DR. R. BALASUBRAMANIAN

BOYSCAST FELLOW

My Erdős number: 04, Google Scholar *h*-index: 35

Professor, Department of Computer Science and Engineering, IIT Roorkee, Roorkee 247 667, India, Tel: +91 1332 285852, email: bala@cs.iitr.ac.in, balaiitr@ieee.org

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EDUCATION

Indian Institute of Technology Madras, Chennai, India   *July 2001*
Ph.D (Mathematics and Computer Science
under Dr. K. Swaminathan and Prof. Sukhendu Das)

Madras Christian College, University of Madras   *July 1996*
M. Sc (Mathematics)
89.81% (Gold Medalist)

A.M. Jain College, University of Madras   *July 1994*
B. Sc (Mathematics)
91.8%

WORK EXPERIENCE

- **Professor**, Department of Computer Science and Engineering, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Dec'18 - Ongoing)

- **Joint Faculty**, Centre for Artificial Intelligence and Data Science (CAIDS), Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Jun'21 - Ongoing)

- **Guest Professor/Visiting Researcher** at Institute for Document Analysis Knowledge Science (IDAKS), Osaka Prefecture University, Osaka, JAPAN (Feb'20 - Mar'23)

- **Visiting Research Professor** in The Centre for Research and Graduate Studies, University of Cyberjaya, MALAYSIA (Jan'20 - Jan'21)

- **Visiting Researcher** with Dr. Masakazu Iwamura, Dept. of Computer Science and Intelligent Systems, Graduate School of Engineering, Osaka Prefecture University, Osaka, JAPAN (Jun'18, Jun' 19 and Dec'19)

- **Visiting Researcher** with Dr. Ganesh Pandian Namasivayam, iCeMS, Kyoto University, Kyoto, JAPAN (Jun' 19 and Dec'19)

- **Visiting Researcher** with Prof. Vincenzo Piuri, Dipartimento di Informatica, Universita' degli Studi di Milano, Milan, ITALY (Jul'19)

- **Visiting Researcher** with Prof. Kidiyo KPALMA, Image Department, Institut d'Électronique et de Télécommunications de Rennes, Institut National des Sciences Appliquées de Rennes (INSA), Rennes, FRANCE (Jun'19 and Jul'19)

- **Visiting Researcher** with Prof. V. Vetrivel, Department of Mathematics, Indian Institute of Technology Madras, Chennai 600 036, INDIA (Dec'17, Dec'18 and Apr'19)

- **Associate Professor**, Department of Computer Science and Engineering, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Sep'13 - Dec'18)

- **Visiting Researcher** with Prof. Umapada Pal, Computer Vision and Pattern Recognition Unit, Indian Statistical Institute, Kolkata, INDIA (Jun'18)

- **Visiting Researcher** with Dr. Andrea Kutics, Department of Natural Sciences, International Christian University, Tokyo, JAPAN (Jun'18)

- **Visiting Researcher** with Dr. Pradeep Atrey, Department of Computer Science, University at Albany - State University of New York (SUNY), NY, USA (Dec'14)

- **Visiting Researcher** with Prof. Mohan S. Kankanhalli, Department of Computer Science, School of Computing as well as SeSaMe Research Centre, National University of Singapore, SINGAPORE (Jul'13 and Jul'14)

- **Visiting Researcher** with Prof. C. Eswaran, Faculty of Computing and Informatics, Multimedia University, Cyberjaya Campus, MALAYSIA (Jun'12 and Jul'14)

- **Associate Professor**, Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Oct'12 - Sep'13)

- **Visiting Researcher** with Dr. Ibrahim Venkat, School of Computer Sciences, Universiti Sains Malaysia, Pulau Pinang, MALAYSIA (Jun'12 and Jul'13)

- **Assistant Professor**, Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Feb' 06 - Oct'12)

- **Visiting Scientist** with Dr. K. Swaminathan, Department of Mathematics, Indian Institute of Technology Madras, Chennai 600 036, INDIA (Oct' 11 and Dec'11)

- **Visiting Professor** (under BOYSCAST fellowship) with Dr. Jonathan Wu, Department of Electrical and Computer Engineering, University of Windsor, Windsor, Ontario, ON, N9B 3P4 CANADA (May' 09 - Aug' 09)

- **Assistant Professor** (On Contract), Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Jan'06 - Feb' 06)

- **Lecturer** (On Contract), Department of Mathematics, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, 247 667, INDIA (Sep' 04 - Dec'05)

- **Lecturer**, Department of Computer Science and Information Systems, IPCU Group, Birla Institute of Technology and Science, Pilani, Rajasthan 333 031, INDIA (Sep' 03 - Sep' 04)

- **Post Doctoral Associate** with Prof. Deborah Silver, Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey, USA (July'02 - Apr'03)

- **Post Doctoral Fellow** with Prof. Pascal Matsakis, Computer Engineering and Computer Science Department, University of Missouri, Columbia, USA (Oct'01 - June' 02)

- **Guest Scientist**, International Center for Theoretical Physics (ICTP) Trieste, ITALY (Sep' 01, Sep' 00)

THESIS SUPERVISED

Ph.D	22 completed, 1 submitted and 12 ongoing
M.Tech/M.Sc/M.C.A	130 completed
B. Tech /Int. M.Sc	33 completed

COMPLETED PH.D STUDENTS

1. **Dr. Sanjeev Kumar (Jul 2004 - Mar 2008)**: *Reconstruction of 3D Objects from 2D views: Simulation, Applications and Error Analysis* (with Prof. N. Sukavanam, Awarded Ph.D in Nov. 2008 and **presently working as an Associate Professor in the Department of Mathematics at IIT Roorkee from Apr. 2016.** He was a Post Doctoral Fellow in the Department of Mathematics and Computer Science, The Artificial Vision and Real-Time Systems (AVIRES) Laboratory, University of Udine, **ITALY** from Mar. 2008 to Nov. 2010).

2. **Dr. Gaurav Bhatnagar (Jul 2006 - Sep 2009)**: *Emphasized Digital Watermarking on Singular Value Decomposition in Frequency Domain* (Awarded Ph.D in Nov. 2010 and **presently working as an Associate Professor in the Department of Mathematics and Statistics at IIT Jodhpur from Mar. 2019**. He was a Post Doctoral Fellow in the Dept. of Electrical and Computer Engineering, University of Windsor, **CANADA** from October 2009 to August 2013).

3. **Dr. Nidhi Taneja (Jan 2007 - May 2010)**: *Security Solutions for Still Visual Data* (with Dr. Indra Gupta, Awarded Ph.D in Nov. 2010 and presently working as an Associate Professor in the Dept. of Electronics and Communication Engineering at Indira Gandhi Delhi Technical University for Women).

4. **Dr. Manoj Kumar (Jul 2006 - Dec 2010)**: *Reconstruction of 3-D Objects using Shape From Shading Algorithms* (with Prof. Rama Bhargava, Awarded Ph.D in Nov. 2011 and Presently working as an Assistant Professor in the Department of Computer Science, Babasaheb Bhimrao Ambedkar Central University, Lucknow).

5. **Dr. Sanjay Rawat (Jan 2008 - June 2011)**: *Digital Watermarking for Copyright Protection and Authentication* (Awarded Ph.D in Nov. 2012 and presently working as an Assistant Professor in the Department of Mathematics, THDC Institute of Hydropower Engineering and Technology, Bhagirathipuram, Tehri Garhwal).

6. **Dr. Anil Balaji Gonde (Jul 2007-Aug 2011)**: *Local and Global Descriptors using Wavelet based features for Image Retrieval* (with Prof. R. P. Maheshwari, Awarded Ph.D in Nov. 2012 and presently working as an Associate Professor in the Department of Electronics and Tele communication Engineering, Shri Guru Gobind Singhji Institute of Engineering and Technology, Nanded).

7. **Dr. Subrahmanyam Murala (Aug 2009-Apr 2012)**: *Design and Integration of Feature Descriptors for Content Based Image Retrieval* (with Prof. R. P. Maheshwari, Defended his thesis on 05/11/2012 and **presently working as an Associate Professor in the Department of Electrical Engineering at IIT Ropar**. He was in the Dept. of Electrical and Computer Engineering, University of Windsor, **CANADA** as a Post Doctoral Fellow from July 2012 to June 2014).

8. **Dr. Sanoj Kumar (Jul 2008 - Dec 2012)**: *Robust Estimation of Optical Flow and Disparity map from Image Sequences* (with Prof. N. Sukavanam, Defended his thesis on 23/05/2013 and he was in the Department of Computer Science, The Artificial Vision and Real-Time Systems (AVIRES) Laboratory, University of Udine, **ITALY** as a Post Doctoral Fellow from October 2013 to September 2014).

9. **Dr. Mohit Srivastava (Jan 2009 - July 2013)**: *Quantitative Approaches for Object Based Image Analysis of Satellite Data* (with Prof. Manoj Arora, Defended his thesis on 27/12/2013).

10. **Dr. Himanshu Agarwal (July 2009 - July 2014)**: *Multipurpose Invisible and Visible Digital Image Watermarking Schemes* (Defended his thesis on 23/02/2015 and presently working as an Assistant Professor in the Department of Mathematics, Jaypee Institute of Information Technology, Sector-62, Noida, Uttar Pradesh, India. He was an Exchange Ph.D student under Dr. Pradeep Atrey in the Applied Computer Science Department, The University of Winnipeg, MB, **CANADA** under the Canadian Commonwealth Scholarship Program, for Six months from September 1, 2012 to February 28, 2013).

11. **Dr. Prabhu Natarajan (Jul 2010- Oct 2014)**: *Study of Some Information Extraction Techniques for Hyperspectral Imaging* (with Prof. Manoj Arora, Defended his thesis on 06/04/2015).

12. **Dr. Manisha Verma (Jul 2012- Dec 2015)**: *New Feature Descriptors for Image Retrieval, Object Tracking and Shot Detection* (Defended her thesis on 06/04/2016, worked as a Post Doctoral Fellow in the Department of Electrical Engineering at IIT Gandhinagar from August 1, 2016 to Oct 14, 2017. Presently she is a Post Doctoral fellow at Institute of Datability Science, Osaka University, **JAPAN** from August 2018).

13. **Dr. Tasneem Ahmed (Jan 2012 - Jan 2016)**: *Development of Land Surface Monitoring Algorithms for Satellite Images* (with Prof. Dharmendra Singh, Defended his thesis on 11/05/2016).

14. **Dr. Pushpendra Kumar (Jul 2011 - Jul 2016)**: *Some Efficient Algorithms for Optical Flow Estimation* (with Dr. Sanjeev Kumar, Defended his thesis on 27/01/2017 and **presently in the Department of Mathematics, NIT Bhopal as an Assistant Professor from January 2019**).

15. **Dr. Bhavik R Patel (Jul 2013 - Dec 2016)**: *Face Image Analysis for Soft Biometric Classification* (with Prof. R. P. Maheshwari, Defended his thesis on 01/05/2017 and presently in **MathWorks** as Senior Technical Writer from July 2020).

16. **Dr. Arun Singh Pundir (Dec 2014 - Mar 2018)**: *Multi-Color-Model Video Analysis for Fire and Smoke Detection* (Defended his thesis on 17/08/2018).

17. **Dr. Rahul Nijhawan (Dec 2014 - May 2018)**: *Machine Learning Models for Snow, Glacier Terrain and Hazard Mapping* (with Prof. Josodhir Das, Defended his thesis on 11/09/2018 and he received **Best PhD thesis award** in MIND 2019 held at NIT Kurukshetra, INDIA).

18. **Dr. Anjali Gautam (Jul 2015 - Jan 2019)**: *Brain Lesion Delineation and Classification* (Defended her thesis on 24/06/2019 and **presently in the Department of Information Technology, IIIT Allahabad as an Assistant Professor from January 2021**).

19. **Dr. Amitesh Singh Rajput (Dec 2015 - Aug 2019)**: *Privacy-Preserving Approach for Cloud Based Multimedia Computing* (Defended his thesis on 21/01/2020).

20. **Dr. Javed Imran (Jul 2016 - Jul 2020)**: *Human Activity Recognition using Deep Learning Techniques* (Defended his thesis on 21/10/2020).

21. **Dr. Vivekraj V.K (Dec 2014 - Oct 2020)**: *Autonomous Video Skimming: Taxonomy, Frameworks and Quantitative Evaluation* (with Prof. Debashis Sen, IIT Kharagpur, Defended his thesis on 12/02/2021).

22. **Dr. Ankur Gupta (Jul 2015 - Dec 2020)**: *Design Automation of Decision Support Systems for Cardiocvascular Disease Prediction* (Defended his thesis on 29/04/2021).

23. **Vishesh Kumar Tanwar (Dec 2015 - Dec 2020)**: *Privacy-Preserving Algorithms For Multimedia Processing Over Cloud* (with Prof. Rama Bhargava, Submitted his thesis on 29/12/2020).

POST DOCTORAL RESEARCH ASSOCIATES

Dr. Asha Rani (30th June 2011 - 31st March 2014): Under **CSIR Project** entitled "Digital Watermarking for Rightful Ownership and Copyright Protection".

Dr. Asha Rani (October 2014- October 2017) under **DST WOS-A Project** entitled "Multimodal Biometric based person Authentication and Identification System".

Dr. Priyanka Singh (Jan 2016- Jan 2017) under **DeitY Project** in "Multimedia Security" and worked as a Post Doctoral Fellow in the Department of Computer Science at Dartmouth College, New Hampshire, USA with **Prof. Hany Farid**.

Dr. Debanjan Sadhya (July 2017 - Feb 2019) under **Institute Post Doctoral Fellow** in "Privacy Preserving Data Deduplication in Cloud".

Dr. Nidhi Saxena (Feb 2019 - Aug 2020) under **Institute Post Doctoral Fellow** in "Privacy Preservation while Removing Data Redundancies".

PROJECT FELLOWS

1. **Dr. Asha Rani** (ISRO Project, June 2007 to December 2007)
2. **Dr. Gaurav Gupta** (ISRO Project, October 2007 to August 2010)
3. **Mr. Deepak Murugan** (ISRO Project, April 2013 to February 2015)
4. **Mr. Ankit Sharma** (Samsung Project, January 2019 to July 2019)

MAJOR AWARDS

- ***BOYSCAST Fellowship (2008-09)*** (Fellowship of US $3000 per month + perks) in Mathematical Sciences awarded by Department of Science and Technology (DST), Government of India to visit **University of Windsor, CANADA** for the duration of THREE months for conducting advanced training/research in the area of Computational aspects of Geometry and Algebra under the mentorship of **Prof. Jonathan Wu**, Canada Research Chair, Department of Electrical and Computer Engineering, University of Windsor, CANADA.

- ***Outstanding Teacher Award*** with citation, awarded by Indian Institute of Technology Roorkee, 2010 **(On Teachers' Day)**.

- ***Outstanding Teacher Award*** with citation and Rs.1,00,000/- awarded by Indian Institute of Technology Roorkee, 2020 **(On Teachers' Day)**.

INDUSTRY INTERACTION

- Microsoft R & D, Bangalore
- Sarnoff Innovative Tech. Ltd., Bangalore
- JFWTC, GE India, Bangalore
- IBM India
- iLink Systems, Seattle, USA
- Samsung, Noida, India
- Intel, Bangalore, India
- Facebook Inc.,USA
- Facebook AI Research and Applied Machine Learning, USA
- Honeywell, Bangalore, India

SPONSORED RESEARCH PROJECTS

S. No	Title of the Project	Sponsoring Agency	Grant Sanctioned (in Rs.)	Investigator	Status
1	Nearest neighbor vector based Palmprint verification	IIT Roorkee, Scheme A	1.0 lac	Principal Investigator	Completed (2006-07)
2	Reconstruction of 3D curves and surfaces from arbitrary Perspective views	MHRD, IIT Roorkee, Scheme B	3.14 lacs	Principal Investigator	Completed (2007-10)
3	Face Recognition: A Neural Network Approach	DST, New Delhi	2.88 lacs	Principal Investigator	Completed (2007-10)
4	Reconstruction of 3D objects from Stereo space Imagery for Development of city models	ISRO, SAC Ahmedabad	11.5 lacs	Co-PI, PI: Prof. Rama Bhargava	Completed (Apr 2007 to August 2010)
5	Digital Watermarking for Rightful Ownership & Copyright Protection	CSIR, New Delhi	10.92 lacs	Principal Investigator	Completed (2011-14)
6	3D Reconstruction and Software Development for City Model Generation from Satellite Images	ISRO, SAC Ahmedabad	7.73 lacs	Principal Investigator	Completed (2012-15)
7	Multimodal Biometric based person Authentication and Identification System	DST, New Delhi	23.52667 lacs	Mentor, PI: Dr. Asha Rani (under WOS-A)	Completed (2014-17)
8	Information Security Education and Awareness (ISEA) Project phase II	DeitY, New Delhi	137.7 lacs	Co-PI, PI: Prof. Manoj Misra (Former Head, CSE)	Ongoing (2014-21)
9	Development and Real-time Implementation of Filters to Remove Noise and Blur Effect	Instruments Research & Development Establishment (IRDE), Dehradun	18.50 lacs	Co-PI, PI: Dr. B. K. Kaushik	Completed (2016-18)
10	Multi-oriented Indic text recognition in natural scene and video images	Science & Engineering Research Board, New Delhi	17.8871 lacs	Co-PI, PI: Dr. Partha Pratim Roy	Completed (2016-20)

11	NVIDIA Hardware Grant, Titan X {non-Pascal} GPU	NVIDIA Corporation	1.5 lacs	Principal Investigator	Completed (2016-17)
12	Thermal Imager with Calibrator for Bad Weather and Night Vision	SMILE, IIT Roorkee	43 lacs	Co-PI, PI: Dr. B. K. Kaushik	Completed (2017-18)
13	End-to-End Emotional Speech Synthesis - Phase 1	Samsung	24.204 lacs (including Instruments)	Principal Investigator	Completed (2018-19)
14	Brain Computer Interface for Neuro and Cognitive Research	SMILE, IIT Roorkee	75 lacs	Co-PI, PI: Dr. Partha Pratim Roy	Completed (2018-19)
15	Urban and Regional Inequality Modelling as Story-Telling: Using Simulation Models as Narrative	SPARC, A Government of India Initiative	94.46 lacs	Co-PI, PI: Dr. Arindam Biswas and Prof. Tetsuo Kidokoro (Japan)	Ongoing (2019-21)
16	End-to-End Emotional Speech Synthesis - Phase 2	Samsung	10.62 lacs	Principal Investigator	Completed (2019-20)
17	Automated Cognitive Metrics Classification Framework to Improve Human Machine Collaboration	DRDO, Delhi	48.83 lacs	Co-PI, PI: Dr. Partha Pratim Roy	Ongoing (2020-23)
18	Hardware implementation of Artificial Intelligence based Object and Motion Detection	Instruments Research & Development Establishment (IRDE), Dehradun	9.65 lacs	Co-PI, PI: Dr. B. K. Kaushik	Ongoing (2021-23)
19	Development of Al powered Multipurpose Intelligent Security and Surveillance System	DST-TIH	Around 150 lacs (To be confirmed)	Co-PI, PI: Dr. B. K. Kaushik	Ongoing (2021-24)

CONSULTANCY PROJECTS

S. No	Title of the Project	Sponsoring Agency	Grant Sanctioned (in Rs.)	Investigator	Status
1	Development of feature reduction and classification algorithms for Hyperspectral data processing	Defence Electronics Applications Laboratory (DEAL), Dehradun	9.3755 lacs	Principal Investigator	Completed (Nov 2010 to Mar 2012)
2	Anomaly Detection and Sub-pixel Classification Algorithms for Hyperspectral Imaging	Defence Electronics Applications Laboratory (DEAL), Dehradun	19.854 lacs	Investigator, PI: Prof. Manoj Arora	Completed (Nov 2010 to Mar 2012)
3	Study of Heat Shimmer Removal Techniques for Long Range Imaging Systems	Instruments Research & Development Establishment (IRDE), Dehradun	8.98 lacs	Co-PI, PI: Dr. B. K. Kaushik	Completed (2013-15)
4	Investigating and Analyzing the Program and Course Structure with respect to its Conformance with the International Standards and Research & Industry needs	Govt. of Yemen	US $8423.00	Investigator, PI: Dr. Sandeep Kumar Garg	Completed (2014-15)
5	Development of Restoration Techniques for Weather Degraded Images	Instruments Research & Development Establishment (IRDE), Dehradun	9.70 lacs	Co-PI, PI: Dr. B. K. Kaushik	Completed (2015-17)

TEACHING

- So far I have taught **Computer Applications (MA 550), Computer Programming and Numerical Analysis (MA 739), Fundamentals of Object Oriented Programming (CSN 103), Data Structures (CS 102/ MA 106/ MA 568/CA 506/MA 302), Mathematical Aspects of Computer Graphics (IMA 17/ MA 634), Unix Network Programming (CA 602), Image Processing (CA/MA 625), Data Base Management System (MA 635/ MA 303/CSN 351), Artificial Intelligence (CA 701), Computer Aided Design (CA 633/CA 717/ MA 632), Computer Systems and Programming (EC 101 A), Object Oriented Programming Languages (CA 503), Graph Theory (MA 631), Object Oriented Analysis and Design (CS-291), Discrete Structures (CSN-106), Machine Learning (CSN 382), Operating Systems (CSN-232), Advanced Algorithms (CSN-501) and Basic Engineering Mathematics (MA 101, MA 102 and MA 201)** courses for UG and PG students (B.Tech, M.Sc and M. Tech) in the Dept. of Computer Science and Engineering and Dept. of Mathematics, IIT Roorkee, INDIA.

COURSE DEVELOPMENT

- Computer Vision, Image Processing, Computer Graphics, Data Structures, Design Analysis of Algorithms, and DBMS (for FIVE year M.Sc Integrated Programme)

- Data Structures, Image Processing, Computer Graphics, Computer Aided Design, Theory of Computation, Object Oriented Programming Languages and DBMS (for M.C.A.)

- Elective Courses for B. Tech Computer Science and Engineering: Computer Vision, Image Processing, Probability and Statistics for Engineers, Computational Geometry, Advanced Graph Theory and Multimedia Technologies

EXPERTISE

- **Computer Vision** Vision Geometry, Shape from Shading and Optical Flow Problems

- **Graphics** Visualization and Volume Graphics

- **Image Processing** Fractional Transform Theory, Wavelet Analysis, Multimedia Security: Encrypted Domain Processing of Big Multimedia Data over Cloud, Biometrics, Content Based Video Retrieval, Video Skimming and Summarization, Medical Imaging, Long-Range Imaging, Hyperspectral Imaging, Machine Learning, Pattern Recognition, Multilingual Text Recognition, EEG based Pattern Analysis.

PUBLICATIONS SUMMARY

Category	Published/ Accepted	Under Review/ Revision
Refereed Journal Papers	128	10
Refereed Conference Papers	68	06
International Book Chapters	07	00
Total	203	16

LIST OF REPRESENTATIVE PUBLICATIONS

A. Refereed International Journal Papers: Q1

1. Himanshu Buckchase and **Balasubramanian Raman**, Towards Zero Shot Learning of Geometry of Motion Streams and Its Application to Anomaly Recognition, *Expert Systems With Applications* (*Elsevier*), **Vol. 177**, pp. 1-12, 114916, 2021.

2. Javed Imran and **Balasubramanian Raman**, Three-stream spatio-temporal attention network for first-person action and interaction recognition, *Journal of Ambient Intelligence and Humanized Computing* (*Springer*), https://doi.org/10.1007/s12652-021-02940-4, pp. 1-16, 2021.

3. Amitesh Singh Rajput, Vishesh Kumar Tanwar and **Balasubramanian Raman**, Z-score based secure biomedical model for effective skin lesion segmentation over eHealth cloud, ***ACM Transactions on Multimedia Computing, Communications and Applications***, 2020.

4. Sahil Garg, Song Guo, Vincenzo Piuri, Kim-Kwang Raymond Choo and **Balasubramanian Raman**, Edge-Cloud Interplay Based on SDN and NFV for Next-Generation IoT Applications, *IEEE Internet of Things Journal*, **Vol. 7**, No. 7, pp. 5690-5694, 2020.

5. Rahul Kumar, **Balasubramanian Raman** and Brajesh Kumar Kaushik, Efficient Method and Architecture for Real-Time Video Defogging, ***IEEE Transactions on Intelligent Transportation Systems***, DOI: 10.1109/TITS.2020.2993906, 2020.

6. Rahul Kumar, Ankur Gupta, Harkirat Singh Arora, Ganesh N. Pandian and **Balasubramanian Raman**, CGHF: A Computational Decision Support System for Glioma Classification Using Hybrid Radiomics-and Stationary Wavelet-Based Features, *IEEE Access*, **Vol. 8**, pp. 79440-79458, 2020.

7. Himanshu Buckchase and **Balasubramanian Raman**, Variational Conditioning of Deep Recurrent Networks for Modeling Complex Motion Dynamics, *IEEE Access*, **Vol. 8**, pp. 67822-67834, 2020.

8. Amitesh Rajput, **Balasubramanian Raman** and Javed Imran, Privacy-preserving human action recognition as a remote cloud service using RGB-D sensors and deep CNN, *Expert Systems with Applications* (*Elsevier*), **Vol. 152**, 113349, 2020.

9. Sibi Chakkaravarthy S, D. Sangeetha, Meenalosini Vimal Cruz, V. Vaidehi and **Balasubramanian Raman**, Design of Intrusion Detection Honeypot using Social Leopard Algorithm to detect IoT ransomware attacks, *IEEE Access*, **Vol. 8**, pp. 169944-169956, 2020.

10. Vishesh Tanwar, **Balasubramanian Raman**, Amitesh Rajput and Rama Bhargava, CryptoLesion: A Privacy-preserving Model for Lesion Segmentation using Whale Optimization over Cloud, ***ACM Transactions on Multimedia Computing Communications and Applications***, Article No.: 50, https://doi.org/10.1145/3380743, 2020.

11. Ankur Gupta, Rahul Kumar, Harkirat Singh Arora and **Balasubramanian Raman**, MIFH : A Machine Intelligence Framework for Heart Disease Diagnosis, *IEEE Access*, **Vol. 8**, pp. 14659-14674, 2019.

12. Javed Imran and **Balasubramanian Raman**, Evaluating Fusion of RGB-D and Inertial Sensors for Multimodal Human Action Recognition, *Journal of Ambient Intelligence and Humanized Computing (Springer)*, **Vol. 11**, pp. 189-208, 2019.

13. Debanjan Sadhya, Kanjar De, **Balasubramanian Raman** and Partha Pratim Roy, Efficient Extraction of Consistent Bit Locations from Binarized Iris Features, *Expert Systems with Applications (Elsevier)*, **Vol. 140**, 112884, 2020.

14. Vivekraj V K, Debashis Sen and **Balasubramanian Raman**, Video Skimming: Taxonomy and Comprehensive Survey, ***ACM Computing Surveys***, **Vol. 52**, No. 5, Article 106, 2019.

15. Gaurav Bhatt, Piyush Jha and **Balasubramanian Raman**, Representation Learning Using Step-based Deep Multi-modal Autoencoders, *Pattern Recognition (Elsevier)*, **Vol. 95**, pp. 12-23, 2019.

16. Debanjan Sadhya, Kanjar De, **Balasubramanian Raman** and Partha Pratim Roy, Development of a clustering based fusion framework for locating the most consistent IrisCodes bits, *Information Sciences (Elsevier)*, **Vol. 491**, pp. 1-15, 2019.

17. Debanjan Sadhya and **Balasubramanian Raman**, Generation of Cancelable Iris Templates via Randomized Bit Sampling, ***IEEE Transactions on Information Forensics and Security***, **Vol.14**, no.11, pp. 2972 - 2986, 2019.

18. Priyanka Singh, Nishant Agarwal and **Balasubramanian Raman**, Secure Data Deduplication using Secret Sharing Schemes over Cloud, *Future Generation Computer Systems (Elsevier)*, **Vol. 88**, pp. 156-167, 2018.

19. Rajkumar Saini, Barjinder Kaur, Priyanka Singh, Pradeep Kumar, Partha Pratim Roy, **Balasubramanian Raman** and Dinesh Singh, Dont Just Sign Use Brain Too: A Novel Multimodal Approach for User Identification and Verification, *Information Sciences (Elsevier)*, **Vols. 430-431**, pp. 163-178, 2018.

20. Priyanka Singh and **Balasubramanian Raman**, Reversible Data Hiding Based on Shamir's Secret Sharing for Color Images over Cloud, *Information Sciences (Elsevier)*, **Vol. 422**, pp. 77-97, 2018.

21. Priyanka Singh, **Balasubramanian Raman** and Manoj Misra, A (n, n) Threshold Non-expansible XOR based Visual Cryptography with Unique Meaningful Shares, *Signal Processing (Elsevier)*, **Vol. 142**, pp. 301-319, 2018.

22. Priyanka Singh, **Balasubramanian Raman** and Nishant Agarwal, Towards Encrypted Video Tampering Detection and Localization Based on POB Number System Over Cloud, ***IEEE Transactions on Circuits and Systems for Video Technology***, **Vol.28**, no.9, pp.2116 - 2130, 2018.

23. Priyanka Singh, **Balasubramanian Raman**, Nishant Agarwal and Pradeep Atrey, Secure Cloud based Image Tampering Detection and Localization using POB Number System, ***ACM Transactions on Multimedia Computing Communications and Applications***, **Vol. 13**, No. 3, Article 23, 2017.

24. Himaanshu Gauba, Pradeep Kumar, Partha Pratim Roy, Priyanka Singh, Debi Prosad Dogra and **Balasubramanian Raman**, Prediction of Advertisement Preference by Fusing EEG Response and Sentiment Analysis, *Neural Networks (Elsevier)*, **Vol. 92**, pp. 77-88, 2017.

25. Bhavik Patel, R.P. Maheshwari and **Balasubramanian Raman**, Compass local binary patterns for gender recognition of facial photographs and sketches, *Neurocomputing (Elsevier)*, **Vol. 218**, pp. 203-215, 2016.

26. Tasneem Ahmed, Dharmendra Singh, Shweta Gupta and **Balasubramanian Raman**, Efficient Application of Fusion approach for Hotspot Detection with MODIS and PALSAR-1 Data, *Geocarto International* (*Taylor and Francis*), **Vol. 31**, No. 7, pp. 715-738, 2016.

27. Manisha Verma, **Balasubramanian Raman** and Subrahmanyam Murala, Local Extrema Co-occurrence Pattern for Color and Texture Image Retrieval, *Neurocomputing* (*Elsevier*), **Vol. 165**, pp 255-269, 2015.

28. Sanoj Kumar, Sanjeev Kumar, N. Sukavanam and **Balasubramanian Raman**, Dual Tree Fractional Quaternion Wavelet Transform for Disparity Estimation, *ISA Transactions* (*Elsevier*), **Vol. 53**, No. 2, pp 547-559, 2014.

29. Gaurav Bhatnagar, Jonathan Wu and **Balasubramanian Raman**, Discrete Fractional Wavelet Transform and its Application to Multiple Encryption, *Information Sciences* (*Elsevier*), **Vol. 223**, No. 2013, pp. 297-316, 2013.

30. Subrahmanyam Murala, R. P. Maheshwari and **R. Balasubramanian**, Local Tetra Patterns: A New Feature Descriptor for Content Based Image Retrieval, ***IEEE Transactions on Image Processing***, **Vol. 21**, No. 5, pp. 2874-2886, 2012.

31. Sanjay Rawat and **Balasubramanian Raman**, A blind watermarking algorithm based on fractional Fourier transform and visual cryptography, *Signal Processing* (*Elsevier*), **Vol. 92**, No. 6, pp. 1480-1491, 2012.

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7. Amitesh Rajput and **Balasubramanian Raman**, Example Based Privacy-Preserving Video Color Grading, Accepted for publication in *Handbook of Multimedia Information Security: Techniques and Applications (HMIS), Springer*, 2018.

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3. Ridhi Arora and **Balasubramanian Raman**, A Deep Neural CNN Model with CRF for Breast Mass Segmentation in Mammograms, Accepted for publication in *the 29th European Signal Processing Conference (EUSIPCO 2021)*, May 2021, Dublin, Ireland.

4. Ankur Gupta, Harkirat Singh Arora, Rahul Kumar and **Balasubramanian Raman**, DMHZ : A Decision Support System based on Machine Computational Design for Heart Disease Diagnosis Using Z-Alizadeh Sani Dataset, Proceedings of *the 35th International Conference on Information Networking (ICOIN 2021)*, pp. 818-823, 13-16, January 2021, Jeju Island, SOUTH KOREA.

5. Rahul Kumar, Ankur Gupta, Harkirat Singh Arora and **Balasubramanian Raman**, GRGE: Detection of Gliomas Using Radiomics, GA Features and Extremely Randomized Trees, Proceedings of *the 35th International Conference on Information Networking (ICOIN 2021)*, pp. 379-384, 13-16, January 2021, Jeju Island, SOUTH KOREA.

6. Puneet Kumar, Sidharth Jain, **Balasubramanian Raman**, Partha Pratim Roy and Masakazu Iwamura, End-to-end Triplet Loss based Emotion Embedding System for Speech Emotion Recognition, Proceedings of *the 25th International Conference on Pattern Recognition (ICPR 2020)*, pp. 8766-8773, 10-15, January 2021, Milan, ITALY.

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14. Jaynil Jaiswal, Ashutosh Chaubey, Bhimavarapu Sasi Kiran Reddy, Shashank Kashyap, Puneet Kumar, **Balasubramanian Raman** and Partha Pratim Roy, A Generative Adversarial Network based Ensemble Technique for Automatic Evaluation of Machine Synthesized Speech, Proceedings of *5th Asian Conference on Pattern Recognition (ACPR 2019)*, pp. 580-593, November 25-29, 2019, Auckland, NEW ZEALAND.

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55. Manoj Kumar, **R. Balasubramanian**, Rama Bhargava and K. Swaminathan, A Probabilistic Approach for the Reconstruction of Polyhedral Objects using Shape from Shading Technique, Proceedings of *Intelligent Robots and Computer Vision XXVI: Algorithms and Techniques, 21st IS&T/SPIE International Symposium on Electronic Imaging 2009*, David P. Casasent; Ernest L. Hall; Juha Rning, Editors, Vol. 7252, 72520B, pp. B1-B10, 18 22, Jan 2009, San Jose, California, USA.

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I. Patents Filed/Awarded:

1. Rahul Kumar, Brajesh Kumar Kaushik, **R. Balasubramanian** and Gaurav Sharma, Real-Time Fog Removal System and its Method Thereof, Status: Filed, Filing No. 202011047686 (Funded by IIT Roorkee).

HONORS, AWARDS AND RECOGNITION

- I Rank holder in B. Sc. Examinations, A.M. Jain College, 1994.

- Gold Medalist in M. Sc. Examinations, Madras Christian College, 1996.

- DST travel award (Rs. 30,000) to attend *Vision Geometry XIII, IS&T/SPIE International Symposium on Electronic Imaging 2005*, San Jose, California, USA, January 2005.

- SPIE travel and registration award ($525) to attend *Vision Geometry XIII, IS&T/SPIE International Symposium on Electronic Imaging 2005*, San Jose, California, USA, January 2005.

- Best paper award for a research paper in "*International Conference of Cognition and Recognition (ICCR-08)*, April 10-12, 2008, Mysore, INDIA, 2008.

- **DST Young Scientist** travel and Registration award (Rs. 1,05,559) to attend *Wavelet Applications in Industrial Processing VI, 21st IS&T/SPIE International Symposium on Electronic Imaging 2009*, 18 22, Jan 2009, San Jose, California, USA.

- CSIR travel award (50% of Airfare) to attend *IEEE Symposium on Industrial Electronics & Applications (ISIEA 2011)*, September 25-28, 2011, Langkawi Island, MALAYSIA.

- Science and Engineering Research Board (A Statutory body under Department of Science & Technology) travel award (Rs. 84,240) to attend and present a paper in **IS&T/SPIE symposium on Electronics Imaging, Conference On Video Surveillance and Transportation Imaging Applications 2014**, held in **San Francisco, California, USA** February 2-6, 2014.

- Best Paper Award for a research paper in "*IEEE International Conference on Signal and Image Processing Applications (ICSIPA'2015)*", Kuala Lumpur, MALAYSIA.

- CSIR travel award (50% of Airfare) to attend *IEEE TENCON* 2016, November 22-25, 2016, Singapore, SINGAPORE.

- **One of the jury members** of 6th IDRBT Doctoral Colloquium held in Institute for Development and Research in Banking Technology (IDRBT), Hyderabad during 8-9, December 2016. High quality papers from ISI Kolkata, IISc Bangalore, IIT Kharagpur, IIT Madras, IIT Hyderabad, IIT Guwahati, IIIT Hyderabad, IIIT Bangalore and IIM Lucknow were presented and top 3 papers have got cash prizes.

- **Attended** Intel India Research Colloquium to represent Department of Computer Science and Engineering, IIT Roorkee during 9th October 2017 at Bangalore, INDIA.

- **Top 15 contenders of Outstanding Teachers' Award** for the year 2018 for Under Graduate Category at IIT Roorkee.

- **Guest Editor** in the Special issue on Blockchain-as-a-Service for Industrial Internet of Things and Big Data Applications (Baas-iot-big-data), **Future Generation Computer Systems**, The International Journal of eScience.

- **Guest Editor** in the Special issue on Edge-Cloud Interplay based on SDN and NFV for Next-Generation IoT Applications, **IEEE Internet of Things Journal**.

- Science and Engineering Research Board (A Statutory body under Department of Science & Technology) travel award (Rs. 1, 31, 300) to attend and present two papers in **The 5th Asian Conference on Pattern Recognition (ACPR 2019)**, held in **Auckland, NEW ZEALAND**, November 26-29, 2019.

- Member, Sakura Science Club, **JAPAN** (ID: 19105514).

- **Associate Editor**, Springer Nature Computer Science Journal, from April 2020.

- One of the **Board of Advisors** for a Start-up Sequoia Insilico Private Ltd (SIPL), New Delhi from April 2020.

- **Chairman**, Project Review Group (PRG) for an R&D project entitled "A web browser based intelligent kernel tool for automatic detection and blocking of obscene image and video contents in real time", is being executed by IIIT Allahabad under the Cyber Crime Prevention against women and Children, **Ministry of Home Affairs, Bureau of police Research & Development**, New Delhi, India (March 2020 to September 2021).

- Best Paper Award for a research paper in "*5th International Conference on Computer Vision and Image Processing (CVIP'2020)*", IIIT Allahabad, INDIA.

ABROAD VISITS

- Participated as one of the fifty scientific researchers in the world, who was invited by **International Center for Theoretical Physics, Trieste, ITALY,** under **UNESCO** fellowship for three weeks course on "*School on Mathematical Problems in Image Processing* during 4th September 2000 to 22nd September 2000.

- Participated as one of the fifty scientific researchers in the world, who was invited by **International Center for Theoretical Physics, Trieste, ITALY,** under **UNESCO** fellowship for four weeks course on "*Summer School on Mathematical Control Theory* during 3rd September 2001 to 28th September 2001.

- Worked as a Post Doctoral Fellow in the **Computer Engineering and Computer Science Department, University of Missouri Columbia, Missouri -65211, USA** from 1st October 2001 to 30th June 2002.

- Worked as a Post Doctoral Associate in the **Department of Electrical and Computer Engineering, Rutgers, The State University of New Jersey, NJ -08855, USA** from 1st July 2002 to 28th April 2003.

- Presented a paper "Error analysis in the reconstruction of a 3D parabola from two arbitrary perspective views" in **Vision Geometry XIII, IS&T/SPIE International Symposium on Electronic Imaging - 2005**, held in **San Jose, California, USA** from 16th January 2005 to 21st January 2005.

- Delivered an invited talk entitled "Applications of Image Processing in health care" in **the Indo-German Workshop on Clean Room Technology, part of 5th World Congress on Bio-Mechanics**, held in **Munich, GERMANY** from 29th July 2006 to 4th August 2006.

- Presented a paper "Automated Stroke Classification in Tennis" in **International Conference on Image Analysis and Recognition (ICIAR 2007)**, held in **Montreal, CANADA** from 22nd August 2007 to 24th August 2007.

- Presented a paper "Multipurpose Watermarking Scheme using Essentially Non-Oscillatory Point-Value Decomposition" in **Wavelet Applications in Industrial Processing VI, 21st IS&T/ SPIE International Symposium on Electronic Imaging 2009** held in **San Jose, California, USA** from 18th January 2009 to 24th January 2009.

- Worked as a **Visiting Professor** under *BOYSCAST Fellowship (2008-09)* (Fellowship of US $3000 per month + perks, awarded by DST) at **University of Windsor, CANADA** from 18th May 2009 to 17th August 2009 (duration of THREE months) for conducting advanced training/research in area of Computational aspects of Geometry and Algebra under the mentorship of **Prof. Jonathan Wu**, Canada Research Chair, Department of Electrical and Computer Engineering, University of **Windsor, CANADA**.

- Presented a paper "Human Action Recognition in a Wide and Complex Environment" in **Real-Time Image and Video Processing 2011, part of IS&T/SPIE Electronic Imaging 2011**, held in **San Francisco, California, USA** from 23rd January 2011 to 27th January 2011.

- Presented a paper "Navigation and Surveillance using Night Vision and Image Fusion", in **IEEE Symposium on Industrial Electronics & Applications (ISIEA 2011)**, held in **Langkawi Island, MALAYSIA** from 25th September to 28th September 2011.

- Presented a paper "Recognizing Human Gestures Using a Novel SVM Tree" in **IS&T/SPIE symposium on Electronics Imaging, Conference On Image Processing: Machine Vision Application V, 2012**, held in **San Francisco, California, USA** from 22nd January 2012 to 26th January 2012.

- **Visited Stanford University, California, USA** to have a technical discussion with **Dr. Daniel L. Rubin, MD, MS**, Assistant Professor of Radiology and Medicine (Biomedical Informatics) in the problem of "Content Based Image Retrieval (CBIR) for Decision Support" on 26th January 2012.

- Delivered an invited talk entitled "Human Action Recognition in a Wide and Complex Environment" in the **School of Computer Sciences, Universiti Sains Malaysia**, Pulau Pinang, **MALAYSIA** on 7th June 2012.

- Conducted a workshop on "Advanced Algorithms in Computer Vision and Imaging using MATLAB" in **the School of Computer Sciences, Universiti Sains Malaysia, Pulau Pinang, MALAYSIA** during June 08-09, 2012.

- Delivered two invited talks on "Digital Image Watermarking using Mathematical Transformations and SVD" and "Recognizing Human Gesture Using a Novel SVM Tree" in the **Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Serdang, Selangor, MALAYISA** on 12th June 2012.

- Conducted a workshop and Seminar on "Content Based Image Retrieval and Computer Vision" in **the Centre for Visual Computing, Multimedia University, Cyberjaya, MALAYISA** on 13th June 2012.

- Delivered an invited talk on "Mathematics and its Applications in Real Life" in Linton University College, Mantin, Negeri Sembilan, **MALAYSIA** on 15th June 2012.

- Presented a paper "Joint Histogram Between Color and Local Extrema Patterns for Object Tracking" in **IS&T/SPIE symposium on Electronics Imaging, Conference On Video Surveillance and Transportation Imaging Applications 2013**, held in **San Francisco, California, USA** from 3rd February 2013 to 7th February 2013.

- Visited **National University of Singapore, SINGAPORE** to have a technical discussion with **Prof. Mohan S. Kankanhalli, Department of Computer Science, School of Computing**, in the areas of Visual Saliency in watermarking, Affective Video Analysis and Retrieval and Multimedia Security during July 01-06, 2013.

- Conducted a workshop on "Advanced Algorithms in Computer Vision and Imaging using MATLAB" in **the School of Computer Sciences, Universiti Sains Malaysia, Pulau Pinang, MALAYSIA** during July 08-09, 2013.

- Presented a paper "Development of a multispectral active stereo vision system for video surveillance applications" in **IS&T/SPIE symposium on Electronics Imaging, Conference On Video Surveillance and Transportation Imaging Applications 2014**, held in **San Francisco, California, USA** from 2nd February 2014 to 6th February 2014.

- Visited **SeSaMe Research Centre at National University of Singapore, SINGAPORE** to have a technical discussion with **Prof. Mohan S. Kankanhalli, Department of Computer Science, School of Computing**, in the areas of Visual Saliency in watermarking, Multi-camera/Multi-sensor surveillance, Multi-agent systems and PTZ camera networks during July 02-07, 2014.

- Conducted a workshop on "Digital Image Watermarking and Optical flow problems" and have a technical discussion with **Prof. C. Eswaran, Faculty of Computing and Informatics, Multimedia University, Cyberjaya Campus, MALAYSIA** in the area of Multimedia Security during July 08-10, 2014.

- Visited **iLink Systems** at **Seattle, Washington, USA** to have a technical discussion in the areas of Data Science and Machine learning during 27/11/2014 to 3/12/2014.

- Visited **University at Albany - State University of New York (SUNY), NY, USA** to have a technical discussion with **Dr. Pradeep Atrey's** research group and Delivered an invited talk on "Applications of Fractional and Multi-resolution Transforms in Information Security, Optical flow Problems and Content Based Image Retrieval" in the **Department of Computer Science** during 4/12/2014 to 6/12/2014.

- Visited **MIMOS Berhad, Technology Park Malaysia, Kuala Lumpur, MALAYSIA** to have a technical discussion with **Prof. Arichandran's** R&D group and delivered an invited talk on "Machine Learning in Vision, Information Security and Content Based Image Retrieval" during 31/5/2015 to 3/6/2015.

- Visited **Telekom Malaysia, Kuala Lumpur, MALAYSIA** to have a technical discussion with **Dr. Ettikan Kandasamy Karuppiah's** R&D group and delivered an invited talk on "Applications of Soft Computing in Vision, Information Security and Content Based Video Retrieval" during 4/6/2015 to 7/6/2015.

- Presented a paper "Fusion of Submanifold and Local Texture Features for Palmprint Authentication" in **IEEE International Conference on Visual Communications and Image Processing (VCIP'2015)**, held in **NTU, Singapore, SINGAPORE** during 13-16, December 2015.

- Presented a paper "A Reversible Robust Watermarking Scheme Based on Two out of Two Visual Cryptography Approach" in **IEEE TENCON** 2016 held in **Singapore, SINGAPORE** during 22-25 November 2016.

- Attended The **IEEE International Conference on Multimedia & Expo (ICME)** held in **HONG KONG** during 10-14 July 2017.

- Attended **The 4th Asian Conference on Pattern Recognition (ACPR 2017)** held in **Nanjing, CHINA** during 26-29 November, 2017.

- IIT Roorkee team named **Triangulation**, Vaibhav Gosain, Adarsh Kumar, Saharsh Luthra and myself as coach has bagged 56th position & 68th rank in the World and 2nd among Indian teams in the World Finals of 42nd ACM International Collegiate Programming Contest (ICPC World Finals) held at Peking University, Beijing, **CHINA** between 15-20 April 2018. IIT-R is one amongst 8 teams that have been selected from India and 140 teams from all over the world.

- Visited Department of Computer Science and Intelligent Systems, **Osaka Prefecture University, Osaka, JAPAN** under Japan Science and Technology Sakura Science Exchange Program and delivered an invited talk on "Machine Learning in Imaging and Vision" during 7/6/2018 to 14/6/2018.

- Visited Department of Natural Sciences, **International Christian University, Tokyo, JAPAN** to have a technical discussion with **Dr. Andrea Kutics** and delivered an invited talk on "Machine Intelligence and its Applications" during 10/6/2018 to 11/6/2018.

- IIT Roorkee team named **Hold right there Sparky!!**, Devanshu Agarwal, Samarth Joshi, Abhishek Kanhar and myself as coach has bagged 41st position & 49th rank in the World and 2nd among Indian teams in the World Finals of 43rd International Collegiate Programming Contest (ICPC World Finals) held at Porto, **PORTUGAL** between 31st March - 5th April 2019. IIT-R is one amongst 8 teams that have been selected from India and 135 teams from all over the world.

- Visited Department of Computer Science and Intelligent Systems, **Osaka Prefecture University, Osaka, JAPAN** to have a technical discussion with **Dr. Masakazu Iwamura** on 12/6/2019.

- Visited iCeMS, **Kyoto University, Kyoto, JAPAN** and delivered an invited talk on "Applications of EEG Signal and Biomedical Image Processing" during 7/6/2019 to 22/6/2019.

- Visited Image Department, **Institut d'Électronique et de Télécommunications de Rennes, Institut National des Sciences Appliquées de Rennes (INSA), Rennes, FRANCE** to have a technical discussion with **Prof, Kidiyo KPALMA** and delivered an invited talk on "Machine Learning in Imaging and Vision" during 30/6/2019 to 7/7/2019.

- Visited **Dipartimento di Informatica, Universita' degli Studi di Milano, Milan, ITALY** to have a technical discussion with **Prof. Vincenzo Piuri** on 11/7/2019.

- Presented a paper "Privacy preserving smart surveillance using local color correction and optimized ElGamal cryptosystem over cloud" and also chaired a session in **IEEE International Conference on Cloud Computing (CLOUD 2019)**, held in **Milan, ITALY** during 8-13, July 2019.

- Delivered a keynote "Applications of AI in Imaging and Vision" and chaired a session in the 9th **International Conference on Soft Computing for Problem Solving (SocProS'2019), Liverpool Hope University, Liverpool, UK** during 2-4, September, 2019.

- Presented two papers (a) "Segment Level Approach to Speech Emotion Recognition using Transfer Learning" and (b) "Generative Adversarial Network based Ensemble Technique for Automatic Evaluation of Machine Synthesized Speech", chaired a session and evaluated the best poster paper as one of the IAPR best poster paper committee members in **5th IAPR Asian Conference on Pattern Recognition (ACPR 2019)**, held in **Auckland, NEW ZEALAND** during 26-29, November 2019.

- Visited iCeMS, **Kyoto University, Kyoto, JAPAN** to have a technical discussion with **Dr. Ganesh Pandian Namasivayam** during 6/12/2019 to 7/12/2019.

- Visited Department of Computer Science and Intelligent Systems, **Osaka Prefecture University, Osaka, JAPAN** under Japan Science and Technology Sakura Science Exchange Program (Member ID: 19105514) and delivered an invited talk on "Encrypted Domain Processing of Big Multimedia Data over Cloud" during 4/12/2019 to 18/12/2019.

- **USA**, B1/B2 (Visiting/Business) visa holder for 10 years (December 2004 to December 2014).

- Visited **MALAYSIA** (January 2005), **AUSTRIA** (August 2006), **USA** (June, July 2009), **SINGAPORE** (February 2013, January 2014), **FRANCE** (March 2019), **WALES, UK** (September 2019) and **THAILAND** (November 2019).

INVITED TALKS/LECTURES

1. Delivered a talk on "Computing the Curve-Skeletons of General 3D Objects", in **Center for Advanced Information Processing (CAIP), Department of Electrical and Computer Engineering, Rutgers, the State University of New Jersey, USA**, April 2003.

2. Delivered an invited talk on "Computing the Curve-Skeletons of General 3D Objects", **Center for Artificial Intelligence and Robotics (CAIR)-DRDO, Bangalore**, June 2003.

3. Invited as a guest speaker in the mini symposium on **Methods for Image Understanding** at **JFWTC, GE India Technology Center, Bangalore** (organized by **Imaging Technologies group**) and delivered a talk on "Computing the Curve-skeletons of general 2D/3D objects by Generalized potential field" along with 6 faculty of top-rated schools in India and USA, July 2004.

4. Delivered an invited talk on "Digital Watermarking using Mathematical Transformations and SVD" in a **CEP course on Emerging Techniques for Image Processing, Defence Electronics Applications Laboratory - DRDO, Dehradun**, 4-8 October 2010.

5. Delivered Series of expert lectures on "Advanced Algorithms in Digital Watermarking and CBIR" in the **"Faculty Development Programme on Computer Vision, Pattern Recognition and Image Processing"** conducted by Department of Computer Science and Engineering, **NIT Delhi** from 18-22 June 2013.

6. Delivered Series of expert lectures (1) "Watermarking Algorithms Based on Fractional Transformations and Visual Cryptography", (2) "Chaos Based Cryptosystem for Still Visual Data" and (3) "Information Security in Multi-resolution Transformations" in the **Workshop on "Cryptography and Information Security"** conducted by Department of Electronics and Communication Engineering, **NIT Calicut** from 23-25 January 2015.

7. Delivered series of invited lectures on (1) "Multimedia Security over cloud" and (2) "Machine Learning in Imaging and Vision" in the Department of Computer Science and Engineering at **IIT Ropar** on 04/11/2017.

8. Delivered an invited talk on "Machine Learning and its Applications" in the Department of Computer Science and Engineering at **MNIT Jaipur** on 19/01/2018.

9. Delivered an expert talk on "Machine Learning in Imaging and Vision" in E&ICT academy for a faculty development programme, **IOT with Machine Learning & Artificial Intelligence** during January 20-24, 2018 at **MNIT Jaipur**.

10. Delivered an invited talk on "Machine Learning and its Applications" in the Department of Computer Science and Engineering at **IIIT-DM Jabalpur** on 24/02/2018.

11. Delivered an invited talk on "Machine Learning in Imaging and Video Analytics" in the Department of Information Technology at **IIIT Allahabad** on 03/04/2018.

12. Delivered an invited talk on "Machine Vision" in the Department of Computer Science and Engineering at **MNNIT Allahabad** on 04/04/2018.

13. Delivered an invited talk on "Challenges in Video Analytics" in the Department of Computer Science and Engineering at **NIT Manipur** on 24/05/2018.

14. Delivered an invited talk on "Encrypted Domain Processing" in Computer Vision and Pattern Recognition Unit, **Indian Statistical Institute, Kolkata** on 22/06/2018.

15. Delivered series of expert lectures on (1) Human Action Recognition (2) Mathematical Elements of Machine Learning in Two Week National Workshop & Summer School on Advances in Deep Architectures For Signal, Image & Vision Applications (ADASIVA'18) in the Department of Information Technology at **IIIT Allahabad** during 15-17 July, 2018.

16. Delivered an invited talk on "AI and its Applications in Imaging and Vision" in the Department of Computer Science and Engineering at **IIT (BHU), Varanasi** on 15/11/2018.

17. Delivered an invited lecture on "Video Analytics Applications" at **Honeywell, Bangalore** on 28/11/2018.

18. Delivered a keynote on "AI and its Applications" in 13th IEEE International Conference on Industrial and Information Systems (IEEE ICIIS'18) at **IIT Ropar** during 01-02 December 2018.

19. Delivered series of expert lectures on (1) Machine Learning and Its Applications and (2) Medical Imaging in a workshop on "Signal and Image Processing for Medical Applications (SIPMA'19)" in the Department of Electronics and Communication Engineering at **VNIT Nagpur** during 20-24 February, 2019.

20. Delivered an invited talk on "Machine Learning and its Applications in Imaging and Vision" **IIITM Gwalior** on 06/03/2019.

21. Delivered an expert lecture on Applications of Biomedical Signal & Image Processing in a five days Short Term Course/ Faculty Development Program on "Recent Trends in Biomedical Signal Processing and VLSI Design (RTBSV-2019)" in the Department of Electronics and Communication Engineering at **NIT Jalandhar** during May 30- June 03, 2019.

22. Delivered an expert lecture on Machine Learning in Imaging and Vision in a National Workshop & Summer School on Advances in Deep Architectures For Signal, Image & Vision Applications (ADASIVA'19) in the Department of Information Technology at **IIIT Allahabad** during 24-30 June, 2019.

23. Delivered series of expert lectures on (1) Machine Learning Applications in Imaging and Vision and (2) Encrypted Domain Processing of Big Multimedia Data over Cloud in STTP on Big Data and IoT: Data Analytics, Security & Privacy in Computer Engineering Department at **NIT Surat** during 24-28 June, 2019.

24. Delivered series of expert lectures on (1) Machine Learning in Imaging and Vision and (2) Applications of Maching Learning in Medical Imaging in "One Week Summer School On Computer Vision and Pattern Recognition using Machine Learning (CVPRML-19)" in the Department of Electronics and Communication Engineering at **NIT Silchar** during 22-26 July, 2019.

25. Delivered a keynote on "Machine Vision and Encrypted Domain Processing: A Mathematical Approach" in the International Conference on Computational Mathematics and its Applications (CMA 2019) at **IIT Indore** during November 12-14, 2019.

26. Delivered series of expert lectures on (1) Information Security and (2) Privacy Preservation in Video Analytics in the "FDP on Cyber Security Using Machine Learning/Big Data Analytics" in the Department of Computer Science and Engineering at **NIT Patna** during 17-21 February, 2020.

27. Delivered an expert lecture on Data Science & Deep Learning in "One Week Short Term Training Program (STTP) on Data Science & Learning Systems for Engineering Research & Design" in the Department of Computer Science and Engineering at **NIT Kurukshetra** during 24-30 June, 2020 (through Webex meeting).

28. Delivered an expert lecture on Applications of Machine/Deep Learning in Imaging and Vision in "One Week Continuing Education Programme on Big Image Data Processing using Deep Learning Techniques" in the Department of Computer Science and Engineering at **NIT Warangal** during 27-31 July, 2020 (through Goto meeting).

29. Delivered an expert lecture on Applications of AI in Imaging and Vision in "Five Days Online Short-Term Training Programme (STTP) on Recent Advances in Artificial Intelligence" in the Department of Computer Science and Engineering at **NIT Uttarakhand** during 27-31 July, 2020 (through Google meet).

30. Delivered an expert lecture on Applications of Machine/Deep Learning in Imaging and Vision in "Recent research trends in Computer Science" in the Department of Computer Science and Engineering at **NIT Jalandhar** during 24-28 August, 2020 (through Google meet).

31. Delivered an expert lecture on Dimensionality Reduction Algorithms in the "Workshop on Digital Image Processing and its Applications" in the Department of Computer Science and Engineering at **NIT Arunachal Pradesh** during 24-28 August, 2020 (through Google meet).

32. Delivered an expert lecture on Applications of Machine Learning in Video Analytics in the "Russian-Indian Network (RIN) on Data Analytics" at **IIT Bombay** during 6-7 October, 2020 (through Webex).

33. Delivered an expert lecture on Information Security in the "FDP on Cyber Security" in the Department of Computer Science and Engineering at **NIT Patna** during 05-11 October, 2020.

34. Delivered an expert lecture on Information Security in the One Week Webinar on "Cyber Security Techniques with Application sponsored by ISEA Project Phase-II, MeitY, in the Department of Computer Science and Engineering at **IIT(ISM) Dhanbad** during 05-09 October, 2020.

35. Delivered an expert lecture on Applications of Machine/Deep Learning in Imaging and Vision in the "Short Term course on Deep Learning Applications in Image Processing under Security ambit" in the Dept. of Electronics and Communication Engineering at **NIT Rourkela** during 05-09 October, 2020.

36. Delivered an expert lecture on Encryption Domain Processing and its Applications in the "TEQIP-III Sponsored One Week ONLINE Short Term Training Programme (STTP) on Data Security and Privacy (DSP 2020)" in the Dept. of Computer Engineering at **NIT Surat** during 26-30 October, 2020.

37. Delivered an expert lecture on Applications of Machine and Deep Learning in Biomedical data in the "TEQIP-III Sponsored Short Term Course (STC) on Artificial intelligence driven biomedical data analysis for disease diagnosis" in the Dept. of Electrical Engineering and Dept. of Mathematics at **IIT Indore** during 05-10 November, 2020.

38. Delivered an expert lecture on Introduction to basics of ML and its Applications in the "e-workshop Mathematical and Statistical Methods for Machine Learning (MSML 2020)" in the Dept. of Mathematics at **NIT Hamirpur** during 07-11 November, 2020.

39. Delivered an expert lecture on Applications of Machine/Deep Learning in Vision and Imaging in the "IEEE CIS Summer School on Emerging Research Trends in Computational Intelligence: Theory and Applications" in the Dept. of Mathematics at **IIT Indore** during 26-30 November, 2020.

40. Delivered a keynote on "Applications of Machine/Deep Learning in Vision and Imaging" in 15th IEEE International Conference on Industrial and Information Systems (IEEE ICIIS'20) at **IIT Ropar** during 26-27 November 2020.

41. Delivered an expert lecture on Applications of Machine/Deep Learning in Vision and Imaging in a National Workshop & Summer School on Advances in Deep Architectures For Signal, Image & Vision Applications (ADASIVA'20) in the Department of Information Technology at **IIIT Allahabad** on 3rd December 2020.

42. Delivered a keynote on "Multimedia Security over Cloud" in the 5th IAPR International Conference on Computer Vision and Image Processing (CVIP'20) at **IIIT Allahabad** during 04-06 December 2020.

43. Delivered an expert lecture on Multimedia Security over cloud in the "FDP on Multimedia and Security" in the Department of Computer Science and Engineering at **NIT Patna** during 16-20 December, 2020.

PROFESSIONAL ACTIVITIES

1. Reviewer of Several top International Journals and Conferences

2. Technical, Advisory and International Program Committee member for various conferences.

3. Coordinated Ten QIP Short term courses at IIT Roorkee

   - Vision, Graphics and Image Processing (2007)
   - Robotic Vision and Image Processing (2008)
   - Vision, Graphics, Robotics and their Applications (2009)
   - Robotic Vision and Image Processing (2011)
   - Image Processing and Computer Graphics for Scientific Visualization (2012)
   - Image Processing with Multidisciplinary Applications (2014)
   - Mathematical Modelling and Numerical Computation Using Matlab (2015)
   - Vision, Graphics and their Applications (2016)
   - Machine Learning and Its Applications (2018)
   - Deep Learning and its Applications (2021)

4. Instructor, Finishing School Programme, Continuing Education, IIT Roorkee, 2007 and 2008.

5. Established Computer Vision, Graphics and Image Processing Laboratory at Department of Mathematics, IIT Roorkee under MHRD, DST and ISRO Projects, 2007-08.

6. Under my coach, the team **"the 65th Bit"**, comprises of Sharat Ibrahimpur, Dipit Grover and Tarun Goyal from IIT Roorkee grabbed 61st rank in the *37th Annual World Finals of the ACM International Collegiate Programming (ACM ICPC)* Contest held in **Saint Petersburg, RUSSIA** in 2013. The team secured 25th position among Asian teams and 1st among other Indian Teams.

7. Served as an Examiner for many Ph.D theses of IIT Bombay, IIT Dhanbad (ISM), IIT Mandi, IIT Guwahati, IIT Gandhinagar, IIT Kharagpur, IIT (BHU) Varanasi, MNIT Jaipur, MNNIT Allahabad, NIT Trichy, VNIT Nagpur, NIT Delhi, NIT Rourkela, NIT Surat, NIT Calicut, NIT Karnataka and Anna University.

8. Served as a Foreign Examiner for five Ph.D theses of Faculty of Computing and Informatics, Multimedia University, MALAYSIA.

9. Delivered Invited Talks (more than 200), many places in India and 12 in abroad.

10. Selection Committee member for **Department of Computer Science and Engineering, NIT Uttrakhand**, May 2014.

11. Attended Preliminary Design Review (PDR part 1) Committee meeting as a member to evaluate a project entitled "Design and Development of Submarine Periscope" at **Instrumentation Research and Development Establishment (IRDE), DRDO, Dehradun**, February 2015.

12. Conducted a Ph.D viva (through Video conferencing) of Dr. Sreeramula Sankariah, **Faculty of Information and Communication Engineering, Multimedia University, Cyberjaya Campus, Malaysia** on "Performance Optimization of Real-Time Video Processing Multicore Architecture" in April 2015.

13. Attended Preliminary Design Review (PDR part 2) Committee Meeting as a member to evaluate a project entitled "Design & Development of Submarine Periscope" at **Instrumentation Research and Development Establishment (IRDE), DRDO, Dehradun** on 18th August 2015.

14. Attended Design Review Committee Meeting as a member to evaluate a project at **Instrumentation Research and Development Establishment (IRDE), DRDO, Dehradun** on 5th October 2015.

15. **Convener, International Conference on Computer Vision and Image Processing (CVIP 2016), IIT Roorkee, February 26-28, 2016.**

16. Selection Committee member for **Department of Computer Science and Engineering, NIT Uttrakhand**, April 2016.

17. **Organizing Chair, Second International Conference on Computer Vision and Image Processing and Workshop on Multimedia (CVIP-WM 2017), IIT Roorkee, September 9-12, 2017.**

18. One of the Course coordinators in **Analysis and Applications of Document Image Processing**, A Global Initiative of Academic Networks (**GIAN**) course, IIT Roorkee, December 4-8, 2017. (other Course coordinators: Dr. Partha Pratim Roy, IIT Roorkee and Josep Llads, Computer Vision Center, Universitat Autnoma de Barcelona, SPAIN).

19. One of the Course coordinators in **Machine Learning & its Applications**, E&ICT Academy course, IIT Roorkee, February 01-05, 2018 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

20. One of the Expert members of Two days Curriculum Development Workshop in **the Department of Computer Science and Engineering, NIT Uttarakhand** during February 17-18, 2018.

21. One of the coordinators in the **Workshop on Computer Vision and Image Processing**, (Sponsored by E&ICT Academy course and Mathworks), IIT Roorkee, March 09-11, 2018 (other coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

22. One of the coordinators in the **Workshop on Machine Learning and Its Applications**, (Sponsored by Institute Computer Centre), IIT Roorkee, April 18-20, 2018 (other coordinators: Dr. Navneet Kumar Gupta and Dr. Partha Pratim Roy, IIT Roorkee).

23. Served as an External Expert for Thesis Proposal Seminar of a PhD student at **IIT Ropar** on 20th August 2018.

24. One of the Course coordinators in **Document Image Processing and its Applications**, E&ICT Academy course, IIT Roorkee, September 04-08, 2018 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

25. **Organizing Chair, Third International Conference on Computer Vision and Image Processing (CVIP 2018), IIIT-DM Jabalpur, September 29-October 01, 2018.**

26. One of the Course coordinators in **Imaging Application through MATLAB**, E&ICT Academy course, IIT Roorkee, October 09-13, 2018 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

27. One of the Course coordinators in **Machine Learning & Its Applications**, E&ICT Academy course, IIT Roorkee, October 27-31, 2018 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

28. Represented IIT Roorkee for the **National Conference of Directors of Computer Centres in Central Universities, IITs, IIMs, IISERs, and NITs** during November 15-17, 2018 held at Banaras Hindu University, Varanasi.

29. Conducted a Workshop on **Human Behavior Analysis based on Video Analytics and Deep Learning** as a part of *15th IEEE International Conference on Advanced Video and Signal-based Surveillance (**AVSS'18**)*, 27-30 November 2018, Auckland, New Zealand (Other Workshop Coordinator: Dr. Maheshkumar H. Kolekar, IIT Patna).

30. Selection Committee member for **Department of Computer Science and Engineering, NIT Delhi**, 13th December 2018.

31. One of the Course coordinators in **Winter Course on Artificial Intelligence and Machine Learning**, E&ICT Academy course through NKN, IIT Roorkee, IIT Guwahati, IIITDM Jabalpur, NIT Patna and MNIT Jaipur with 943 participants during December 17-21, 2018 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

32. Represented IIT Roorkee in a high level meeting in the **Ministry of Home Affairs (Internal Security - I Division), New Delhi** to discuss about the high-tech products required by security agencies of the country, 26th December 2018.

33. Attended Research Advisory Committee Meeting as a member of Electronics and ICT Academy at **IIIT-DM, Jabalpur** on 14th February 2019.

34. Attended Academic Committee Meeting as a special invitee of Electronics and ICT Academy, **IIIT-DM, Jabalpur** on 14th February 2019.

35. One of the Course coordinators in **Digital Image Processing using MATLAB**, E&ICT Academy course, IIT Roorkee, February 18-22, 2019 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

36. Acted as a Single Point of Contact (SPOC) and conducted Grand Finale of **Smart India Hackathon, Software Edition** at the nodal Centre, IIT Roorkee where the event happened in 48 centres across the country during March 2-3, 2019.

37. Served as an External Expert for Thesis Proposal Seminar of a PhD student at **IIT Ropar** on 8th March 2019 (through Skype).

38. One of the Course coordinators in **Image Processing using VLSI Architectures**, E&ICT Academy course, IIT Roorkee, March 26-30, 2019 (other Course coordinators: Dr. Brajesh Kumar Kaushik and Dr. Partha Pratim Roy, IIT Roorkee).

39. Attended Purchase Committee Meeting, **IIIT Una** on 4th May 2019 (through Skype).

40. Invited as one of the experts to review the internal multidisciplinary UAY & IMPRINT projects at **IIT Delhi** on 9th May 2019.

41. Attended Research Advisory Committee meeting of a PhD student at **NIT Delhi** on 16th May 2019.

42. One of the Course coordinators in **Summer Course on Deep Learning and Applications**, E&ICT Academy course through NKN, IIT Roorkee, IIT Guwahati, IIITDM Jabalpur, NIT Patna and MNIT Jaipur with 1300 participants during May 27-31, 2019 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

43. Served as one of the committee members for the academic audit in the Department of Computer Science and Engineering at **VNIT Nagpur** on 19th July 2019.

44. One of the Course coordinators in **Deep Learning and its Applications**, E&ICT Academy course, IIT Roorkee, August 20-24, 2019 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

45. One of the Course coordinators in **Machine Learning and Data Analytics using Python**, E&ICT Academy course, IIT Roorkee, September 09-13, 2019 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

46. Selection Committee member for Department of Computer Science and Engineering, **NITTR Chandigarh**, 11th September 2019.

47. Served as one of the experts to evaluate the work done by **INSPIRE Fellows** in the broad subject area of Engineering Sciences, **Department of Science and Technology** held at Chandigarh University, Punjab, 19th September 2019.

48. Special Invitee for 6th Empowerment and Equity Opportunities for Excellence in Science (EMEQ) Task Force Committee Meeting, **SERB, New Delhi** to evaluate project proposals in Electronics and Computer Engineering disciplines, JW Marriott, Aerocity, New Delhi, September 27-28, 2019.

49. **Program Chair, Fourth International Conference on Computer Vision and Image Processing (CVIP 2019), MNIT Jaipur, September 27-29, 2019.**

50. Selection Committee member for Department of Computer Science and Engineering, **NITTR Chandigarh**, 14th October 2019.

51. Participated and delivered a talk on "Indian Academic Perspective: Big Data" in IC7: Deep dive Workshop on Low carbon Affordable Heating and Cooling of Buildings, **Department of Science and Technology** held at **IIT Delhi**, 6th November 2019.

52. Served as an External Expert in a Research Progress Committee (RPC) of a PhD student at **NIT Uttarakhand** on 19th December 2019 (through Skype).

53. One of the Course coordinators in **Winter Course on Artificial Intelligence and Machine Learning**, E&ICT Academy course through NKN, IIT Roorkee, IIITDM Jabalpur, NIT Patna and MNIT Jaipur with 1800 participants during December 23-27, 2019 (other Course coordinator: Dr. Partha Pratim Roy, IIT Roorkee).

54. Selection Committee member for DST Centre for Interdisciplinary Mathematical Sciences, Institute of Science, **Banaras Hindu University**, Varanasi, 14th January 2020.

55. Served as one of the experts in the Project Review and Steering Group (PRSG) committee to evaluate the progress of the project, implemented by C-DAC Noida and IIT Jodhpur in the **Ministry of Electronics & Information Technology (MeitY)**, New Delhi on 16th January 2020.

56. External member in the Selection board of Recruitment & Assessment Centre of **Defence Research & Development Organisation (DRDO), Delhi** for selection of entry level Scientists, held on 3rd February 2020 and 6th February 2020.

57. External member in the Selection board of Recruitment & Assessment Centre of **Defence Research & Development Organisation (DRDO), Delhi** for selection of Scientists D and E, held during March 3-4, 2020.

58. Course coordinator in **Online Short Course/FDP on Machine Learning and Data Analytics with Python**, E&ICT Academy course through Zoom, IIT Roorkee, April 15-22, 2020.

59. Course coordinator in **Online Short Course/FDP on Machine Learning and Data Analytics with Python**, E&ICT Academy course through Zoom, IIT Roorkee, April 23 - May 01, 2020.

60. Course coordinator in **Machine Learning and AI using Python**, Batch I, E&ICT Academy course through Zoom, IIT Roorkee, April 27 - May 06, 2020.

61. Course coordinator in **Machine Learning and Data Analytics using Python**, E&ICT Academy course through Zoom, IIT Roorkee, April 27 - May 04, 2020.

62. Course coordinator in **Machine Learning and AI using Python**, Batch II, E&ICT Academy course through Zoom, IIT Roorkee, April 27 - May 06, 2020.

63. Course coordinator in **Machine Learning and AI using Python**, E&ICT Academy course through Zoom, IIT Roorkee, May 04-13, 2020.

64. Course coordinator in **Machine Learning and its Applications**, E&ICT Academy course through Zoom, IIT Roorkee, May 04-12, 2020.

65. Course coordinator in **Machine Learning and Data Analytics using Python**, E&ICT Academy course through Zoom, IIT Roorkee, May 05-13, 2020.

66. Course coordinator in **Machine Learning and its Applications**, E&ICT Academy course through Zoom, IIT Roorkee, May 05-14, 2020.

67. Course coordinator in **Machine Learning and Data Analytics using Python**, E&ICT Academy course through Zoom, IIT Roorkee, May 06-14, 2020.

68. Served as an External Expert for Thesis Proposal Seminar of two PhD students at **IIT Ropar** during 11-12 June, 2020 (through Google Meet).

69. Served as an External Expert for State of Art Seminar of a PhD student at **IIIT Allahabad** on 16th June, 2020 (through Google Meet).

70. Course coordinator in **Machine Learning and IOT with AWS**, E&ICT Academy course through Zoom, IIT Roorkee, June 23 - July 2, 2020.

71. Course coordinator in **Machine Learning with Python**, E&ICT Academy course through Zoom, IIT Roorkee, June 25 - July 8, 2020.

72. Served as an External Expert for a Seminar of a PhD student at **IIIT Sri City, Chittoor** on 29th June, 2020 (through Google Meet).

73. Course coordinator in **Data Science using Python**, E&ICT Academy course through Zoom, IIT Roorkee, July 09 - 22, 2020.

74. Selection Committee member for **Department of Computer Science and Engineering, NIT Delhi**, 15th July 2020 (through Google meet).

75. External member in the Selection board of Recruitment & Assessment Centre of **Defence Research & Development Organisation (DRDO), Delhi** for selection of Scientists F of various labs (ADA, CAIR, DEAL, DLRL, CABS, ARDE, DARE, DEBEL, DRDL and GTRE) held during August 3-5, 2020 (through Narad Video Conferencing).

76. One of the panel experts on one week online FDP **Exemplary Practices in Teaching-Learning and Evaluation of Courses in Computer Science & Information Technology**, held at IIIT Allahabad, 3-7 August, 2020 (through Google Meet).

77. Served as an External Expert for M.Tech Thesis evaluation at **IIITDM Jabalpur** on 7th August 2020 (through Zoom).

78. Course coordinator in **Data Analytics and Machine Learning using Python**, E&ICT Academy course through Microsoft Team, IIT Roorkee, August 12 - 25, 2020.

79. Course coordinator in **Data Science using Python**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, August 17 - 30, 2020.

80. Member of 7th Empowerment and Equity Opportunities for Excellence in Science (EMEQ) Task Force Committee Meeting, **SERB, New Delhi** to evaluate project proposals in Electronics and Computer Engineering disciplines, New Delhi, August 17-25, 2020 (through Lifesize Video Conference System).

81. Chairman of the first Project Review Group (PRG) meeting for an R&D project entitled "A web browser based intelligent kernel tool for automatic detection and blocking of obscene image and video contents in real time", is being executed by IIIT Allahabad under the Cyber Crime Prevention against women and Children, **Ministry of Home Affairs, Bureau of police Research & Development**, New Delhi, August 24, 2020.

82. External expert of a committee for the selection of project proposals under the TIIC-TIED 2.0 Entrepreneur-in-Residence (EiR) and Minimum Viable Product (MVP)/Proof of Concept (PoC) scheme, **IIITM Gwalior** during September 14-15, 2020.

83. Participated in Vaishwik Bharatiya Vaigyanik (VAIBHAV) Summit as a panel expert in the areas of Video Analytics, ML and AI in Medical Imaging held during October 2-31, 2020.

84. Course coordinator in **Data Analytics and Machine Learning using Python**, E&ICT Academy course through Zoom, IIT Roorkee, October 05-19, 2020

85. Served as one of the experts in the Project Review and Steering Group (PRSG) committee to evaluate the progress of the project, implemented by C-DAC Noida and IIT Jodhpur in the **Ministry of Electronics & Information Technology (MeitY)**, New Delhi on 14th October 2020.

86. Course coordinator in **Data Science using Python**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, October 28 - November 10, 2020.

87. Participated as an expert in a Brain-Storming Session on the development of two new programs (1) Bachelor of Engineering Science and Technology and (2) Bachelor of Engineering Management and Technology at IIIT Allahabad on 30/10/2020.

88. Chairman of the second Project Review Group (PRG) for an R&D project entitled "A web browser based intelligent kernel tool for automatic detection and blocking of obscene image and video contents in real time", is being executed by IIIT Allahabad under the Cyber Crime Prevention against women and Children, **Ministry of Home Affairs, Bureau of police Research & Development**, New Delhi, 12th November, 2020.

89. Served as an External Expert for a Seminar of a PhD student at **IIIT Sri City, Chittoor** on 18th November, 2020 (through Google Meet).

90. **General Co-Chair, Fifth International Conference on Computer Vision and Image Processing (CVIP 2020), IIIT Allahabad, December 04-06, 2020.**

91. Selection Committee member for **Department of Computer Science and Engineering, IIITDM Kancheepuram**, 11th December 2020 (through Google meet).

92. Special invitee for the senate of **IIIT Allahabad**, 12th December 2020 (through Google meet).

93. Course coordinator in **Workshop on Computer Vision and Image Processing**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, December 14-24, 2020.

94. Conducted a TEQIP course on Image Processing using VLSI Architectures in the Department of Computer Science and Engineering at **IIT Roorkee**, during 17-21 December 2020.

95. Course coordinator in **Data Science using Python**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, January 04-17, 2021.

96. Course coordinator in **Machine Learning using Python**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, Jan. 19 - Feb. 01, 2021.

97. Course coordinator in **Advanced Data Science using Python**, E&ICT Academy course through Microsoft Teams, IIT Roorkee, February 02-15, 2021.

98. Selection Committee member for **Department of Computer Science and Engineering, NITTR Chandigarh**, 17th February 2021 (through Google meet).

99. Attended a Ph D Thesis colloquium as a possible PhD thesis Examiner in the Department of Electrical Engineering at **IISC Bangalore** on 26th April 2021.

100. Course coordinator in **Machine Learning & Data Science using Python**, E&ICT Academy course through Zoom, IIT Roorkee, June 02-15, 2021.

ADMINISTRATIVE RESPONSIBILITIES (DEPARTMENT AND INSTITUTE)

1. Deputy Superintend of Examinations, Nov. 2004.

2. Department Research Committee (DRC) Member, 2006-08, 2012-13 (Dept. of Mathematics), 2013-15 (Dept. of Computer Science and Engineering)

3. Academic Programme Committee (DRC (APC), MCA Programme) Member, 2006 to 2015.

4. Secretary, Department Faculty Board (DFB), January 2007 - June 2009.

5. Course Coordinator, MCA II year, 2007-08, 2009-10, 2010-11 and 2011-12.

6. Course Coordinator, MCA I year, 2008-09, 2011-12, 2012-13 and 2013-14.

7. Department Academic Committee Member (Formerly Under Graduate Committee), 2008-10 and 2010-12.

8. Deputy Coordinator, Mathematics I (MA 101), B. Tech, 2007-08, 2009-10.

9. Coordinator, Summer Term Course Mathematics I (MA 101), B. Tech, 2007-08.

10. O.C. Garden, Dept. of Mathematics, IIT Roorkee, July 2009 to April 2012.

11. Faculty Advisor, Cognizance 2010 and 2011 (Technical Festival), Dept. of Mathematics, IIT Roorkee.

12. Joint Secretary, IEEE Uttrakhand Subsection, July 2010 to March 2013.

13. Member, Board of SRIC, IIT Roorkee, March 2011 to December 2016.

14. Chairman, Department Website Committee, IIT Roorkee, March 2011 to September 2013.

15. Coordinator, Summer Term Course Computer Systems and Programming (EC-101 A), B.Tech 2010-11 and 2011-12.

16. Coordinator, MCA III year, Industrial Project, IIT Roorkee, 2011-12.

17. Department FIST, DST committee member, IIT Roorkee, 2011-12

18. O.C. Training and Placement, Dept. of Mathematics, IIT Roorkee, April 2012 to Sep 2013.

19. Department Anti Ragging Committee member, IIT Roorkee, 2012-13.

20. Presiding Officer, SAC Elections, Azad Bhawan, IIT Roorkee, 2012-13.

21. Institute Strategy Committee member, IIT Roorkee, January 2013 to December 2016.

22. Course Coordinator, M.Sc Final year, IIT Roorkee, 2012-13.

23. Secretary, IEEE Uttrakhand Subsection, March 2013 to January 2018.

24. Course Coordinator, MCA III year, 2012-13

25. Institute Research Committee member, Department of Computer Science and Engineering, October 2013 to October 2015.

26. Faculty Coordinator, CodeChef, IIT Roorkee Chapter.

27. Faculty Coordinator, B. Tech II Year, 2014-15.

28. Institute Panel of Chairpersons for Screening and Selection committees for the recruitment of Project/Research staff under Sponsored Research and Consultancy Projects, January 2015 to December 2015.

29. **Head, Institute Computer Centre, IIT Roorkee, February 2015 to March 2020**

30. Chairman, Department Purchase Committee, February 2015.

31. O.C. Seminar, Dept. of Computer Science and Engineering, IIT Roorkee, February 2015 to January 2017.

32. **Faculty In-charge, Communications, IIT Roorkee, May 2016 onwards**

33. Chairman, Department Research Committee, October 2016 to October 2018.

34. O.C. Research Scholar, Department Research Committee, November 2016 to May 2018.

NAMES OF REFEREES

- Prof. Kidiyo KPALMA, Professor at EII / IETR-INSA - UMR CNRS 6164, Charg de mission for International Affairs - African Area, Dpartement Image/IETR/UMR 6164, Institut National Des Sciences Appliquees Rennes, 20, av. des Buttes de Cosmes, 35708 Rennes, Cedex 7, FRANCE, email: Kidiyo.Kpalma@insa-rennes.fr

- Prof. Phalguni Gupta, Department of Computer Science & Engineering, Indian Institute of Technology Kanpur, Kanpur 208 016, INDIA, email: pg@cse.iitk.ac.in

- Prof. C. Chandra Sekhar, Head, Department of Computer Science and Engineering, Indian Institute of Technology Madras, Chennai - 600 036, INDIA, email: chandra@cse.iitm.ac.in