

Dr. Aditya Nigam

Assistant Professor
School of Computing and Electrical Engineering
Indian Institute of Technology Mandi - 175005

+918894607738,+919956772068
aditya-at-iitmandi.ac.in
<http://faculty.iitmandi.ac.in/~aditya/>

Education

- **Indian Institute of Technology** Kanpur, INDIA
Ph.D., Computer Science and Engineering (Grade: 9 CPI) Dec. 2009 - Feb. 2015
 - Ph.D Thesis: Multimodal Biometric based Recognition System.
 - Relevant courses: Digital Watermarking and Steganography, Computational Complexity, Software Architecture.
- **Indian Institute of Technology** Kanpur, INDIA
M.Tech., Computer Science and Engineering (Grade: 9 CPI) 2007-2009
 - M.Tech Thesis: A Novel Method for Face Recognition using *NUP* measure.
 - Relevant courses: Multi-Model Biometrics, Computer Vision, Machine Learning and Knowledge Discovery.
- **Babu Banarasi Das National Inst. of Tech. and Management** Lucknow, INDIA
B.E., Computer Science and Engineering (Grade: 80%) 1999-2003
 - Graduated with Honors.
 - Relevant courses: Data Structures, Database Management, Automata Theory, Discrete Mathematics, Computer Networks, Compiler Design, Algorithm Design, Computer Graphics, Computer Organisation, Computer Architecture.
- **Kendriya Vidyalaya** IIT Kanpur, INDIA
SSC, Maths and Biology (Grade: 72%) 1997
- **Kendriya Vidyalaya** IIT Kanpur, INDIA
HSC, Maths and Science (Grade: 63%) 1995

Work Experience

- **Indian Institute of Technology Mandi** Mandi, INDIA
Assistant Professor (Regular) July 2016 - Till date
 - Associated with Teaching and Research activities
 - Subjects : Deep Learning and its Applications, Computer Networks, Data Structures, Communicating Distributed Processes, System and Design Practicum
- **Indian Institute of Technology Mandi** Mandi, INDIA
Visiting Assistant Professor Aug 2014 - July 2016
 - Associated with Teaching and Research activities
 - Subjects : Data Structures, Communicating Distributed Processes

Current PG Students

- **Mrs. Avantika Singh** IIT Mandi, INDIA
Ph.D Student, Computer Science and Engineering (Grade: 8.3 CPI) June 2016 - Till Date

– Ph.D Thesis: Deep Learning and its Applications in Biometrics

- **Mr. Ranjeet R. Jha** IIT Mandi, INDIA
Ph.D Student, Computer Science and Engineering (Grade: 8 CPI) Dec. 2016 - Till Date
 - Ph.D Thesis: Analyzing human brain connectivity using fMRI and DTI modalities to explore the characterization of complex neuronal disorder.
 - Jointly with Dr. Arnav Bhavsar, Assistant Professor, IIT Mandi
- **Mr. Daksh Thapar** IIT Mandi, INDIA
Ph.D, Computer Science and Engineering (Grade: 8.2 CPI) Dec. 2016 - Till Date
 - Ph.D Thesis: Identity and Attributes Extraction from Egocentric Videos
 - Jointly with Dr. Chetan Arora, Associate Professor, IIT Delhi
- **Mr. Aman Kamboj** NIT Jalandhar, INDIA
Ph.D, Computer Science and Engineering (Grade: - CPI) Dec. 2017 - Till Date
 - Ph.D Thesis: Ear based recognition system
 - Jointly with Dr. Rajneesh Rani, Assistant Professor, NIT, Jalandhar
- **Mrs. Preethi Srinivasan** IIT Mandi, INDIA
M.S, Computer Science and Engineering (Grade: 9 CPI) May. 2018 - Till Date
 - M.S Thesis: Brain Computer Interface for Communication in Completely Locked in State Patients
 - Jointly with Dr. Arnav Bhavsar, Assistant Professor, IIT Mandi
- **Mr. Sabin Kafley** IIT Mandi, INDIA
Ph.D, Computer Science and Engineering (Grade: - CPI) May. 2018 - Till Date
 - Foreign Ph.D student from Nepal
 - Ph.D Thesis: Application of Deep Learning in Medical Imaging
 - Jointly with Dr. Arnav Bhavsar, Assistant Professor, IIT Mandi

Externally Funded Projects

- **BCI for Communication in Completely Locked in State Patients** 3 Years Project
Accepted by DBT Budget: 85 Lakhs
 - **Brain Computer Interface for Communication in Completely Locked in State Patients**
 - Indo-German collaborative project. Project Registration Number: BT/IN/BMBF-BioHR/31/BVRK/2018-19.
 - Indian Team Members : Dr. Ratish Kumar (PI) IIT Kanpur, Aditya Nigam (Co-PI).
 - German Team Members : Prof. Dr. Niels Birbaumer (PI) University of Tuebingen, Dr. Ujwal Choudhary (Co-PI) University of Tuebingen.
 - **39 Lakhs INR are allocated to IIT Mandi** and 46 Lakhs INR are allocated to IIT Kanpur
 - Patients in Completely Locked State (CLIS) are totally devoid of any communication. In this project we focus to develop a brain computer interface based on deep learning that can raise the limit of communication and their quality of life using fNIRS and EEG modalities.
- **Development of Low cost MRI device and its software** 3 Years Project
Initially accepted by IIT Mandi-Ropar Consortium and funded 20 Lakhs) Budget : 106 Lakhs

- Team Members : Dr. Shubhajit Roy Chowdhury (PI), Dr. Arnav Bhavsar (Co-PI), Aditya Nigam (Co-PI), Dr. Anil K. Sao (Co-IP), Dr. Renu Rameshan (Co-PI) IIT Mandi, Dr. Deepti (Co-PI) IIT Ropar and Dr. Chirag Ahuja and Dr. Mahesh from PGI Chandigarh.
- Development of a portable low magnetic field ($< 0.2T$) MRI to monitor the brain, bones and tissues with optimization for magnetic field intensity and accuracy of monitoring. Improvement of the SNR level of the tissue images obtained via. proposed device. Developing disease specific CAD (computer aided diagnoses) system using above mentioned portable device. Validating the robustness of the proposed device using large number of samples.

- **Network Analytic and Anomaly Detection**

3 Years Project

Accepted under UAY Scheme

Budget : 140 Lakhs

- **Design of Advanced Big-Data Analytic in the CygNet Network Management System for Large Telecom Networks**

- Team Members : Dr. Dileep A.D (PI), Prof. Timothy Gonzalez (Co-PI), Dr. Varun Dutta (Co-PI), Dr. Sriram Kailasam (Co-IP), Dr. Samar Agnihotri (Co-PI), Aditya Nigam (Co-PI) : IIT Mandi and Dr. S. Srikant (Co-PI) NMSWorks Pvt Limited, Chennai

- **Application of High Definition Fiber Tracking (HDFT)**

3 Years Project

Accepted as SPARK Project

Budget : Travel Funding

- **Development and Neurosurgical Application of High Definition Fiber Tracking**

- This project accepted under the SPARK scheme. One Ph.D student (Mr. Ranjeet R Jha) from IIT Mandi will be visiting the University of Pittsburgh for collaborative research along with one from IIT Kanpur
- Indian Team Members : Dr. Ratish Kumar (PI) IIT Kanpur, Dr. Aditya Nigam (CO-PI)
- US Team Members: Prof. Walter Schneider (PI) University of Pittsburgh, Dr. Sudhir Kumar Pathak (CO-PI) University of Pittsburgh
- Automatically segmenting the human brain tractography based neuronal fiber data into meaningful tracts. Actively working to segment such data automatically into eight tracts having similar fibers which are anatomically meaningful viz. Arcute, Cingulum, Corticospinal, Forceps Major, Fornix, Inferior Occipitofrontal Fasciculus, Superior Longitudinal Fasciculus, Uncinate.
- Estimating fiber density and connectivity of different brain regions useful to profile Alzheimer and Parkinson diseases.

Interests

Academics: Image processing, Computer vision and Machine learning applications.

Sports: Cricket, Table Tennis, Lawn Tennis and Chess.

Computers: Working on Image processing related applications, software and libraries

Musical: Playing guitar, piano and mouthorgan, Listening to old hindi music.

Other: Reading hindi and urdu poetry.

Journal Publications

7. ■ Daksh Thapar, Gaurav Jaswal, Aditya Nigam and Chetan Arora, “*Gait metric learning Siamese network exploiting dual of spatio-temporal 3D-CNN intra and LSTM based inter gait-cycle-segment features*” in Journal of Pattern Recognition Letters , Elsevier (Impact Factor: 2.8)
6. ■ Avantika Singh and Aditya Nigam, “*Effect of identity mapping, transfer learning and domain knowledge on the robustness and generalization ability of a network: A biometric based case study*” in Journal of ambient intelligence and humanized computing , Springer (Impact Factor: 1.4)
5. ■ Gaurav Jaswal, Aditya Nigam, Ravinder Nath, Amit Kaul and Amit Kumar Singh “*Bring your own hand: how a single sensor is bringing multiple biometrics together*” in Journal of Soft Computing, Springer (Impact Factor: 2.4)
4. ■ Shruti Bhilare, Gaurav Jaswal, Vivek Kanhangad and Aditya Nigam, “*Single-sensor hand-vein multimodal biometric recognition using multiscale deep pyramidal approach*” in Journal of Machine Vision and Applications (MVA), Springer (Impact Factor: 1.306)
3. ■ Gaurav Jaswal, Aditya Nigam and Ravinder Nath, “*DeepKnuckle : Revealing the human identity*” in The Journal of Multi-media Tools and Applications (MTAS-2016), Springer (Impact Factor: 1.403)
2. ■ Aditya Nigam, Kamlesh Tiwari and Phalguni Gupta, “*Multiple Texture Information Fusion for Finger-Knuckle-Print Authentication System*” in Journal of Neurocomputing (2016), Elsevier (Impact Factor: 3.31)
1. ■ Aditya Nigam and Phalguni Gupta, “*Designing An Accurate Hand Biometric Based Authentication System Fusing Finger Knuckleprint with Palmprint*” in Journal of Neurocomputing (2015), Elsevier (Impact Factor: 3.31)

Selected Conference Publications

46. Suraj Kumar, Aayush Mishra, Saiful Islam and Aditya Nigam, “*VStegNET: Video Steganography Network using Spatio-Temporal features and Micro-Bottleneck*” in 30th British Machine Vision Conference (BMVC-2019), 9-12 September 2019, Cardiff, UK
45. Seema Kumari, Ranjeet R. Jha, Arnav Bhavsar and Aditya Nigam, “*Autodepth: Single Image Depth Map Estimation via. Residual CNN Encoder-Decoder and Stacked Hourglass*” in International Conference on Image Processing (ICIP-2019), 22-25 September 2019, Taipei, Taiwan
44. Ranjeet R Jha, Shreyas Patil, Arnav Bhavsar and Aditya Nigam, “*FS2Net : Fiber Structural Similarity Network (FS2Net) for Rotation Invariant Brain Tractography Segmentation using Stacked LSTM based Siamese Network*” in 18th International Conference on Computer Analysis of Images and Patterns (CAIP-2019), 3-5 September 2019, Salerno, Italy
43. Daksh Thapar, Gaurav Jaswal, and Aditya Nigam, “*FKIMNet: A Finger Dorsal Image Matching Network Comparing Component (Major, Minor and Nail) Matching with Holistic (Finger Dorsal) Matching*” in International Joint Conference on Neural Networks (IJCNN-2019), 14-19 July 2019, Budapest, Hungary

42. Chandrakant Sonawane, Dipendra Pratap Singh, Raghav Sharma, Aditya Nigam and Arnav Bhavsar, "***Fabric Classification and Matching using CNN and Siamese Network for E-commerce***" in 18th International Conference on Computer Analysis of Images and Patterns (CAIP-2019), 3-5 September 2019, Salerno, Italy
41. Gaurav Jaswal, and Aditya Nigam, "***HFDSegNet: Holistic and Generalized Finger Dorsal ROI Segmentation Network***" in 8th International Conference on Pattern Recognition Applications and Methods (ICPRAM), Prague, Czech Republic, Feb 19-21, 2019
40. Real Time Object Detection On Aerial Imagery, "***Raghav Sharma, Rohit Pandey and Aditya Nigam***" in 18th International Conference on Computer Analysis of Images and Patterns (CAIP-2019), 3-5 September 2019, Salerno, Italy
39. Daksh Thapar, Gaurav Jaswal, and Aditya Nigam, "***Learning Domain Specic Features using Convolutional Autoencoder : A Vein Authentication Case Study using Siamese Triplet Loss Network***" in 8th International Conference on Pattern Recognition Applications and Methods (ICPRAM), Prague, Czech Republic, Feb 19-21, 2019
38. Daksh Thapar, Gaurav Jaswal, and Aditya Nigam, "***PVSNet: Palm Vein Authentication Siamese Network Trained using Triplet Loss and Adaptive Hard Mining by Learning Enforced Domain Specific Features***" in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 22-24 Jan 2019, IDRBT, Hyderabad, India
37. Avantika Singh, Shreya Has Mukh Patel, Gaurav Jaswal, and Aditya Nigam, "***FDFNet : A Secure Cancelable Deep Finger Dorsal Template Generation Network Secured via. Bio-Hashing***" in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 22-24 Jan 2019, IDRBT, Hyderabad, India
36. Avantika Singh, Gaurav Jaswal, and Aditya Nigam, "***FDSNet: Finger dorsal image spoof detection network using light field camera***" in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 22-24 Jan 2019, IDRBT, Hyderabad, India
35. Prabhjot Kaur, Aditya Sharma, Aditya Nigam and Arnav Bhavsar, "***MR-Srnet: Transformation of Low Field MR Images to High Field MR Images***" in IEEE International Conference on Image Processing (ICIP), 7-10 Oct 2018, Athens, Greece
34. Avantika Singh, Shreya Patel and Aditya Nigam, "***Cancelable Knuckle Template Generation Based on LBP-CNN***" in European Conference on Computer Vision Workshops, (ECCV-Workshop), 8-14 September 2018, Munich, Germany
33. Arjun Pankajakshan, Anshul Thakur, Daksh Thapar, Padmanabhan Rajan and Aditya Nigam, "***All-Conv Net for Bird Activity Detection-Significance of Learned Pooling***" in Interspeech (INTERSPEECH-2018), 02-06 Sep 2018, Hyderabad, India
32. Avantika Singh, and Aditya Nigam, "***Encapsulating the Impact of Transfer Learning, Domain Knowledge and Training Strategies in Deep-Learning Based Architecture: A Biometric Based Case Study***" in IEEE Conference on Computer Vision and Pattern Recognition Workshops, pp. 1866-1868 (CVPR-Workshop), 18-22 June 2018, Salt Lake City, USA
31. Aditya Sharma, Prabhjot Kaur, Aditya Nigam and Arnav Bhavsar, "***Learning to Decode 7T-like MR Image Reconstruction from 3T MR Images***" in 21st International Conference on Medical Image Computing and Computer Assisted Intervention (DLMIA@MICCIA), 16-20 Sep 2018, Grenada, Spain

30. Siddhant, Neha, Shaifu, Dileep A.D, and Aditya Nigam, “**Association Learning based Long Short Term Memory Model for Cloud Workload Prediction**” in International Joint Conference on Neural Networks (IJCNN-2018) [ORAL], 08-13 July 2018, Rio, Brazil
29. Daksh Thapar, Divyansh Aggarwal, Punjal Agarwal and Aditya Nigam, “**VGR-Net: A View Invariant Gait Recognition Network**” in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 10-12 Jan 2018, Singapore
28. Avantika Singh, Vishesh Mistry, Dhananjay Yadav and Aditya Nigam, “**GHCLNet: A Generalized Hierarchically tuned Contact Lens detection Network**” in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 10-12 Jan 2018, Singapore
27. Ranjeet R. Jha, Shreyas M. Patil, Daksh Thapar, and Aditya Nigam, “**UBSegNet: Unified Biometric ROI Segmentation Network**” in at 28th Asian Conference on Pattern Recognition (ACPR), Nanjing, China, Nov 26-29, 2017
26. Gaurav Jaswal, Aditya Nigam and Ravinder Nath, “**Deformable Multi-Scale Scheme for Biometric Personal Identification**” in IEEE International Conference on Image Processing (ICIP), 17-20 Sep 2017, Beijing, China
25. Tushar Jain, Shreyas M. Patil, Daksh Thapar, Mukkaram Tailor and Aditya Nigam, “**BrainSegNet: A Segmentation Network for Human Brain Fiber Tractography Data into Anatomically Meaningful Clusters**” in DLID at 28th British Machine Vision Conference (BMVC), Imperial Collage London, Sep 4-7, 2017
24. Samriddhi Jain, Renu M. Rameshan and Aditya Nigam, “**Object triggered egocentric video summarization**” in 16th International Conference on Computer Analysis of Images and Patterns (CAIP), Ystad, Sweden, Aug 22-24, 2017
23. Gaurav Jaswal, Aditya Nigam and Ravinder Nath, “**Finger Knuckle Image based personal authentication using DeepMatching**” in IEEE International Conference on Identity, Security and Behavior Analysis (ISBA), 22-24 Feb 2017, IIIT Delhi
22. Vedang Patel, Aditya Nigam and Arnav Bhavsar, “**Automated brain tractography segmentation using curvature points**”, in 10th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP), 18-22 Dec 2016, IIT Guwahati
21. Dhruv, Tuhin, Aditya Nigam and Arnav Bhavsar, “**Unsupervised Fully Automated Cartilage Segmentation from Knee MRI**”, in Workshop at International Conference on Pattern Recognition (ICPR), 04-08 Dec 2016, Mexico
20. Aditya Nigam, Balender and Phalguni Gupta, “**Automated Soft Contact Lens Detection Using Gradient based Information**” in 11th International Conference on Computer Vision Theory and Applications (VISAPP), Rome, Italy, Feb 27-29, 2016
19. Balender, Aditya Nigam and Phalguni Gupta, “**Fully Automated Soft Contact Lens Detection from NIR Iris Images**” in 5th International Conference on Pattern Recognition Applications and Methods (ICPRAM), Rome, Italy, Feb 24-26, 2016
18. Aditya Nigam and Phalguni Gupta, “**Finger-Knuckle-Print ROI Extraction Using Curvature Gabor Filter for Human Authentication**” in 11th International Conference on Computer Vision Theory and Applications (VISAPP), Rome, Italy, Feb 27-29, 2016
17. Aditya Nigam and Phalguni Gupta, “**Tri-Modal Biometric Fusion for Human Authentication by Tracking Differential Code Pattern**” in 5th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), at IIT Patna, India, Dec 16-19, 2015

16. Gitesh, Aditya Nigam and Phalguni Gupta, ***“Pose Invariant Face Recognition using Binocular Stereo 3D Reconstruction”*** in 5th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), at IIT Patna, India, Dec 16-19, 2015
15. Aditya Nigam, Balender Kumar, Jyoti Triyar and Phalguni Gupta, ***“Iris Recognition Using Discrete Cosine Transform and Relational Measures”*** in 16th International Conference on Computer Analysis of Images and Patterns (CAIP), Valetta, Malta, Sep 2-4, 2015
14. Lovish, Aditya Nigam, Balender Kumar and Phalguni Gupta, ***“Robust Contact Lens Detection using Local Phase Quantization and Binary Gabor Pattern”*** in 16th International Conference on Computer Analysis of Images and Patterns (CAIP), Valetta, Malta, Sep 2-4, 2015
13. Rahul Ajmera, Aditya Nigam and Phalguni Gupta, ***“3D Face Recognition using Kinect”*** in International Conference on Vision, Graphics and Image Processing (ICVGIP), IISC Bangalore, INDIA, Dec 14 - 17, 2014
12. Aditya Nigam and Phalguni Gupta, ***“Personal Authentication System using Ear”*** in HIS at 12th Asian Conference on Computer Vision (ACCV), Singapore, November 1 - 5, 2014
11. Aditya Nigam, Vamshi Krishna, Amit Bendale and Phalguni Gupta, ***“Iris Recognition Using Block Local Binary Patterns and Relational Measures”*** in International Joint Conference on Biometrics (IJCB), Clearwater, Florida, USA, 29 Sep - 2 Oct, 2014
10. Aditya Nigam, Lovish, Amit Bendale and Phalguni Gupta, ***“Efficient Iris recognition using Relational Measures”*** in IWCF at International Conference on Pattern Recognition (ICPR), Stockholm, Sweden, August 24-28, 2014
9. Aditya Nigam and Phalguni Gupta, ***“Quality Assessment of Knuckleprint Biometric Images”*** in IEEE 20th International Conference on Image Processing (ICIP 2013), Melbourne, Australia, September 15-18, 2013
8. Aditya Nigam and Phalguni Gupta, ***“Multimodal Personal Authentication System Fusing Palmprint”*** in 9th International Conference on Intelligent Computing (ICIC 2013), Nanning, China, July 28-31, 2013
7. Aditya Nigam, Anvesh T. and Phalguni Gupta, ***“Iris Classification Based on its Quality”*** in 9th International Conference on Intelligent Computing (ICIC 2013), Nanning, China, July 28-31, 2013
6. Aditya Nigam and Phalguni Gupta, ***“Iris Recognition using Consistent Corner Optical Flow”*** in 11th Asian Conference on Computer Vision (ACCV 2012), Daejeon, Korea, November 5-9, 2012.
5. Nishant Singh, Aditya Nigam, Puneet Gupta and Phalguni Gupta, ***“Four Slap Fingerprint Segmentation”*** in 8th International conference on Intelligent Computing (ICIC 2012), Huangshan, China, July 25-29, 2012.
4. Amit Bendale, Aditya Nigam, Surya Prakash and Phalguni Gupta, ***“Iris Segmentation using an Improved Hough Transform”*** in 8th International conference on Intelligent Computing (ICIC 2012), Huangshan, China, July 25-29, 2012.
3. Aditya Nigam and Phalguni Gupta ***“Knuckleprint Recognition using Feature Tracking”*** in 6th Chinese Conference on Biometric Recognition (CCBR 2011), Beijing, China, December 3-4, 2011.

2. G.S Badrinath, Aditya Nigam and Phalguni Gupta, “*An Efficient Finger-knuckle-print based Recognition System Fusing SIFT and SURF Matching Scores*” in 13th International Conference on Information and Communications Security (ICICS 2011), Beijing, China, 23-26 November, 2011.
1. Aditya Nigam , Phalguni Gupta “*Comparing Human Faces using Edge Weighted Dissimilarity Measure*” in 11th International Conference on Control, Automation, Robotics and Vision (ICARCV 2010) Singapore December, 2010.