyush Sahoo (12807481)
Thesis Title: Rotation Invariant Descriptor for Disparate Images using Line Segments
Status: Thesis defended, 2017
- 26.** Mr. Gaurav Saraswat (16104032)
Thesis Title: Residual Life Prognosis of Main Battle Tank Engine using Fuzzy Model with DNN based Feature Selection
Status: Thesis defended, 2018
- 27.** Mr. Bhanu Teja Nalla (16104022)
Co-Supervisor – Prof. S. R. Sahoo
Thesis Title: Image Dehazing using Convolutional Neural Networks
Status: Thesis defended, 2018
- 28.** Ms. Sejal Samaiya (EXY18007)
Thesis Title: Study of Fuzzy based Feature Selection and Classification
Status: Thesis defended, 2019
- 29.** Astha Jain (EXY18008)
Thesis Title: Study of Object Counting Algorithms Under Varying Lighting Conditions
Status: Thesis defended, 2019
- 30.** Mr. Ashish Kumar (17104012)
Co-Supervisor – Prof. P. Sircar
Thesis Title: Detection and Removal of salt and pepper noise by Gaussian membership function and Guided filter
Status: Thesis defended, 2019
- 31.** Mr. Harshit Mishra (17204012)
Co-Supervisor – Prof. Saikat Chakrabarti
Project Title: Three phase Unbalanced Distribution System State Estimation Using Neural Network for Pseudo Measurement Modelling
Status: Project defended, 2020
- 32.** Mr. Sonu Kumar Jha (17204021)
Thesis Title: Multi-Step Load Demand Forecasting using Autocorrelation, PCA, and DNN based Feature Extraction Methods
Status: Thesis defended, 2020

- 33. Mr. Boda Pool Singh (18104072)**
Co-Supervisor – Prof. Saikat Chakrabarti
Project Title: Modeling and Simulation of Fuzzy Expert System for Mitigation of Power Fluctuation in AC-DC Hybrid Microgrid Connected in a Distribution Network
Status: Project defended, 2020
- 34. Ms. Ankita (18104019)**
Co-Supervisor – Prof. Y. N. Singh
Project Title: Wavelength Routing Algorithm using link Congestion and Path length in WDM Network with Wavelength Converter
Status: Project defended, 2020
- 35. Mr. R Kumar (18104147)**
Co-Supervisor – Prof. Y. N. Singh
Thesis Title: Implementation of network address translation for peer-to-peer network
Status: Thesis defended, 2020
- 36. Mr. Jitesh PS (18104048)**
Co-Supervisor – Prof. Y. N. Singh
Thesis Title: Development of service modules for peer to peer networks
Status: Thesis defended, 2020
- 37. Mr. Digvijay Singh Dhakad (18104036)**
Co-Supervisor – Prof. P. Sircar
Project Title: Image registration using 3D point cloud data
Status: Project defended, 2020
- 38. Mr. Ratnesh Kumar (18104088)**
Co-Supervisor – Prof. P. Sircar
Project Title: Image-based Registration method for 3D Reconstruction
Status: Project defended, 2020
- 39. Mr. Shahrukh Masood (18104169)**
Co-Supervisor – Prof. P. Sircar
Thesis Title: Mixed Fuzzy Pooling in Convolutional Neural Networks for Image Classification
Status: Thesis defended, 2020
- 40. Mr. Shivam Pal (15807678)**
Co-Supervisor – Prof. Vipul Arora
Thesis Title: Finding Prerequisite Relations between Concepts using Textbook Information
Status: Thesis defended, 2020
- 41. Mr. Bharat Gupta (17204009)**
Project Title: Study of Position and Attitude Control of a Quadrotor in Quaternion Framework with Disturbance Rejection using RBFN
Status: Project defended, 2021
- 42. Mr. Mayur Sonowal (19104053)**
Project Title: An Analysis of Face Spoofing Detection Algorithms Using Deep Learning Techniques
Status: Project defended, 2021
- 43. Mr. Sandeep Singh (19104083)**
Project Title: Study on CNN Based Induction Motor Fault Diagnosis
Status: Project defended, 2021
- 44. Mr. Tarun Agrawal (19104121)**
Project Title: Study on Data Driven Fault Diagnosis by Using Convolutional Neural Network
Status: Project defended, 2021

45. Mr. Arif Khan (19104015)
Project Title: Face Mask detection with Alert system using Convolution Neural Networks
Status: Project Defended, 2021
46. Mr. Akash Banerjee (17204003)
Status: In Progress

MS by Research

1. Mr. Dhan Jeet Singh (15204403)
Co-Supervisor – Prof. A. K. Ghosh
Current Affiliation: Sr. Manager (Design), Aircraft Upgrade Research and Design Center, Hindustan Aeronautics Ltd., India
Thesis Title: Nonlinear Aerodynamic System Modeling Using Takagi-Sugeno Fuzzy Inference System
Status: Thesis defended, 2018
2. Mr. ShreedharKumar D. Rajurkar (15104413)
Current Affiliation: Design Engineer, Intel Technology Pvt Ltd., Bangalore, India
Thesis Title: Development of Fuzzy Inference Networks
Status: Thesis defended, 2018
3. Mr. Aniket Kar (15104410)
Current Affiliation: Edison Engineer, @GE Transportation, JFWTC, Bangalore, India
Thesis Title: Navigation and Control of an Automated Guided Vehicle in a Cyber- Physical Environment
Status: Thesis defended, 2018
4. Mr. Raghav Dev (15204408)
Thesis Title: Fuzzy based Approaches for Mixed Gaussian and Impulse Noise Removal from Color Images
Status: Thesis defended, 2019
5. Mr. Ashish Gupta (16104402)
Project Title: Real-Time Missile Midcourse Guidance for Surface-to-Air Missile using Long Short-Term Memory
Status: Project defended, 2020

Ph.D. Supervision

1. Dr. Narendra Kohli (Y4108070)
Current Affiliation: Professor & Head, Dept. of CSE, HBTU Kanpur, India
Thesis Title: Automated Health Care Systems: Performance Enhancement
Status: Thesis defended, 2011
2. Dr. Ashutosh Dwivedi (Y4104101)
Co-Supervisor - Prof. P. K. Kalra
Thesis Title: Soft-computing Based Approaches for Digital Image/Video Processing in E-classroom Learning Environment
Status: Thesis defended, 2012
3. Dr. Rajeev Tripathi (Y7104097)
Co-Supervisor - Prof. Y. N. Singh
Current Affiliation: Assistant Professor, NIT Delhi, India
Thesis Title: Base Station Positioning, Nodes' Localization and Clustering Algorithms for Wireless Sensor Networks
Status: Thesis defended, 2013
4. Dr. Rajiv Shakya (Y8104073)
Co-Supervisor - Prof. Y. N. Singh
Current Affiliation: Assistant Professor, Galgotias University UP, India
Thesis Title: Spatial correlation-based efficient communication protocols for wireless sensor networks
Status: Thesis defended, 2015

- 5.** Dr. Bibhu Prasad Padhy (Y9104091)
Co-Supervisor - Prof. S. C. Srivastava
Current Affiliation: Assistant Professor, IIT Ropar, India
Thesis Title: Development of Synchrophasor Measurement-Based Wide-Area Damping Controllers for Improving Power System Stability
Status: Thesis defended, 2015
- 6.** Dr. Rahul Kumar Sevakula (10104124)
Current Affiliation: Massachusetts General Hospital, Harvard Medical School, USA
Thesis Title: Intelligent Hybrid Classifiers for Real-Time Applications
Status: Thesis defended, 2017
- 7.** Dr. Narendra Kumar Dhar (14104272)
Co-Supervisor - Prof. L. Behera
Thesis Title: Event-Triggered Near Optimal Control under Cyber-Physical System Framework
Status: Thesis defended, Feb. 2020
- 8.** Dr. Teena Sharma (16104286)
Thesis Title: Development of Artificial Intelligent Algorithms for Image Dehazing and Non-Uniform Illumination Enhancement
Status: Thesis defended, June 2021
- 9.** Dr. Padmini Singh (13504061)
Co-Supervisor - Prof. L. Behera
Thesis Title: Sliding Mode Control Strategies for Autonomous Robotic Systems in the presence of network uncertainties
Status: Thesis defended, August 2021
- 10.** Dr. Vibhu Kumar Tripathi (13104197)
Co-Supervisor - Prof. L. Behera
Thesis Title: Advanced Sliding Mode Control Strategies for a Quadrotor
Status: Thesis defended, August 2021
- 11.** Dr. Sonal Dixit (14104272)
Co-Supervisor - Prof. A. K. Ghosh
Thesis Title: Deep Learning Framework for Intelligent Fault Diagnosis and Remaining Useful Life Prediction of Rotary Machines
Status: Thesis defended, October 2021
- 12.** Mr. Vikas Singh (15104279)
Thesis Title: Development of Machine learning algorithms and applications to Condition-based monitoring and gene expression data analysis
Status: Thesis Submitted, June 2021
- 13.** Mr. Pankaj Kumar Mishra (16104276)
Thesis Title: Adaptive control of nonlinear systems with state variable inequality constraints
Status: Open Seminar Delivered, March 2021
- 14.** Mr. Heera Lal Maurya (14104284)
Co-Supervisor - Prof. L. Behera
Thesis Title: Adaptive controllers for Quadcopter
Status: In Progress
- 15.** Mr. J Balaji (16201261)
Co-Supervisor - Prof. A. K. Ghosh
Thesis Title: Development and Analysis of various robust non-linear flight control approaches for fixed wing aircrafts
Status: In Progress

16. Mr. Mayank Pandey (17104274)
Co-Supervisor - Prof. Sandeep Shukla
Thesis Title: Enhancement of Security Features for Blockchain using Machine Learning Algorithms
Status: In Progress
17. Mr. Arun K. Sharma (17204263)
Thesis Title: Aerodynamic Modeling of ATTAS Aircraft using Mamdani Fuzzy Inference Network
Status: In Progress
18. Mr. Mohd Aquib (18204271)
Thesis Title: Deep Fuzzy Learning based Controllers
Status: In Progress
19. Mr. Seetaram Maurya (18204282)
Thesis Title: Intelligent Condition based Monitoring
Status: In Progress
20. Mr. Dhan Jeet Singh (18204281)
Thesis Title: Type-3 Fuzzy Systems
Status: In Progress

U.G.P./B.T.P.

1. Sumanik Singh (10734)
2. Jayesh Kumar Gupta (11337)
3. Varun Sood (Y9642), 2012
4. Vipul Goyal
5. Sudip
6. Kamlesh Bharodiya (11346)
7. Anadi Chaman (12105)
8. Vishal Kumar Gupta (2013)
9. Aditya Jain
10. Swati Singh
11. Sonu Agarwal
12. Anirudh Agrawal (2015)
13. Raghuvveer Thirukovalluru, 2016
14. Harshwardhan, 2017
15. Lucien Barrett, 2017
16. Rituj Beniwal (150589), 2018
17. Ankur Singh, 2018
18. Rakshit Verma (160559), 2018
19. Abdul Wasim (160008), 2018
20. Akshay Bhola (14060), 2020
21. Akshan Agrawal (180061)
22. Keshav Kumar (180353)
23. Shubham Gupta (180748)

Knowledge Dissemination

Book Authored

1. **Nishchal K. Verma** and A. Salour, "Intelligent Condition Based Monitoring: For Turbines, Compressors, and other Rotating Machines" *Studies in Systems, Decision and Control*, Springer, 2020. ISBN 978-981-15-0512-6.
(<https://www.springer.com/gp/book/9789811505119>)

Books Edited

1. **Nishchal K. Verma** and A. K. Ghosh, “Computational Intelligence: Theories, Applications and Future Directions-Volume I (ICCI-2017)” *Advances in Intelligent Systems and Computing, Springer*, 2019. ISBN 978-981-13-1132-1.
(<https://www.springer.com/gp/book/9789811311314>)
2. **Nishchal K. Verma** and A. K. Ghosh, “Computational Intelligence: Theories, Applications and Future Directions-Volume II (ICCI-2017)” *Advances in Intelligent Systems and Computing, Springer*, 2019. ISBN 978-981-13-1135-2.
(<https://www.springer.com/gp/book/9789811311345>)
3. V. K. Giri, **Nishchal K. Verma**, R. K. Patel, and V. P. Singh, “Computing Algorithms with Applications in Engineering, Proceedings of ICCAEEE 2019” *Algorithms for Intelligent Systems, Springer*, 2020. ISBN 978-981-15-2369-4.
(<https://www.springer.com/gp/book/9789811523687>)

Monograph

1. Rahul K. Sevakula and **Nishchal K. Verma**, “Intelligent Hybrid Classifiers for Real-Time Applications” *Springer*, 2020. (Accepted for publication and in progress)

NPTEL Course(s)

1. Fuzzy Sets, Logic and Systems & Applications

Course Link: https://onlinecourses.nptel.ac.in/noc20_e03/preview

No. of Lectures – 60

About: The course is designed to give a solid grounding of fundamental concepts of fuzzy logic and its applications. The level of the course is chosen to be such that all students aspiring to be a part of computational intelligence directly or indirectly in near future should get these concepts. The intended audience of the course is UG, PG Students, industry professionals, researchers, etc.

Publications

List of Journal Papers

- [74] D. Singh, N. K. Verma, A. K. Ghosh, and A. K. Malagaudanavar, “An Approach Towards the Design of Interval Type-3 T-S Fuzzy System,” *IEEE Transactions on Fuzzy Systems*, Dec. 2021. (Early Access) DOI: 10.1109/TFUZZ.2021.3133083 ([PDF](#))
- [73] A. K. Sharma and **Nishchal K. Verma**, “Quick Learning Mechanism with Cross-Domain Adaptation for Intelligent Fault Diagnosis,” *IEEE Transactions on Artificial Intelligence*, Oct. 2021. (Accepted for publication)
- [72] S. Dixit, **Nishchal K. Verma**, and A. K. Ghosh, “Intelligent fault diagnosis of rotary machines: conditional auxiliary classifier GAN coupled with meta learning using limited data,” *IEEE Transactions on Instrumentation and Measurement*, pp. May 2021. (Early Access) DOI: 10.1109/TIM.2021.3082264 ([PDF](#))
- [71] T. Sharma and **Nishchal K. Verma**, “Adaptive interval Type-2 fuzzy filter: an AI agent for handling uncertainties to preserve image naturalness,” *IEEE Transactions on Artificial Intelligence*, pp. 1-10, May 2021. (Early Access) DOI: 10.1109/TAI.2021.3077522 ([PDF](#))
- [70] V. K. Tripathi, A. K. Kamath, L. Behera, **Nishchal K. Verma**, and S. Nahavandi, “An adaptive fast terminal sliding-mode controller with power rate proportional reaching law for quadrotor position and altitude tracking,” *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, pp. 1-14, April 2021. (Early Access) DOI: 10.1109/TSMC.2021.3072099 ([PDF](#))
- [69] N. K. Dhar, A. Nandanwar, **Nishchal K. Verma**, and L. Behera, “Online Nash solution in networked multi-robot formation using stochastic near-optimal control under dynamic events,” *IEEE Transactions on Neural Networks and Learning Systems*, pp. 1-14, Jan. 2021. (Early Access) DOI: 10.1109/TNNLS.2020.3044039 ([PDF](#))

- [68] T. Sharma and **Nishchal K. Verma**, “Estimating depth and global atmospheric light for image dehazing using Type-2 fuzzy approach,” *IEEE Transactions on Emerging Topics in Computational Intelligence*, pp. 1-10, Oct. 2020. (Early Access) DOI: 10.1109/TETCI.2020.3032970 ([PDF](#))
- [67] S. Maurya, V. Singh, **Nishchal K. Verma**, and C. K. Mechefske, “Condition based monitoring in variable machine running conditions using low-level knowledge transfer with DNN,” *IEEE Transactions on Automation Science and Engineering*, pp. 1-15, Oct. 2020. (Early Access) DOI: 10.1109/TASE.2020.3028151 ([PDF](#))
- [66] P. Singh, S. Gupta, L. Behera, **Nishchal K. Verma**, and S. Nahavandi, “Perching of nano-quadrotor using self-trigger finite time second order continuous control”, *IEEE Systems Journal*, pp. 1-11, Sept. 2020. (Early Access) DOI: 10.1109/JSYST.2020.3021579 ([PDF](#))
- [65] V. Singh and **Nishchal K. Verma**, “Intelligent condition based monitoring techniques for bearing fault diagnosis,” *IEEE Sensors Journal*, Sept. 2020. (Early Access) DOI: 10.1109/JSEN.2020.3021918 ([PDF](#))
- [64] V. K. Tripathi, L. Behera, and **Nishchal K. Verma** “Finite-time super twisting sliding mode controller based on higher-order sliding mode observer for real-time trajectory tracking of a quadrotor,” *IET Control Theory & Applications*, vol. 14, issue no. 16, pp. 2359-237, Nov. 2020. DOI: 10.1049/iet-cta.2020.0348 ([PDF](#))
- [63] S. Dixit and **Nishchal K. Verma**, “Intelligent condition based monitoring of rotary machines with few samples,” *IEEE Sensors Journal*, July 2020. (Early Access) DOI: 10.1109/JSEN.2020.3008177 ([PDF](#))
- [62] P. Singh, P. Agrawal, A. Nandanwar, L. Behera, **Nishchal K. Verma**, S. Nahavandi, and M. Jamshidi, “Multivariable event-triggered generalised super-twisting controller for safe navigation of non-holonomic mobile robot,” *IEEE Systems Journal*, April 2020. (Early Access) DOI: 10.1109/JSYST.2020.2985730 ([PDF](#))
- [61] A. K. Sharma, D. Singh, V. Singh, and **Nishchal K. Verma**, “Aerodynamic modeling of ATTAS aircraft using Mamdani fuzzy inference network”, *IEEE Transactions on Aerospace and Electronic Systems*, vol. 56, no. 5, pp. 3566-3576, Oct. 2020. DOI: 10.1109/TAES.2020.2975447 ([PDF](#))
- [60] N. K. Dhar, **Nishchal K. Verma**, and L. Behera, “An online event-triggered near optimal controller for Nash solution in interconnected system,” *IEEE Transactions on Neural Networks and Learning Systems*, Feb. 2020. (Early Access) DOI: 10.1109/TNNLS.2020.2969249 ([PDF](#))
- [59] S. Maurya, V. Singh, and **Nishchal K. Verma**, “Condition monitoring of machines using fused features from EMD based local energy with DNN,” *IEEE Sensors Journal*, vol. 20, no. 15, pp. 8316-8327, July 2019. DOI: 10.1109/JSEN.2019.2927754 ([PDF](#))
- [58] P. K. Mishra, N. K. Dhar, and **Nishchal K. Verma**, “Adaptive neural network control of MIMO nonaffine nonlinear systems with asymmetric time-varying state constraints,” *IEEE Transactions on Cybernetics*, July 2019. (Early Access) DOI: 10.1109/TCYB.2019.2923849 ([PDF](#))
- [57] V. Singh, **Nishchal K. Verma**, and Y. Cui, “Type-2 fuzzy PCA approach in extracting salient features for molecular cancer diagnostics and prognostics,” *IEEE Transactions on NanoBioscience*, vol. 18, no. 3, pp. 482-489, July 2019. DOI: 10.1109/TNB.2019.2917814 ([PDF](#))
- [56] R. Dev and **Nishchal K. Verma**, “Robust noisiness measure based improved generalized fuzzy peer group for removal of mixed noise from color image”, *IEEE Signals Processing Letters*, vol. 26, no. 2, pp. 267-271, Feb. 2019. DOI: 10.1109/LSP.2018.288943 ([PDF](#))
- [55] A. Mustafa, N. K. Dhar, and **Nishchal K. Verma**, “Event-triggered sliding mode control for trajectory tracking of nonlinear systems”, *IEEE/CAA Journal of Automatica Sinica*, vol. 7, no. 1, pp. 307-314, Jan. 2020. DOI: 10.1109/JAS.2019.1911654 ([PDF](#))
- [54] P. Singh, P. Agrawal, H. Karki, A. Shukla, **Nishchal K. Verma**, and L. Behera, “Vision based guidance and switching based sliding mode controller for a mobile robot in the cyber physical framework”, *IEEE Transactions on Industrial Informatics*, vol. 15, no. 4, pp. 1985-1997, Apr. 2019. DOI: 10.1109/TII.2018.2869622 ([PDF](#))
- [53] A. Kar, N. K. Dhar, P. K. Mishra and **Nishchal K. Verma**, “Relative vehicle displacement approach for path tracking adaptive controller with multisampling data transmission,” *IEEE Transactions on Emerging Topics in Computational Intelligence*, vol. 3, no. 4, pp. 322-336, Aug. 2019. DOI: 10.1109/TETCI.2018.2865205 ([PDF](#))

- [52] A. Kar, N. K. Dhar, and **Nishchal K. Verma**, "Event-triggered adaptive neural network controller in a cyber-physical frameworks," *IEEE Transactions on Industrial Informatics*, vol. 15, no. 4, pp. 2101-2111, Apr. 2019, DOI: 10.1109/TII.2018.2861904 ([PDF](#))
- [51] R. Dev and **Nishchal K. Verma**, "Generalized fuzzy peer group for removal of mixed noise from color image," *IEEE Signal Processing Letters*, vol. 25, no. 9, pp. 1330-1334, Sept. 2018. DOI: 10.1109/LSP.2018.2852140 ([PDF](#))
- [50] R. K. Sevakula, V. Singh, **Nishchal K. Verma**, C. Kumar and Y. Cui, "Transfer learning for molecular cancer classification using deep neural networks," *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, vol. 16, no. 6, pp. 2089-2100, Nov.-Dec. 1 2019. DOI: 10.1109/TCBB.2018.2822803 ([PDF](#))
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- [18] **Nishchal K. Verma**, A. Roy and S. Vasikarla, "Medical Image Segmentation Using Improved Mountain Clustering technique version-2", 2010 7th IEEE Intl. Conference on Information Technology (Data mining) (ITNG 2010), Las Vegas, USA, pp. 156-161, Apr. 2010.
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- [12] **Nishchal K. Verma**, P. Gupta, P. Agrawal and Y. Cui, "MRI Brain Image Segmentation for Spotting Tumors Using Improved Mountain Clustering Approach", In 2009 IEEE Applied Imagery Pattern Recognition International Conference Washington DC, USA, pp. 1-8, Oct., 14-16, 2009.
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- [9] **Nishchal K. Verma** and P. K. Kalra, "Health monitoring of rotating machines", BOEING NEM Roadshow 2009 at Seattle, WA, USA, 2009.
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Book Chapters

1. M. Pandey, V. Singh, and **Nishchal K. Verma**, “Fuzzy based investment portfolio management,” *Applying Fuzzy Logic for the Digital Economy and Society, Fuzzy Management Methods - Springer, Cham*, pp. 73-95, March 2019. DOI: https://doi.org/10.1007/978-3-030-03368-2_4
2. V. Singh and **Nishchal K. Verma**, “Deep learning architecture for high-level feature generation using stacked auto encoder for business intelligence,” *Complex systems: solutions and challenges in economics, management and engineering, Studies in Systems, Decision and Control, Springer Cham*, vol. 125, pp. 269-283, 2017. DOI: https://doi.org/10.1007/978-3-319-69989-9_16
3. R. Kiran, P. Sircar, and **Nishchal K. Verma**, “Soft computing approaches for two-dimensional beamforming,” *Recent Developments and New Direction in Soft-Computing Foundations and Applications, Studies in Fuzziness and Soft Computing, Springer, Cham*, vol 342, pp. 301-314, 2016. DOI: https://doi.org/10.1007/978-3-319-32229-2_22

Development

List of developed and demonstrated technologies/ products/ technology transfer

- 1) **Automated Guided Vehicle:** Developed automated guided vehicle which can perform multiple operations namely object recognition, optimal path tracking, vision-based path following and obstacle avoidance. It is mainly used in manufacturing industries for raw material handling, pallet handling, finished product handling, trailer loading and roll handling.
- 2) **Computer vision based Inventory Control and Management:** Inventory Management facility has been set up under the project BOEING/EE/ 20100220. It provides a user-friendly environment for managing the inventory/stock by counting the available number of objects by automatic notification through email.
- 3) **Intelligent CBM using Windows Phone, Tablets and Smartphones:** Smartphone based Intelligent Condition Based Monitoring System is developed at IIT Kanpur under the project BOEING/EE/20100220. It can be used for detection of various faults in industrial reciprocating air compressors. This technology has been presented at Seattle USA and successfully demonstrated to BOEING team at IIT Kanpur.
- 4) **Sensitive Position finder for Data Acquisition System:** Sensitive position finder is developed at IIT Kanpur under the project BOEING/EE/20100220. It is a ranking based system that detects the most sensitive position around the machine for positioning a sensor.

- 5) **Future Image Frame Generator:** Future image frame generator is developed at IIT Kanpur under the project DST/EE/20100272. It is a predictor-based system that generates the future images based on past image sequence as input to the system.
- 6) **MTBA:** MATLAB Toolbox for Biclustering Analysis: MATLAB toolbox designed to perform a variety of biclustering algorithms under a common user interface. Biclustering is a popular approach to analyze patterns in a dataset, especially those of biological origin such as gene expression data. Toolbox includes functionalities of data handling, preprocessing, biclustering and visualization.
- 7) **BIDEAL:** MATLAB Toolbox for Bi-clustering Pattern Analysis

Nishchal K. Verma, T. Sharma, S. Dixit, P. Agrawal, S. Sengupta and V. Singh, "BIDEAL: A Toolbox for Bicluster Analysis - Generation, Visualization and Validation," *arXiv preprint arXiv:2007.13737*, 2020.
<https://arxiv.org/pdf/2007.13737.pdf>

Software's Developed

- 1) MATLAB Toolbox on Biclustering (<http://iitk.ac.in/iil/mtba/>)
- 2) BIDEAL Toolbox on Biclustering (<https://iitk.ac.in/idea/bideal/>)
- 3) Desktop Application for Sensitive Position Finding (<https://iitk.ac.in/idea/finder/>)
- 4) Condition Based Monitoring using Smartphones/Windows Phone
- 5) Desktop Application for Inventory Management
- 6) Self Optimal Clustering (SOC) (<https://iitk.ac.in/idea/selfoptimalclustering/>)

Datasets Repository Developed

- 1) Air Compressor Dataset Repository (<https://iitk.ac.in/idea/datasets/>)
 This dataset has also been used by MathWorks for extracting VGGish features.
<https://in.mathworks.com/help/audio/ref/vggishfeatures.html>
- 2) Air Compressor Health State Dataset Features Repository (<https://iitk.ac.in/idea/datasets/>)
- 3) Air Compressor Healthy and LIV State Cyclic Dataset (<https://iitk.ac.in/idea/datasets/>)
- 4) Drill Bit Dataset Repository (<https://iitk.ac.in/idea/datasets/>)

Patent

1. **Nishchal K. Verma**, R. K. Sevakula, and R. Thirukovalluru, "Condition monitoring setup for long term reliability in fault recognition," no. 201611029228, dated-March 2nd, 2018.

Funding

List of Sponsored Projects as PI

S. No.	Title	Sponsor	Amount (in INR)	From Date (Month-Year)	To Date (Month-Year)	Name of Co-PI	Outcome
1.	Complex defence object recognition and autonomous handling in unstructured and noisy outdoor environment	DRDO, Ministry of Defense, Govt. of India	4,93,00,500.00	2019	--	Prof. A. K. Ghosh, Prof. L. Behera, Prof. M. J. Akhtar	In Progress
2.	Development of Fuzzy Rule based Gaussian Regression Model for Generating Future Images	DST, Govt. of India	25,80,000.00	2010	2014	Prof. L. Behera	Successfully Completed
3.	Prediction for Visual Surveillance using static camera	DRDO, Ministry of Defense, Govt. of India	24,77,740.00	2011	2015	Prof. Y. N. Singh	Successfully Completed

4.	Instruments for monitoring of the Health Monitoring of Automotive	DST, Govt. of India	6,97,576.00	2009	2010	--	Successfully Completed
5.	Spatiotemporal Data Based Fuzzy Video Model for Future Image Frame Generation	IIT Kanpur, India	10,00,000.00	2009	2010	--	Successfully Completed
6.	Transducers and Instrumentation Virtual Laboratory	Ministry of HRD, Govt. of India	40,00,000.00	2010	2016	--	Successfully Completed
7.	Computational Intelligence: Theories, Applications and Future Directions	SERB, DST, Govt. of India	1,50,000.00	2013	2013	--	Successfully Completed
8.	Computational Intelligence: Theories, Applications and Future Directions	SERB, DST, Govt. of India	1,50,000.00	2015	2015	--	Successfully Completed
9.	Computational Intelligence: Theories, Applications and Future Directions	SERB, DST, Govt. of India	2,00,000.00	2017	2017	--	Successfully Completed
10.	Computational Intelligence: Theories, Applications and Future Directions	CSIR, Govt. of India	1,00,000.00	2017	2017	--	Successfully Completed
11.	Deep learning approach for Condition based Monitoring	Shastri Indo Canadian Institute	3,02,400.00	2018	2018	--	Successfully Completed

List of Sponsored and Projects as Co-PI

S. No.	Title	Sponsor	Amount (in INR)	From Date (Month-Year)	To Date (Month-Year)	Name of PI	Outcome
1.	Pilot Project On Development And Implementation Of Industry 4.0 Protocols For Rail-Coach Design & Manufacturing At Modern Coach Factory, Raebarely	DST, Govt. of India	1663.84 Lacs	2019	--	Prof. N S Vyas	In Progress
2.	Development of low-cost multi-rotor mini-UAV for early detection of crop diseases and development of an optimal system for management of farming activities	Ministry of HRD, Govt. of India	77.74 Lacs	2019	--	Prof. L. Behera	In Progress
3.	Development of Solar Air Taxi	IIT Kanpur and Others	15,00,00,000.00	2018	--	Prof. A. K. Ghosh	In Progress
4.	Teaching Learning Centre (TLC), Panit Madan Mohan Malviya National Mission on Teachers and Teaching (PMMMNMTT)	Ministry of HRD, Govt. of India	7,54,00,000.00	2016	2019	Prof. L. Behera	Successfully Completed
5.	Intelligent Visual Control of Redundant Manipulator Systems for Grasping 3-D Objects	DST, Govt. of India	40,00,000.00	2010	2013	Prof. L. Behera	Successfully Completed

6.	Setting up Real Time Simulation Facility for Advanced Research in Power and Control	DST, Govt. of India	7,00,00,000.00 (approx.)	2010	2015	Prof. S. C. Srivastava	Successfully Completed
7.	Path Tracking Control of Four Wheel Drive Four Wheel Steer Electric Vehicle	DST, Govt. of India	19,60,800.00	2012	2016	Prof. R. Potluri	Successfully Completed
8.	Development of Personalized and performance based e-learning tool for existing e-resources	MCIT, Govt. of India	30,00,000.00	2013	2017	Prof. Y. N. Singh	Successfully Completed
9.	Development of Small Sized Fixed Wing Unmanned Aerial System	IIT Kanpur, India	1,74,00,000.00	2014	2016	Prof. A. K. Ghosh	Successfully Completed
10.	Design and Development of Visually Guided Autonomous Quadrotors: Application in Surveillance and Disaster Management	IIT Kanpur, India	30,00,000.00	2014	2015	Prof. L. Behera	Successfully Completed

Consultancy

List of Consultancy Projects as PI

S. No.	Title	Sponsor	Amount (in INR)	From Date (Month-Year)	To Date (Month-Year)	Name of Co-PI	Outcome
1.	CBM of Air Compressors and Motors	The BOEING Company, USA	2,37,58,222.00	2009	2017	Prof. A. R. Harish	Successfully Completed

List of Consultancy Projects as Co-PI

S. No.	Title	Sponsor	Amount (in INR)	From Date (Month-Year)	To Date (Month-Year)	Name of PI	Outcome
1.	Passive and Active RFID and Location Technology Research	The BOEING Company, USA	3,00,00,000.00 (approx.)	2009	2017	Prof. A. R. Harish	Successfully Completed

Peer Recognition

Awards, Fellowships, other recognitions

- 1) Teaching Performance Excellence rated by Students for EE617A: Industrial Automation and Control from Academic Senate, IIT Kanpur, India (2019-20 Sem I)
- 2) Award of US\$7750 for conducting IEEE CIS Summer School from IEEE Computational Intelligence Society (2018)
- 3) SFTIG Award of CAD\$6000 for Shastri Faculty Training and Internationalization Program from Shastri-Indo-Canadian Institute (2017-18)
- 4) Nominated by IIT Kanpur, India for electrical works and services to quality assurance of civil, electrical and mechanical works/services at AIIMS Bhopal (July 2018)
- 5) Teaching Performance Excellence rated by Students for EE658A: Fuzzy Set, Logic & System & Applications from Academic Senate, IIT Kanpur, India (2017-18 Sem II)

- 6) Teaching Performance Excellence rated by Students for EE658A: Fuzzy Set, Logic & System & Applications from Academic Senate, IIT Kanpur, India (2016-17 Sem II)
- 7) Achiever award from the Institution of Engineers (India) at Jodhpur on Engineers day (Sept. 15th, 2017)
- 8) Best Paper Presentation Award from IEEE International Conference on Control and Robotics Engineering (ICCRE), Thailand (2017)
- 9) Distinguished Researcher in the Area of Computational Intelligence Award from IEEE UP Section CIS Chapter (2016)
- 10) Award of US\$5000 for conducting IEEE CIS Winter School from IEEE Computational Intelligence Society (2015)
- 11) Best Poster Award from IEEE Bombay Section Symposium (2015)
- 12) “Devendra Shukla Young Faculty Research Fellowship” from IIT Kanpur (2013-16)
- 13) DST Travel Award for attending FUZZ-IEEE, USA (2005)
- 14) IEEE CIS travel award US\$ 700 for attending and presenting paper in FUZZ-IEEE 2005, Reno USA (2005)
- 15) Secured highest rank in M. Tech. (Measurement and Instrumentation), IIT Roorkee (2003)
- 16) National Merit Scholarship (1989-1996)

Editorial Board (Journals/ Conferences)

- 1) **Associate Editor**, IEEE Transactions on Artificial Intelligence (Since 2020)
- 2) **Associate Editor**, IEEE Transactions on Neural Networks and Learning Systems (Since 2019)
- 3) **Associate Editor**, IEEE Computational Intelligence Magazine (2015-2021)
- 4) **Associate Editor**, Journal of Prognostics and Health Management, Carleton University, Ottawa, Canada (Since 2018)
- 5) **Associate Editor**, Transactions of the Institute of Measurement and Control, UK (Since 2014)
- 6) **Associate Editor**, International Journal of Advances in Intelligent Informatics (Since 2016)
- 7) **Associate Editor**, Electrical & Electronic Technology, Open Access Journal (Since 2017)
- 8) **Guest Editor**, *IEEE Access*: Special Section: “Advances in Prognostics and System Health Management, *IEEE Access*” (Since 2018)
- 9) **Editor**, IETE Technical Review Journal, India (Since 2015)
- 10) **Guest Editor**, Special issue on “Recent Advances in Computational Intelligence” of International Journal of Computational Systems Engineering, Inderscience Publishers (Since 2017)
- 11) **Guest Editor**, Special issue on “Computational Intelligence” of International Journal of Swarm Intelligence, Inderscience Publishers (Since 2017)
- 12) **Guest Editor**, Special issue on “Computational Intelligence: Theories, Applications and Future Directions” of International Journal of Artificial Intelligence and Soft Computing, Inderscience Publishers (Since 2017)
- 13) **Guest Editor**, Special issue on “Intelligent Informatics” for International Journal of Computational Vision and Robotics, vol. 4, no. 4. (2014)

Contributions to the institute

Administrative Responsibilities

- **Expert Committee Member** for MATHEMATICAL RESEARCH IMPACT-CENTRIC SUPPORT SCHEME (MATRICS), under Science & Engineering Research Board (SERB), Govt. of India (Sept. 2020 – Sept. 2021)
- **Member** for 7th EMEQ Task Force Committee under “Empowerment & Equity Opportunities for Excellence in Science” scheme (March-May, 2020)
- **Chairman**, SAEC, IIT Kanpur (Since April 2019)
- **Member**, IRDC, Dept. of Electrical Engineering, IIT Kanpur (2018)
- **Coordination-and-Development**, Electronics Equipment Maintenance (WLE 211), IIT Kanpur (2018-2019)
- **Member**, Institute level anti-ragging committee, IIT Kanpur (2018-19)
- **Member**, Budget Committee, IDP of Cognitive Science, IIT Kanpur (2018-19)
- **Warden-in-Charge**, Hall-VI (GH Tower A, B, C and D Blocks), IIT Kanpur (Sept. 2017 - Sept. 2019)
- **Member**, Aesthetic Committee, Dept. of Electrical Engineering, IIT Kanpur (2017-18)
- **Member**, Department Post Graduate Committee (DPGC), Dept. of Electrical Engineering, IIT Kanpur (2017-18)
- **Member**, EEA Advisory Committee, Dept. of Electrical Engineering, IIT Kanpur (2017-18)
- **Warden-in-Charge**, Hall-VI (GH Tower and New RA GH), IIT Kanpur (Sept. 2013-Sept. 2016)
- **Convener**, Department Post Graduate Committee, Electrical Engineering, IIT Kanpur (Oct. 2014- Aug 2015)
- **Member**, Hall Automation Committee, IIT Kanpur (2013)
- **Chairman**, DCF Committee, IIT Kanpur (2012)
- **Warden-in-Charge**, Hall-VI (Girls’ Hostel-2 and NSBRA A & Z blocks), IIT Kanpur (Sept. 2010- Sept. 2013)
- **Member**, CARE, Committee, IIT Kanpur (2010)
- **Coordinator**, Control and Automation Group, IIT Kanpur

- **Member**, Web development Committee, EE Dept., IIT Kanpur
- **Convener**, Electrical Engineering Society, IIT Kanpur (2009-2011)
- **Member**, DPGC Committee, IIT Kanpur (2009-2010)
- **Member**, Faculty Apartment Residents Welfare Group, IIT Kanpur

Research Workshops Conducted

- 1) **Coordinator**, QIP Short Term Course on Artificial Intelligence and Fuzzy Systems: Theories, Concepts and its Application, IIT Kanpur, December 9-13, 2019 ([Website](#))
- 2) **Transducers and Instrumentation Virtual Laboratory Lecture and Demonstration**, IIT Kanpur, Sept. 14, 2019
- 3) **Transducers and Instrumentation Virtual Laboratory Lecture and Demonstration**, Rajkiya Engineering College, Kannauj, Sept. 07, 2019
- 4) **Transducers and Instrumentation Virtual Laboratory Lecture and Demonstration**, PSIT Kanpur, Mar. 30, 2019
- 5) **Transducers and Instrumentation Virtual Laboratory Lecture and Demonstration**, KIT Kanpur, Feb. 16, 2019
- 6) **Coordinator**, 2018 IEEE CIS Summer/Winter School on Deep Learning and Computational Intelligence, IIT Kanpur, December 5-7, 2018 ([Website](#))
- 7) **General Chair**, 2017 International Conference on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, December 6-8, 2017 ([Website](#))
- 8) **Coordinator**, QIP Short Term Course on Deep Learning and Computational Intelligence in Automation & Control, IIT Kanpur, December 4-8, 2017 ([Website](#))
- 9) **General Chair**, IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, December 14-17, 2015 ([Website](#))
- 10) **Coordinator**, IEEE CIS Winter School on Computational Intelligence, IIT Kanpur, December 14-16, 2015 ([Website](#))
- 11) **General Chair**, IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, July 14, 2013 ([Website](#))
- 12) **Coordinator**, QIP Short Term Course on Intelligent Informatics, IIT Kanpur, July 15-19, 2013 ([Website](#))
- 13) **Coordinator**, QIP Short Term Course on Intelligent Informatics in Electrical Engineering, IIT Kanpur, September 17-21, 2012 ([Website](#))
- 14) **Coordinator**, Transducers and Instrumentation Virtual Laboratory, IIT Kanpur, December 7, 2012
- 15) **Coordinator**, Transducers and Instrumentation Virtual Laboratory, IIT Kanpur, February 4, 2012
- 16) **Coordinator**, Brainstorming on Health Monitoring of Automotive, IIT Kanpur, March 9-10, 2010 ([Website](#))

New Laboratory/ Facilities Developed

- 1) **Transducers and Instrumentation Virtual Laboratory (202.3.77.143/virtuallab/)**: Transducers and Instrumentation virtual laboratory is developed under the project MHRD/EE/20100082 at IIT Kanpur. This Lab caters mainly to students of UG level for conducting the experiments online and offline to have a feel of working of various transducers and related instruments.
- 2) **Brain Computer Interface Laboratory**: Brain Computer interface is a direct communication modality between brain and external environment that bypasses the usual peripheral pathways. In Intelligent Informatics the Brain Computer Interface Laboratory, we have the emotiv epoc, a 14-channel high-resolution wireless EEG system. The System consists of active sensors that tune into electrical signals produced by the brain to detect user thoughts, feelings, and expressions. System is capable of capturing raw EEG, affective responses, as well as evoked potentials. The aim of our BCI lab is studying EEGs of people when subjected to external visual stimulations.
- 3) **Acoustic and Vibration Data Acquisition Facility**: Intelligent Condition Based Health Monitoring of Air Compressors system has been Set Up under the project the project BOEING/EE/20100220 which consists of four sets of single stage and double stage compressors and two acoustic and accelerometer based data acquisition system.

Contributions outside the Institute

Invited Research Talks/ Keynote/ Lectures/Discussions

- **Keynote Speech**: “Deep Learning and its role in Artificial Intelligence”, College of Engineering, Roorkee, Utrakhand, India, November 20, 2019

- **Invited Lecture:** “Deep Learning and its Applications”, Dept. of Computer Science, University of Hyderabad, India, November 11, 2019
- **Keynote Speech:** “Artificial Intelligence and Deep Learning”, International Conference on Computing Applications in Electrical and Electronics Engineering (ICCAEEE), Rajkiya Engineering College, Sonbhadra, India, August 30-31, 2019
- **Keynote Speech:** “Deep Fuzzy Networks”, IEEE CIS Summer School 2019 on “Big Data Analytics and Stream Processing: Tools, Techniques and Application”, Indian Institute of Information Technology Allahabad, India, August 10-14, 2019
- **Keynote Speech:** “Artificial Intelligence and Machine Vision for Facial Recognition”, Workshop on Role of Technology in Reuniting Missing Children & Trafficked Persons, National Crime Records Bureau, Ministry of Home Affairs, Mahipal Pur, NH-8, Delhi, August 5, 2019
- **Expert Lecture:** “Cognition and Deep Fuzzy Networks”, Banasthali Vidyapith, Rajasthan, India, January 5, 2019
- **Expert Lecture:** “Automated Inventory Management using Machine Vision: Recognition, Counting, and Replenishment”, Workshop on Robotics and Autonomy, IIT Kanpur, India, December 9, 2018
- **Expert Lecture:** Kanpur Institute of Technology, Kanpur, India, November 16, 2018
- **Expert Lecture:** “Deep Fuzzy Networks”, TEQIP, GITS Udaipur, September 15, 2018
- **Expert Lecture:** “Deep Learning in Fuzzy Systems”, TEQIP, National Institute of Technology Silchar, August 20, 2018
- **Expert Lecture:** “Fuzzy Logic and Deep Learning”, Faculty Development Program (FDP) on Machine Learning and Applications (MLA-2018), ABV-IIITM Gwalior, March 26-30, 2018
- **Tutorial:** “Vision based Inventory Control”, 2019 International Conference on Sensing, Diagnostics, Prognostics, and Control, Xian, China, August 15-17, 2018
- **Tutorial:** “Data Driven Models for Condition based Monitoring of Machines”, 2018 IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA, June 11-13, 2018
- **Panel Session Moderator & Speaker:** “Deep Learning in Prognostic and Health Management”, 2018 IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA, June 11-13, 2018
- **Invited Lecture:** “Deep Learning and Deep Fuzzy Networks”, Workshop on Swarm and Evolutionary Algorithms: Theory and Applications, Indian Institute of Technology Roorkee, March 18th, 2018
- **Keynote Speech:** “Deep Learning and Computational Intelligence”, Amity University, Lucknow, March 15, 2018
- **Invited Lecture:** “Deep Learning with Fuzzy Systems”, IET Lucknow, March 13, 2018
- **Keynote Speech:** “Deep Fuzzy Networks in Condition based Monitoring”, International Conference on Signals, Machines and Automation (SIGMA 2018), NSIT Delhi, February 24, 2018
- **Invited Lecture:** “Deep Learning and Fuzzy Systems”, Faculty Development Program, National Institute of Technology, Kurukshetra, January 13-14, 2018
- **Tutorial:** “Intelligent Health Monitoring of Rotating Machines”, 2017 International Conference on Sensing, Diagnostics, Prognostics, and Control, Shanghai, China, August 16-18, 2017
- **Tutorial:** “Deep Learning, Computational Intelligence and Health Monitoring of Machines”, 2017 IEEE International Conference on Prognostics and Health Management, Dallas, Texas, USA, June 19-21, 2017
- **Invited Lecture:** “Deep Learning and Fuzzy Deep Networks”, Faculty Development Program, Banasthali Vidyapith, Rajasthan, December 26, 2017
- **Keynote Speech:** “Deep Learning and Fuzzy Deep Networks”, SocPros 2017, Indian Institute of Technology, Bhubaneswar, December 23, 2017
- **Keynote Speech:** “Deep Learning and Fuzzy Deep Networks”, 17th International Conference on Intelligent Systems Design and Applications (ISDA) at South Asian University, December 14, 2017
- **Plenary Speech:** “Deep Learning and Computational Intelligence”, 6th IEEE International Conference on Computer Applications in Electrical Engineering - Recent Advances (CERA 17), Indian Institute of Technology Roorkee, October 6, 2017
- **Invited Lecture:** “Deep Learning and Computational Intelligence”, Malaviya National Institute of Technology, Jaipur, August 1, 2017
- **Keynote Speech:** International Conference on Advances in Internet of Things and Connected Technologies (ICIoTCT 2017), Malviya National Institute of Technology, Jaipur, India, May 26-27, 2017
- **Keynote Speech:** “Deep Learning and Condition based Monitoring”, International Conference on Intelligent Systems and Signal Processing (ISSP-2017), March 24-25, 2017
- **Expert Lecture:** “Fuzzy Logic Controllers”, TEQIP, National Institute of Technology, Silchar, February 26, 2017
- **Invited Lecture:** “Deep Learning, PID and Fuzzy Controllers”, Short Term Course, Indian Institute of Technology, Varanasi, February 18, 2017
- **Speaker and Panelist:** “IoT in Developing Countries”, IEEE World Forum on Internet of Things, RESTON, VA, USA, December 12-14, 2016
- **Tutorial:** “Rotating Machines: Intelligent Condition Based Monitoring”, 2016 IEEE International Conference on Prognostics and Health Management, Carleton University, Ottawa, ON, Canada, June 20-22, 2016

- **Invited Lecture:** Institute of Engineering and Technology, Lucknow
- **Invited Lecture:** Johndeere, Pune
- **Invited Lecture:** AIT, New Delhi
- **Invited Lecture:** SYBASE, Dublin, San Francisco, USA
- **Invited Lecture:** Market Toppers, Gurgaon
- **Invited Lecture:** University of Chicago, Chicago, USA
- **Invited Lecture:** 4th World Conference on Soft Computing, University of Berkeley, Berkeley, San Francisco, USA, May 25-27, 2014
- **Invited Lecture:** Hangzhou Dianzi University, Hangzhou, China
- **Invited Lecture:** Center for Integrative and Translational Genomics, University of Tennessee, Memphis, USA
- **Invited Lecture:** The Boeing Company, St Louis, USA
- **Invited Lecture:** The Boeing Company, Everett, Seattle, WA, USA
- **Invited Lecture:** The Boeing Company, Lynwood, Seattle, WA, USA
- **Invited Lecture:** Raman Research Institute, Bangalore
- **Invited Lecture:** Saint Xavier's Catholic College of Engineering, Nagercoil
- **Invited Lecture:** Indian Institute of Technology Jodhpur, Rajasthan (NEM BOEING, IITR and IITK initiative)
- **Invited Lecture:** California State University, Dominguez Hills Carson, CA, USA
- **Invited Lecture:** Indo-German Workshop on Engineering and Analysis of Evolutionary Algorithms, DEI Dayalbagh, Agra, January 18, 2013
- **Invited Lecture:** IIITDM Jabalpur, March 9, 2013
- **Invited Lecture:** Banasthali Vidyapeeth, Tonk, Jaipur, March 14, 2013
- **Invited Lecture:** Huawei Technologies Pvt. Limited, Bangalore, March 25, 2013
- **Invited Lecture:** SKF Technologies India Pvt. Limited, Bangalore, December 22, 2014

Research Associations and Activities

- **Program Chair:** International Conference on Sensing, Diagnostics, Prognostics, and Control, Xi'an, China (2018)
- **Keynote Session Chair:** International Conference on Sensing, Diagnostics, Prognostics, and Control, Xi'an, China (2018)
- **Panel Session Moderator:** IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA (2018)
- **Panel Speaker:** IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA (2018)
- **Session Chair:** IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA (2018)
- **Paper Review Chair:** Prognostics and System Health Management Conference, Chongqing, China (2018)
- **Session Chair:** Prognostics and System Health Management Conference, Chongqing, China (2018)
- **Program Chair,** 2018 International Conference on Sensing, Diagnostics, Prognostics, and Control, Xi'an, China, August 15-17, 2018
- **Technical Program Committee,** 2018 IEEE International Conference on Prognostics and Health Management, Seattle, WA, USA
- **Chairman,** CDR Committee, Indigenous Design & Development of Electronic Box P/n 241900000 for Do-228 Dornier Aircraft, ASERDC, HAL, Lucknow, February 26, 2018
- **Chairman,** PDR Committee, Indigenous Design & Development of Electronic Box P/n 241900000 for Do-228 Dornier Aircraft, ASERDC, HAL, Lucknow, November 21, 2017
- **Chairman,** CDR Committee, Indigenous Design & Development of Fuel Quantity Transmitters for Do-228 Dornier Aircraft, ASERDC, HAL, Lucknow, November 20, 2017
- **Chairman,** PDR Committee, Indigenous Design & Development of Electronic Box P/n 241900000 for Do-228 Dornier Aircraft, ASERDC, HAL, Lucknow, April 22, 2017
- **Vice Chairman,** IEEE UP Section CIS Chapter (2017)
- **Conference Chair,** 2017 International Conference on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, India
- **Chairman,** PDR Committee, Design & Development of Technology Demonstrator Model for Smart Generator Control & Protection Unit (SGCPU) for Aerospace Applications, ASERDC, HAL, Lucknow, April 24, 2017
- **Program Chair,** 2017 International Conference on Sensing, Diagnostics, Prognostics, and Control, Shanghai, China
- **Chairman,** IEEE UP Section CIS Chapter (2016)
- **Chairman,** Design Review Committee, DC Master Box, P/No. 261300000 for HTT-40 Aircraft, ASERDC, HAL, Lucknow, May 31, 2014
- **Member,** International Electrotechnical Commission, Systems Evaluation Group (IEC-SEG4)
- **Member,** P7000 Working Group, IEEE Standards Association (IEEE-SA)
- **Fellow,** IETE

- **Senior Member**, IEEE
- **Organizer**, IEEE Uttar Pradesh Section Computational Intelligence Society Chapter (2013)
- **Member**, IEEE Computational Intelligence Society
- **Member**, IEEE Communications Society
- **Member**, IEEE Industrial Electronics Society
- **Member**, IEEE Sensors Council
- **Member**, IEEE Technology Management Council
- **Member**, Executive committee, IEEE UP Section CIS Chapter
- **Convener**, Educational Activities Committee, IEEE UP Section (2011-12)
- **Reviewer**, IEEE Transactions on Fuzzy Systems
- **Reviewer**, IEEE Transactions on Systems Man and Cybernetics Part-A, B and C.
- **Reviewer**, IEEE Transactions on Geoscience and Remote Sensing
- **Reviewer**, IEEE Transactions on Knowledge and Data Engineering
- **Reviewer**, IEEE Transactions on Pattern Analysis and Machine Intelligence
- **Reviewer**, Fuzzy Sets and Systems
- **Reviewer**, Pattern Recognition
- **Reviewer**, Applied Soft Computing
- **Reviewer**, Defense Science Journal
- **Chairman**, Review Committee for Design and Development of Interface Unit for FCG Probes for Light Combat Helicopter (LCH), HAL, Lucknow
- **Treasurer**, IEEE UP Section (2012-13)
- **Publicity Chair**, 2013 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE-2013), Hyderabad, India, July 7-10, 2013
- **Publicity Chair**, Special Session on Soft Computing Techniques for Biometric Technologies, The 12th International Conference on Artificial Intelligence and Soft Computing (ICAISC 2013), Zakopane, Poland, June 9-13, 2013
- **General Chair**, IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, July 14, 2013
- **General Chair**, IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions, IIT Kanpur, December 15-17, 2015
- **Coordinator**, CIS Winter School, IIT Kanpur, December 14-16, 2015
- **Program Committee Member**, IEEE PHM 2016
- **Program Committee Member**, IEEE PHM 2017
- **Finance and Registration Chair**, 3rd International Conference Advances in Control and Optimization of Dynamical Systems, IIT Kanpur, March 13-14, 2014
- **Program Chair**, IEEE Computational Intelligence Workshop (CIW-2014), IIT Allahabad, October 13-15, 2014
- **Panel Member**, IEEE World Forum on Internet of Things, RESTON, VA, USA, December 12-14, 2016

(Last Updated in October 2021)