



भारतीय प्रौद्योगिकी संस्थान भुवनेश्वर

Indian Institute of Technology Bhubaneswar

Personal Profile of Dr. Debi Prosad Dogra



Dr. Debi Prosad Dogra

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Courses Taught

Spring 2017: Computational Geometry, Operating Systems, Autumn 2016: Computer Organization and Architecture;

Research Interests

Visual Surveillance; Augmented Reality; Human Computer Interface

Degree	Discipline	Year	School
Ph. D.	Computer Science & Engineering	2012	IIT Kharagpur
M.Tech.	Computer Science & Engineering	2003	IIT Kanpur
B.Tech.	Computer Science & Engineering	2001	Haldia Institute of Technology

Recent Publications (International Journals)

- P. Kumar, H. Gauba, P. P. Roy, **D. P. Dogra**. Coupled HMM-based Multi-Sensor Data Fusion for Sign Language Recognition, **Pattern Recognition Letters**, 86(15):1-8, 2017.
- P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. 3D Text Segmentation and Recognition using Leap Motion, **Multimedia Tools and Applications**, DOI:10.1007/s11042-016-3923-z, 2016.
- P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. Study of Text Segmentation and Recognition using Leap Motion Sensor, **IEEE Sensors Journal**, DOI:10.1109/JSEN.2016.2643165, 2016.
- P. Kumar, H. Gauba, P. P. Roy, **D. P. Dogra**. A Multimodal Framework for Sensor based Sign Language Recognition, **Neurocomputing** (Accepted), 2016.
- A. Ahmed, **D. P. Dogra**, B. G. Kim, P. Hill, S. Kar, H. Bhaskar. Localization of region of interest in surveillance scene, **Multimedia Tools and Applications**, DOI: 10.1007/s11042-016-3762-y, 2016.
- N. Paul, A. Singh, A. Midya, P. P. Roy, **D. P. Dogra**. Moving Object Detection using Modified Temporal Differencing and Local Fuzzy Thresholding, **Journal of Supercomputing**, DOI:10.1007/s11227-016-1815-7, 2016.
- A. Sikdar, S. K. Behera, **D. P. Dogra**. Computer Vision Guided Pulse Rate Estimation: A Review, **IEEE Reviews in Biomedical Engineering**, 9(1):1-15, December 2016.
- K. M. Vamsikrishna, **D. P. Dogra**, M. S. Desarkar. Computer Vision Assisted Palm Rehabilitation With Supervised Learning, **IEEE Transactions on Biomedical Engineering**, 63(5):991-1001, 2016.
- H. Bhaskar, K. Dwivedi, **D. P. Dogra**, M. Al-Mualla, L. Mihaylova. Autonomous Detection and Tracking under Illumination Changes, Occlusions and Moving Camera, **Signal Processing**, 117:343-354, 2015.
- D. P. Dogra**, A. Ahmed, H. Bhaskar. Smart Video Summarization using Mealy Machine based Trajectory Modelling, **Multimedia Tools Applications**, 75(11):6373-6401, 2016.
- D. P. Dogra**, B. Vishal, A. K. Majumdar, S. Sural, J. Mukhopadhyay, S. Mukherjee, and A. Singh. Kalman Filter Based Multi Path Tracking Algorithm for Video Object Tracking with Application to Infant Neurological Examinations. **Medical & Biological Engineering & Computing**, 52(9):759-772, 2014.
- D. P. Dogra**, A. K. Majumdar, S. Sural, J. Mukhopadhyay, S. Mukherjee, and A. Singh. Analysis of Adductors Angle Measurement in Hammersmith Infant Neurological Examinations using Mean Shift Segmentation and Feature Point based Object Tracking. **Computers in Biology and Medicine**, 42(9):925-934, 2012.
- D. P. Dogra**, A. K. Majumdar, S. Sural, J. Mukhopadhyay, S. Mukherjee, and A. Singh. Toward Automating Hammersmith Pulled-To-Sit Examination of Infants using Feature Point based Video Object Tracking. **IEEE Transactions on Neural Systems and Rehabilitation Engineering**, 20(1):38-47, 2012.
- D. P. Dogra**, A. K. Majumdar, and S. Sural. Evaluation of Segmentation Techniques Using Region Area and Boundary Matching Information. **Visual Communication and Image Representation** 23(1):150-160, 2012.

D. P. Dogra, K. Nandam, A. K. Majumdar, S. Sural, J. Mukhopadhyay, B. Majumdar, S. Mukherjee, and A. Singh. A Tool for Automatic Hammersmith Infant Neurological Examination. **E-Health and Medical Communications**, 2(2):1-13,2011.

Conferences (International)

Prasanjith Dey, **Debi Prosad Dogra**, Partha Pratim Roy, Harish Bhaskar. Autonomous vision-guided approach for the analysis and grading of vertical suspension tests during HINE, 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Orlando, FL, 17-20 August 2016 (Accepted).

S. Bhoi, **D. P. Dogra**, P. Roy. On-line Gesture Based User Authentication System Robust to Shoulder Surfing, International Conference on Computer Vision & Image Processing, IIT Roorkee, 26-28 February, 2016.

A. Fatir, P. Roy, **D. P. Dogra**. Posture Recognition in HINE Exercises, International Conference on Computer Vision & Image Processing IIT Roorkee, 26-28 February, 2016.

R. Saini, A. Ahmed, **D. P. Dogra**, P. Roy. Classification of Object Trajectories Represented by High-level Features using Unsupervised Learning, International Conference on Computer Vision & Image Processing, IIT Roorkee, 26-28 February, 2016.

R. Saini, A. Ahmed, **D. P. Dogra**, P. Roy. Surveillance Scene Segmentation Based on Trajectory Classification Using Supervised Learning, International Conference on Computer Vision & Image Processing, IIT Roorkee, 26-28 February, 2016.

K. M. Vamsikrishna, **D. P. Dogra**, H. Bhaskar. Classification of Head Movement Patterns to Aid Patients Undergoing Home-based Cervical Spine Rehabilitation, IEEE ICASSP, Shanghai, March 20-25, 2016.

C. Agarwal, **D. P. Dogra**, R. Saini, P. P. Roy. Segmentation and Recognition of Text Written in 3D using leap Motion Interface, 3rd Asian Conference on Pattern Recognition, Kuala Lumpur, Malaysia, 3-6 Nov, 2015.

A. Sikdar, S. K. Behera, **D. P. Dogra**, H. Bhaskar. Contactless Vision-based Pulse Rate Detection of Infants under Neurological Examinations, 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pp. 650-653, Milan, Italy, August 25-29, 2015.

D. P. Dogra, A. Ahmed, H. Bhaskar. Interest Area Localization using Trajectory Analysis in Surveillance Scenes. 10th International Conference on Computer Vision Theory and Applications (VISAPP), pp.31-38, Berlin, March 2015.

D. P. Dogra, R. D. Reddy, K.S. Subramanyam, A. Ahmed, H. Bhaskar. Scene Representation and Anomalous Activity Detection using Weighted Region Association Graph, 10th International Conference on Computer Vision Theory and Applications (VISAPP), pp.17-25, Berlin, March 2015.

D. P. Dogra, A. K. Majumdar, S. Sural, J. Mukhopadhyay, S. Mukherjee, A. Singh. Automatic Adductors Angle Measurement for Neurological Assessment of Post-neonatal Infants during Follow Up. In: LNCS Proceedings of the 4th International Conference on Pattern Recognition and Machine Intelligence, Moscow, vol. 6744, pp. 160-166, 2011.

S. Roy, **D. P. Dogra**, S. Bhattacharya, B. Saha, A. Biswas, A. K. Majumdar, J. Mukhopadhyay, B. Majumdar, A. Singh, A. Paria, S. Mukherjee. A Web Enabled Health Information System for Neonatal Intensive Care Unit (NICU). In: Proceedings of the 7th IEEE World Congress on Services (SERVICES), Washington, pp. 451-458, 2011.

D. P. Dogra, S. Sinha, A. K. Majumdar, S. Sural, J. Mukhopadhyay, B. Majumdar, S. Mukherjee, A. Singh. Automatic Posture Estimation for Hammersmith Infant Neurological Examination. In: Proceedings of the International Symposium on Medical Imaging-Perspectives on Perception and Diagnostics Organized in Conjunction with the Seventh Indian Conference on Computer Vision, Graphics and Image Processing, IIT Delhi, MA-202, 2010.

D. Patra, J. Mukhopadhyay, A. K. Majumdar, B. Majumdar, **D. P. Dogra**. Tele-consultation using Clinical Document Architecture in Disease Specific Domains. In: IEEE Proceedings of the 12th International Conference on E-Health Networking, Application and Services (Healthcom), Lyon, France, pp. 187-194, 2010.

D. P. Dogra, K. Nandam, A. K. Majumdar, S. Sural, J. Mukhopadhyay, B. Majumdar, S. Mukherjee, A. Singh. A User Friendly Implementation for Efficiently Conducting Hammersmith Infant Neurological Examination. In: IEEE Proceedings of the 12th International Conference on E-Health Networking, Application and Services (Healthcom), Lyon, France, pp.374-378, 2010.

D. P. Dogra, A. K. Majumdar, S. Sural. Evaluation of Segmentation Techniques Using Region Size and Boundary Information. In: LNCS Proceedings of the 3rd International Conference on Pattern Recognition and Machine Intelligence (PReMI), IIT Delhi, vol. 5909, pp. 285-290,2009.

D. P. Dogra, K. Tripathy, A. K. Majumdar, S. Sural. A Comparative Study on Texture Features Used for Segmentation of Images Rich in Texture. In: IEEE Proceedings of the International Conference on Signal and Image Processing Applications (ICSIPA), Kuala Lumpur, pp. 336-339, 2009.

D. P. Dogra. A Hidden Markov Model Based Approach for Telephonic Digit Recognition. In: Proceedings of the CSI International Conference on Emerging Applications of IT (EAIT), Science City, Kolkata, pp. 287-290, 2006.

Conferences (National)

S. Bhoi, **D. P. Dogra**, P. P. Roy. Handwritten Text Recognition In Odia Script Using Hidden Markov Model, 5th National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), IIT Patna, 16-19 Dec, 2015.

S. Bhattacharya, A. Roy, **D. P. Dogra**, A. Biswas, J. Mukhopadhyay, A. K. Majumdar, B. Majumdar, S. Mukherjee, A. Singh. Summarization of Neonatal Video EEG for Seizure and Artifact Detection. Third National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), pp. 134-137, November 2011.

D. P. Dogra, A. K. Majumdar, S. Sural. Detection of Object Pick Up and Drop Off by Humans in Video Surveillance Applications. In: Proceedings of the National Seminar on Image Classification and Pattern Recognition (NSICPR), Vidyasagar University, 2009.

D. P. Dogra, H. Karmakar. Real-time Uncompressed Voice Transmission Through High Speed LAN. In: Proceedings of the National Conference on Applications of Advanced Technology in Networking, The Golden Retreat, Haldia, 2005.

Journal Editors

- Guest Editor, Multimedia Tools and Applications, Special Issue on "Emerging Multimedia Technology for Multimedia-centric Internet of Things" (Deadline: Dec. 31, 2016).

- Co-Guest Editor, Sensors, Special Issue on "[Scalable Localization in Wireless Sensor Networks](#)".
- Guest Editor, International Journal of Distributed Sensor Networks, Special Issue on "[Data Mining Techniques based on WSNs](#)", (Deadline: Dec. 30, 2016).

Projects Undertaken

- Analysis and Implementation of Nonchronological Video Synopsis and Indexing, Funding Agency: Korea Institute of Science and Technology (KIST) and IKST, Type: **CONSULTANCY PROJECT**, Budget: INR 1,500,000.00, Status: **On-going**, Duration: September 2016-August 2017 (**Principal Investigator**).
- Computer vision guided mass gathering surveillance using crowd flow analysis, Funding Agency: Department of Science and Technology, Govt. of India, Type: Young Scientist Start-up Research Grant (**RESEARCH PROJECT**), Budget: INR 22,55,000.00, Status: **On-going**, Duration: January 2016-December-2018 (**Principal Investigator**).
- Video Analytics Algorithms to Detect Unusual Behavior in Crowds and Traffic, Funding Agency: OutDu Mediatech Private Limited, Bangalore Type: **CONSULTANCY PROJECT**, Budget: INR 750,000.00, Status: **On-going**, Duration: June 2016 - September 2016 (**Principal Investigator**).
- C/C++ implementation with adequate GUI for sparsity based abnormal event detection, Funding Agency: Korea Institute of Science and Technology (KIST) and IKST, Type: **CONSULTANCY PROJECT**, Budget: INR 700,000.00, Status: **Completed**, Duration: February 2016-June 2016 (**Principal Investigator**).
- C/C++ implementation with adequate GUI for temporal analysis of motif mixtures using Dirichlet processes, Funding Agency: Korea Institute of Science and Technology (KIST) and IKST, Type: **CONSULTANCY PROJECT**, Budget: INR 800,000.00, Status: **Completed**, Duration: February 2016 - June 2016 (**Principal Investigator**).
- Development of a Computer Vision Assisted System to Facilitate Full Body Rehabilitation, Funding Agency: IIT Bhubaneswar, Type: Start-up Research Grant (**RESEARCH PROJECT**), Budget: INR 9,70,000.00, Status: **Completed**, Duration: 01-07-2014 to 30-06-2016 (**Principal Investigator**).

Patents Granted / Filed

- Badrinath Gurappa Srinivas, Shashi Bhanwar, Shefali Singhal, **Debi Prosad Dogra**, Saurabh Tyagi, Authentication using multi-tier multi-class objects, **US 8,997,215 B2**.
- **Debi Prosad Dogra** and Saurabh Tyagi, Multi-Path Analysis based Trajectory Estimation of Moving Objects in Videos, **US 9,147,261 B2**.
- **Debi Prosad Dogra** and Saurabh Tyagi, Method and system for gesture recognition, India Application No. 2866/DEL/2012, and US Application No. US 14/024,215.
- **Debi Prosad Dogra**, Trilochan Verma and Saurabh Tyagi, Method and system for Augmented Reality based Smart Classroom Environment, India Application No. 3116/DEL/2012, and US Application No: US 14/047,921.
- **Debi Prosad Dogra** and Saurabh Tyagi, Computer Vision Based Depth Estimation Using Smart Phone, India Application No. 3693/DEL/2012.
- Byung-Gyu KIM, **Debi Prosad Dogra**, Chang-Sik Cho, Inter Mode Determination Method for Video Encoder, US Application No. US 12/056,922.

Books and Chapters

- **D. P. Dogra** (2015). Visual Attention Guided Object Detection and Tracking. In R. Pal (Eds.), Innovative Research in Attention Modeling and Computer Vision Applications (pp. 100-115), IGI Global, Hershey, PA.

Professional Experience

- **Group Leader / Development Manager:** Advanced Technology Group, Samsung Research Institute Noida, India (22-Nov-2011 to 23-Nov-2013)
- **Researcher:** Multimedia Research Team, Electronics and Telecommunication Research Institute, Daejeon, South Korea (1-Nov-2006 to 13-Apr-2007)
- **Lecturer:** Department of Computer Science & Engineering, Haldia Institute of Technology, Haldia, India (2-June-2003 to 30-June-2006)

Papers Under Review

- A. Singla, P. P. Roy, **D. P. Dogra**. Retrieval and Rendering of Shapes by Recognizing Natural Hand Gestures using Leap Motion Interface. IEEE Transactions on Visualization and Computer Graphics (Revision Submitted).
- M. Yadava, P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. Analysis of EEG Signals and Its Application to Neuromarketing, Multimedia Tools and Applications (Revision Submitted).
- S. K. Behera, **D. P. Dogra**, P. Roy. Fast Recognition and Verification of 3D Air Signatures Using Convex Hull, IEEE Transactions on Cybernetics (Revision Submitted).
- P. Kumar, H. Gauba, P. Singh, P. P. Roy, B. Raman, **D. P. Dogra**. Prediction of Advertisement Preference by Fusing EEG Response and Sentiment Analysis, Neural Networks (Revision Submitted).
- P. Kumar, A. Singhal, R. Saini, P. P. Roy, **D. P. Dogra**. A Pervasive Authentication System for Cloud Environment using EEG Signals, Multimedia Tools and Applications (Revision Submitted).
- P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. A Bio-Signal based Framework to Secure Mobile Devices, Journal of Network and Computer Applications (Revision Submitted)
- P. Kumar, P. Poojary, P. P. Roy, **D. P. Dogra**. Independent Bayesian Classifier Combination based Sign Language Recognition using Facial Expression, Information Sciences (Revision Submitted).
- S. K. Behera, **D. P. Dogra**, P. P. Roy. Analysis of 3D Signatures Recorded Using Leap Motion Sensor, Multimedia Tools and Applications (Submitted).
- A. Fatir, P. P. Roy, **D. P. Dogra**. Exercise Classification and Event Segmentation in HINE Videos, Machine Vision and Applications (Submitted).
- P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. A Position and Rotation Invariant Framework for Sign Language Recognition (SLR) using Kinect, Multimedia Tools and Applications (Submitted).
- A. Ahmed, **D. P. Dogra**, S. Kar, P. P. Roy. Unsupervised Classification of Erroneous Video Object Trajectories, Soft Computing (Submitted).
- P. Kumar, R. Saini, P. P. Roy, **D. P. Dogra**. A Novel Framework of Continuous Human-Activity Recognition using Kinect, Neurocomputing (Submitted).
- K K Santhosh, **D. P. Dogra**, P. Roy. Temporal Unknown Incremental Clustering (TUIC) Model and Tracking Framework for Analysis of Traffic Surveillance Videos, IEEE Transactions on Intelligent Transportation Systems (Submitted).

- M. Chebiyyam, R. Reddy, **D. P. Dogra**, H. Bhaskar, M. Mihaylova. Learning-based Motion Anomaly Detection and Trajectory Analysis for Visual Big Data Analytics in Surveillance, (Under Revision).
- R. Saini, P. P. Roy, **D. P. Dogra**. A Novel Feature based on Point-Line Duality for Trajectory Classification (Under Revision).
- R. Saini, P. P. Roy, **D. P. Dogra**. Trajectory Classification using Segmental HMM (Under Revision).