Soumyabrata DEV

Contact Information

The ADAPT Centre
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Executive Statement

I am a researcher with interests in image processing, machine learning, and deep learning. Most specifically, I use these expertise in solving problems related to consumer digital media, remote sensing, earth sciences, solar and renewable energy.

Current Affiliation

University College Dublin, Ireland August 2019 – till date
Assistant Professor in Computer Science

- Leading our research group THEIA: THE visIon and Analytics lab, in the area of computer vision, image processing, and remote sensing.
- Teaching courses in distributed systems, network security, and agile methodology.

Education

Nanyang Technological University (NTU) Singapore 2012 – 2017
Ph.D. in Electrical & Electronic Engineering
Thesis: 2D and 3D Image Analysis and Its Application to Sky/Cloud Imaging
CGPA: 4.08/5.0

National Institute of Technology Silchar, India 2006 – 2010
Bachelor of Technology in Electronics & Communication Engineering
Graduated *summa cum laude* with highest honors and ranked 1 in class of 70
CGPA: 9.43/10.0

Experience

ADAPT Centre, Trinity College Dublin July 2017 – July 2019
Postdoctoral Researcher
Worked with Prof. François Pitié and Declan McKibben, in industry-affiliated research projects of Huawei Ireland Research Centre.

- Developed state-of-the-art techniques for effective image- and video- analysis in consumer advertisement videos.
- Published our findings in leading conferences.

National College of Ireland, Dublin August 2018 – August 2019
Associate Faculty in Computing

- Lectured courses in programming and data analytics.
- Supervised students for their Master of Science research projects.

Nanyang Technological University Singapore Singapore, Singapore
PhD Student July 2012 – July 2017
Worked with Prof. Lee Yee Hui, NTU Singapore and Dr. Stefan Winkler, Principal Scientist, Advanced Digital Sciences Center (ADSC).

- Developed state-of-the-art image segmentation and image classification algorithms for cloud image analysis and earth observations.
- Created and released first large-scale cloud image datasets with manually annotated labels to the community.
- Published our findings in top-tier journals and conferences.

École polytechnique fédérale de Lausanne Lausanne, Switzerland
Visiting Student July 2015 – December 2015
Worked with Prof. Martin Vetterli and Dr. Adam Scholefield during this exchange term.
- Devised algorithms with theoretical bounds for point localization in multi-camera setups with noisy camera poses.
- Provided a rigorous analysis of such localization problems in the task of cloud-base height reconstruction using ground-based sky cameras.

Ericsson India Gurgaon, India
Engineer - Network Consulting July 2010 – July 2012
- Provided 2G frequency planning and optimization for metropolitan cities, and received excellent customer feedback.
- Developed heuristic processes and optimization techniques to streamline the 2G/3G network operations. Developed tool was subsequently included into Ericsson's tools and services portal.

Indian Institute of Science, Bangalore Bangalore, India
Research Intern May 2009 – July 2009
Worked with Prof. Vinod Sharma during this internship period.
- Developed a high performance source-relay assignment scheme, denoted Timer based Adaptive Relay Selection Protocol (TARSeP) that efficiently improves the overall throughput in wireless 802.11 networks.
- Published our results in a journal of related area.

Indian Institute of Technology Guwahati Guwahati, India
Research Intern May 2008 – June 2008
Worked with Prof. Harshal B. Nemade during this internship period.
- Designed a minimum off-time device for protecting refrigerator compressor after a brief power interruption.
- Developed a working prototype of the designed device using off-the-shelf components.

Teaching

National College of Ireland Dublin
Associate Faculty July 2018 – August 2019
- Lectured a course on 'Programming for big data' for Higher Diploma in Science in Data Analytics for the term January 2019 – May 2019.
- Lectured a course on H9PDA: Programming for Data Analytics, for degree in Masters in Cloud Computing for the term August 2018 – December 2018, and June 2019 – August 2019.

Trinity College Dublin, Ireland Dublin
Teaching Assistant January 2019 – till date
- Currently conducting the lab sessions of EEU44C08 Digital Image and Video Processing, for fourth year undergraduates of Trinity College Dublin, for the term January 2019 – May 2019.

NTU Singapore Outreach Team Singapore
Instructor January 2015 – June 2017
- Reached out to pre-tertiary students with a passion for Science and Engineering, and received commendable appreciation from Ministry of Education, Singapore.
- Developed learning programmes (viz. Cantenna workshop & LED Cube workshop) that offered students an opportunity to appreciate STEM field education, under the tutelage of NTU professors and staffs.

NTU Singapore Undergraduate Class Singapore
Peer Tutor 2016 – 2017
Teaching Assistant 2014 – 2016

- Taught the course *EE2008: Data Structures and Algorithms* to 150+ students for Semester 1 AY 2014–15, and Semester 2 AY 2015-16 session.
- Received Best Teaching Award for the course.

Supervision

National College of Ireland Dublin
Supervisor July 2018 – till date

- Supervised 3 students in their Master of Science (MSc) research thesis, in areas of machine learning and data analytics.

Nanyang Technological University Singapore Singapore
Mentor January 2013 – June 2017

- Mentored 14 students in their Final Year Projects (FYPs) and Nanyang Research Program (NRP) projects, in areas of image processing and remote sensing.

Invited Talks

- Invited talk at the IEEE YP Symposium on Impact of Data Science in Healthcare, Dublin, July 2019.
- Invited talk at Machine Learning Dublin meetup to discuss our recent work on deep-learning based advert-creation system, developed in collaboration with Huawei Ireland Research Centre, June 2019.
- Talk on the course 'Inside the Machine: An Introduction to Architecture, Parallelism & its Applications', at University College Dublin, Dublin, Ireland, May 2019.
- Undergraduate research talk on 'Solving Interdisciplinary Problems Using Computer Vision', at Maynooth University, Co. Kildare, February 2019.
- Research talk on 'Computer-Vision Solutions for Sensing Problems', at University of Dundee, Scotland, October 2018.
- Talk on the course 'Inside the Machine: An Introduction to Architecture, Parallelism & Electronics', at Bucknell University, Lewisburg, PA, United States, July 2018.
- Seminar on 'Developing Computer-Vision Solutions for Sensing Problems in Intelligent Systems', at University of Derby, United Kingdom, April 2018.
- Talk on 'Ground-based Image Analysis for Solar Energy Applications' in Machine Learning Dublin meetup at The Innovation Academy TCD, August 2017.

Publications

2019

- S. Manandhar, S. Dev, Y. H. Lee, Y. S. Meng, and S. Winkler, A Data-Driven Approach for Accurate Rainfall Prediction, *IEEE Transactions on Geoscience and Remote Sensing*, 2019.
- F. Orlandi, A. Meehan, M. Hossari, S. Dev, D. O'Sullivan and T. Alskaif, Interlinking Heterogeneous Data for Smart Energy Systems, *International Conference on Smart Energy Systems and Technologies (SEST)*, 2019.
- S. Dev, M. Hossari, M. Nicholson, K. McCabe, A. Nautiyal, C. Conran, J. Tang, W. Xu, and F. Pitié, Localizing Adverts in Outdoor Scenes, *IEEE International Conference on Multimedia & Expo Workshops (ICMEW)*, 2019.
- S. Dev, M. Hossari, M. Nicholson, K. McCabe, A. Nautiyal, C. Conran, J. Tang, W. Xu, and F. Pitié, The ALOS Dataset for Advert Localization in Outdoor Scenes, *Eleventh International Conference on Quality of Multimedia Experience (QoMEX)*, 2019.
- C. S. Nwosu($\star$), S. Dev($\star$), P. Bhardwaj, B. Veeravalli, and C. J. Deepu, Understanding Electronic Health Records for Stroke Prediction, *41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2019 ($\star$ Authors contributed equally).

- T. AlSkaif(⋆), S. Dev(⋆), L. Visser, M. Hossari, and W. van Sark, On the Interdependence and Importance of Meteorological Variables for Photovoltaic Output Power Estimation, *46th IEEE Photovoltaic Specialists Conference (PVSC)*, 2019 (⋆ Authors contributed equally).
- S. Dev, A. Nautiyal, Y. H. Lee, S. Winkler, CloudSegNet: A Deep Network for Nychthemeron Cloud Segmentation, *IEEE Geoscience and Remote Sensing Letters*, 2019.
- S. Dev, M. Hossari, M. Nicholson, K. McCabe, A. Nautiyal, C. Conran, J. Tang, W. Xu, and F. Pitié, The CASE Dataset of Candidate Spaces for Advert Implantation, *International Conference on Machine Vision Applications (MVA)*, 2019.
- S. Dev, S. Manandhar, Y. H. Lee and S. Winkler, Multi-label Cloud Segmentation Using a Deep Network, *IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, 2019.
- S. Manandhar(⋆), S. Dev(⋆), Y. H. Lee and S. Winkler, Predicting GPS-based PWV Measurements Using Exponential Smoothing, *IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, 2019 (⋆ Authors contributed equally).
- M. Hossari, S. Dev and J. D. Kelleher, TEST: A Terminology Extraction System for Technology Related Terms, *11th International Conference on Computer and Automation Engineering (ICCAE)*, 2019.

2018

- M. Hossari(⋆), S. Dev(⋆), M. Nicholson, K. McCabe, A. Nautiyal, C. Conran, J. Tang, W. Xu, and F. Pitié, ADNet: A Deep Network for Detecting Adverts, *26th Irish Conference on Artificial Intelligence and Cognitive Science (AICS)*, 2018 (⋆ Authors contributed equally and arranged alphabetically.).
- A. Nautiyal(⋆), K. McCabe(⋆), M. Hossari(⋆), S. Dev(⋆), M. Nicholson, C. Conran, D. McKibben, J. Tang, X. Wei, and F. Pitié, An Advert Creation System for Next-Gen Publicity, *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECM-PKDD)*, 2018 (⋆ Authors contributed equally and arranged alphabetically.).
- S. Dev(⋆), T. AlSkaif(⋆), M. Hossari, R. Godina, A. Louwen, and W. van Sark, Solar Irradiance Forecasting Using Triple Exponential Smoothing, *International Conference on Smart Energy Systems and Technologies (SEST)*, 2018 (⋆ Authors contributed equally).
- S. Manandhar(⋆), S. Dev(⋆), Y. H. Lee, S. Winkler and Y. S. Meng, Systematic Study of Weather Variables for Rainfall Detection, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018 (⋆ Authors contributed equally).
- S. Manandhar, S. Dev, Y. H. Lee, Y. S. Meng and S. Winkler, A Data-driven Approach to Detect Precipitation from Meteorological Sensor Data, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018.
- F. Pitié, A. Nautiyal, S. Dev, M. Nicholsan, A. Abdelkader, K. McCabe, C. Conran, D. McKibben, An automatic system that identifies and locates the four corners of the advertising space in a video as a cloud service, *Patent Filed*, 2018.
- F. Pitié, A. Nautiyal, S. Dev, M. Nicholsan, A. Abdelkader, K. McCabe, C. Conran, D. McKibben, An algorithm that ranks candidate advertising spaces based on their quality and value, *Patent Filed*, 2018.
- S. Manandhar, Y. H. Lee, Y. S. Meng, F. Yuan and S. Dev, A Potential Low Cost Remote Sensing Using GPS Derived PWV, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2018.
- S. Dev, F. M. Savoy, Y. H. Lee, S. Winkler, High-Dynamic-Range Imaging for Cloud Segmentation, *Atmospheric Measurement Techniques (AMT)*, 2018.
- S. Manandhar(⋆), S. Dev(⋆), Y. H. Lee and Y. S. Meng, Analyzing Solar Irradiance Variation From GPS and Cameras, *IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, 2018 (⋆ Authors contributed equally).

- S. Manandhar, S. Dev, Y. H. Lee and Y. S. Meng, On the Importance of PWV in Detecting Precipitation, *IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, 2018.

2017

- S. Dev, F. M. Savoy, Y. H. Lee, S. Winkler, Rough-set Based Visible Color Channel Selection, *IEEE Geoscience and Remote Sensing Letters*, vol. 14, no. 1, pp. 52-56, 2017.
- S. Dev, Y. H. Lee, S. Winkler, Color-based segmentation of sky/cloud images from ground-based cameras, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 10, no. 1, pp. 231-242, Jan 2017.
- S. Dev, F. M. Savoy, Y. H. Lee and S. Winkler, DIY Sky Imager For Weather Observation: A complete guide to build a ground-based sky imager using off-the-shelf components with automatic cloud coverage computation, *Students' Design Project Series: Sharing Experiences [SP Education], IEEE Signal Processing Magazine*, Jan 2017.
- S. Dev, S. Manandhar, Y. H. Lee and S. Winkler, Study of Clear Sky Models for Singapore, *Proc. Progress In Electromagnetics Research Symposium (PIERS)*, 2017.
- S. Manandhar, S. Dev, Y. H. Lee and Y. S. Meng, Analyzing Cloud Optical Properties Using Sky Cameras, *Proc. Progress In Electromagnetics Research Symposium (PIERS)*, 2017.
- S. Manandhar, S. Dev, Y. H. Lee and Y. S. Meng, Correlating Satellite Cloud Cover with Sky Cameras, *Proc. Progress In Electromagnetics Research Symposium (PIERS)*, 2017.
- S. Dev, F. Savoy, Y. H. Lee and S. Winkler, Nighttime sky/cloud image segmentation, *IEEE International Conference on Image Processing (ICIP)*, 2017.
- F. Savoy, S. Dev, Y. H. Lee and S. Winkler, Stereoscopic Cloud Base Reconstruction Using High-Resolution Whole Sky Imagers, *IEEE International Conference on Image Processing (ICIP)*, 2017.
- S. Dev, S. Manandhar, F. Yuan, Y. H. Lee and S. Winkler, Cloud Radiative Effect Study Using Sky Camera, *IEEE AP-S Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, 2017.

2016

- S. Dev, B. Wen, Y. H. Lee, S. Winkler, Machine Learning Techniques and Applications For Ground-based Image Analysis, *IEEE Geoscience and Remote Sensing Magazine, Special Issue on Advances in Machine Learning for Remote Sensing and Geosciences*, vol. 4, no. 2, pp. 79-93, June 2016.
- S. Dev, S. Manandhar, Y. H. Lee and S. Winkler, Detecting rainfall onset using sky images, *TENCON 2016 - 2016 IEEE Region 10 Conference*, 2016.
- S. Dev, F. M. Savoy, Y. H. Lee and S. Winkler, Short-term prediction of localized cloud motion using ground-based sky imagers, *TENCON 2016 - 2016 IEEE Region 10 Conference*, 2016.
- S. Manandhar, F. Yuan, S. Dev, Y. H. Lee and Y. S. Meng, Weather radar to detect cloud occurence level, *TENCON 2016 - 2016 IEEE Region 10 Conference*, 2016.
- S. Dev, F. M. Savoy, Y. H. Lee, S. Winkler, Estimation of solar irradiance using ground-based whole sky imagers, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2016.
- F. M. Savoy, S. Dev, Y. H. Lee, S. Winkler, Geo-referencing and stereo calibration of ground-based whole sky imagers using the sun trajectory, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2016.
- S. Manandhar, Y. H. Lee, S. Dev, GPS Derived PWV for rainfall monitoring, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2016.

2015

- S. Dev, Y. H. Lee, S. Winkler, Categorization of Cloud Image Patches Using an Improved Texton-based Approach, *IEEE International Conference on Image Processing (ICIP)*, 2015.
- S. Dev, Y. H. Lee, S. Winkler, Multi-level Semantic Labeling of sky/cloud images, *IEEE International Conference on Image Processing (ICIP)*, 2015.
- S. Dev, F. M. Savoy, Y. H. Lee, S. Winkler, Design of low-cost, compact and weather-proof whole sky imagers for high-dynamic-range captures, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2015.
- F. M. Savoy, S. Dev, Y. H. Lee, S. Winkler, Cloud base height estimation using high-resolution whole sky imagers, *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, 2015.
- S. Dev, A. Ghasemi, M. Vetterli, A. Scholefield, Point localization in Multi-camera system, *Doctoral internship report*, École polytechnique fédérale de Lausanne, Switzerland, 2015.

2014

- S. Dev, Y. H. Lee, S. Winkler, Systematic Study of Color Spaces and Components for the segmentation of sky/cloud images, *IEEE International Conference on Image Processing (ICIP)*, 2014.
- S. Dev, F. M. Savoy, Y. H. Lee, S. Winkler, WAHRSIS: A low-cost, high-resolution whole sky imager with near-infrared capabilities, *Proc. IS&T/SPIE Infrared Imaging Systems: Design, Analysis, Modeling, and Testing*, 2014.

2010

- S. Dev, Z.H. Choudhury, K. L. Baishnab, A. Nag, An efficient heap management technique with Minimum Fragmentation and Auto Compaction, *IEEE International Conference on Industrial and Information Systems*, 2010.

2009

- S. Dev, Nischal S, An efficient partner assignment algorithm for improving the performance of 802.11 WLAN, *International Journal of Recent Trends in Engineering*, vol. 2, no. 6, Nov. 2009, Issue on Electrical and Electronics.
- S. Dev, Z. H. Choudhury, A randomized cryptographic algorithm and its simulation in C and MATLAB, with its hardware implementation in Verilog HDL, *IEEE Conference on Anti-Counterfeiting, Security and Identification*, Aug 2009.

Skills

Languages
Python, MATLAB, Perl.
Technologies
TensorFlow, Keras, LaTeX
Expertise
image processing, machine learning, remote sensing, deep learning.
Media Links
- Github: github.com/Soumyabrata
- Publons: publons.com/author/1307481/soumyabrata-dev
- Google Scholar: scholar.google.com.sg/citations?user=_akXw8IAAAAJ

Organization

Xonkolpo North-East India
Advisor October 2013 – present
- Assisted in floating Xonkolpo: a non-profit initiative, along with other enthusiasts from Assam, India.

- Provided support and guidance, along with application materials for students, particularly from North-Eastern India to pursue studies in any Science, Technology, Engineering and Management (STEM) field.

NTU - Graduate Student Council Singapore
Director April 2016 – March 2017
Director April 2015 – March 2016
Public Relations Officer May 2014 – March 2015

- Lead NTUGSC - Career & Entrepreneurship committee that is primarily involved in organizing Career talks, Entrepreneurial talks and Industrial visits for the graduate students.
- Established long-term collaborations with NTU - Career & Attachment Office (CAO) for our activities.

IEEE Young Professionals Singapore
Chair November 2015 – November 2016
Vice Chair November 2014 – November 2015
Executive Committee Member November 2013 – October 2014

- Lead the Singapore chapter of IEEE Young Professionals, and was primarily involved in facilitating young graduates to become world class professionals, enhancing their skills and establishing a strong and diverse professional network.
- Received best Affinity Group award from IEEE R10 section.

IEEE Student Chapter Silchar Silchar, India
Executive Committee Member June 2008 – June 2010

- Responsible for the overall management of IEEE Student Chapter Branch affairs.

Awards & Honors

- Awarded the Outstanding Academic Achievement award, by Technology Ireland, November 2018.
- Awarded the ADAPT Centre Directors Commercialisation Award 2018, in recognition of the contribution to Huawei Advert project.
- Recognition and appreciation for contribution as a tutor in the Peer Tutoring Scheme, NTU Singapore, AY 2016-17.
- IEEE Region-10 Young Professionals Affinity Group Award in recognition and appreciation of valued services and contributions, August 2016.
- Commendable Teaching Assistant Award for the AY 2014–15 by School of Electrical and Electronic Engineering, NTU Singapore, November 2015.
- Institute Silver Medal in Bachelor of Technology, National Institute of Technology Silchar, July 2010.

References Available on request.