Durga Prasad Bavirisetti

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I am a Researcher, Engineer, and Educator with special expertise in machine learning, deep learning, computer vision, and signal and image processing. Currently working on autonomous perception problems as an ERCIM research fellow at NTNU Norway. I also have a year and half of experience as an Algorithm Expert at the Innovation Centre of AlibabaGroup of companies, mainly worked on Automatic checkout using deep learning, and 3D object detection for Autonomous driving using 3D deep learning techniques. I was also selected as one of the young scientists representing India at the sixth BRICS Young Scientist Conclave in Bengaluru, India.

Education

August 2021	**Summer trainee, Oxford Machine Learning Summer School (OxML 2021)**
	Selected for best-in-class training on a broad range of advanced topics and developments in machine learning (ML) and deep learning (DL) offered by Machine Learning Summer School, Oxford University to 350 participants from over 118 countries with an acceptance rate of 15%.
Vellore, India 2013 – 2016	**Ph.D. in Signal and Image Processing** School of Electronics, Vellore Institute of Technology, INDIA *Thesis*: Image Fusion using Multi-Scale Decomposition Techniques
Vellore, India 2010 - 2012	**M.Tech. in Communication Engineering** School of Electronics, Vellore Institute of Technology, INDIA *Thesis*: Optimal power management in wireless sensor networks
Kakinada, India 2006 - 2010	**B.Tech. in Electronics and Communication Engineering** Department of Electronics and Communication, JNTU Kakinada

Industrial Experience

Shanghai, China Dec 2018 – Feb 2020	**Computer Vision Algorithm Expert** Department of Artificial Intelligence, Alibaba Research Institute, Alibaba Group of Companies, Shanghai

Automatic checkout (ACO) Project:

- Coordinated research-engineering team of ACO project on adaptation problem, development, and training process.
- Evaluated existing alternate designs and processing methods to assess the feasibility andmade proactive adjustments of parameters to boost performance.
- Improvised training process by using the **cycle-GAN** method to solve the domain adaptation problem, with synthesized images for data augmentation.
- Trained **MaskRCNN** for detection and counting visual items to post augmentation.
- Experiments on the large-scale Retail Product Checkout (RPC) dataset demonstrated the superiority of our approach, i.e., we achieved **92.20% accuracy** compared with 80.51% of the previous best method and obtained a **first place** on RPC Leaderboard.

3D object detection for Autonomous Driving Project:

Acquired knowledge on 3D deep learning techniques in 3D point cloud understanding.

Contributed towards the development of **3D object detection** algorithm which can directly consume **Lidar point** cloud.

Secured **5th position** on Kitti Leader Board in 3D vision for Autonomous driving competition.

3D reconstruction Project:

Learned 3D reconstruction problems based on Depth cameras, LIDAR sensors, and monocameras.

Analyzed structure from motion (SFM) and Multi-view Stereo (MVS) software packages such as **Visual SFM**, **OSM bundler,** and **COLMAP**.

Worked on 3D viewing software such as **Open3D**, **Meshlab** and **Cloud compare**.

Academic Experience

Trondheim, Norway
Feb 2022 – Present

ERCIM Postdoctoral Researcher
Department of Computer Science, NTNU, Gloshaugen, Norway.
- Working on **c**omputer vision problems related to Autonomous driving.

Bhopal, M.P, INDIA
Dec 2020 – Jan 2022

Sr. Assistant Professor Grade II
Department of AI, School of Computer Science, VIT, Bhopal, INDIA.
- **Subjects Teaching:**
  UG level: Fundamentals in AI & ML (CSA2001), Artificial Intelligence (CSE3007), Artificial Neural Networks (CSA4002).
  PG level: Artificial Intelligence and Machine Learning (CSD5004)
- **Faculty coordinator** for Mozilla Firefox club, VIT Bhopal Chapter.
- **AI conclave and Student Internship Coordinator.**

Trondheim, Norway
Aug 2020 – Oct 2020

Contract Researcher
Department of Computer Science, NTNU, Norway

- Worked remotely on projects such as Lane Line detection, traffic signsclassification, and Steering angle prediction for autonomous driving from INDIA.

Kelowna, Okanagan
2018

Visiting Researcher
School of Civil Engineering, University of British Columbia, Canada.

Shanghai, China
Dec 2016 – Nov 2018

Postdoctoral Researcher
School of Aeronautics and Astronautics, Shanghai Jiao Tong University

- Developed image and video fusion algorithms with improved recognition and detection. Explored various signal and image processing tools for the accomplishment of these tasks.
- Conceived and built a fast and efficient video fusion algorithm based on a guidedimage filter. It is further filed as a **national patent** (China).
- Provided an **Altitude Aircraft Safety** project proposal for an industrial grant of2, 00,000 RMB.
- Hosted as a session chair in IEEE conference on information fusion, Xian, 2017.
  Published 3 SCI journals and 6 international conferences.
- Lectured on Image Fusion for graduate students during the spring semester of 2017-2018.
- Mentored master students with the research topic and their thesis.

Vellore, India 2013–2016	**Research Assistant** School of Electronics, Vellore Institute of Technology

- Designed mono and multi-sensor image fusion algorithms for Surveillance, Digital photography, Medical imaging and remote sensing applications.

Course Certifications

- **Machine Learning** an online course authorized by Stanford University, offered through Coursera and taught by Andrew Ng.
- **Deep Learning Specialization** an online series of courses offered by Coursera and taught by Andrew Ng.
- **DeepLearning.AI TensorFlow Developer certification** offered by Coursera and taught by Laurence Moroney and Andrew Ng.
- **The Complete Self-Driving Car Course - Applied deep learning** an online course offered by Udemy.
- **PyTorch for Deep Learning and Computer Vision** an online course offered by Udemy.
- **Deep Learning with Pytorch** an online course offered by Udemy.
- **Automate the Boring Stuff with Python Programming** an online course offered by Udemy.
- **Vim MasterClass** an online course offered by Udemy

Teaching Experience

A.P., India Jun 2016 – Sep 2016	**Associate Professor** SITAMS, Chittoor, A.P, INDIA. Subjects taught: Signals and Systems, Digital image processing, Analog communication.
Gujarat, India 2012 – 2013	**Assistant Professor** Marwadi Group of Education Foundation, Rajkot, INDIA. Subjects taught: Signals and Systems, Digital electronics.

Project Proposal submission:

1. As a co-PI along with a professor (Dr. Ravindra Munje) in Electrical Engineering at K K. Wagh Institute of Engineering Education and Research, Pune, submitted a project proposal to Scientific and Useful Profound Research Advancement (SUPRA).

   Title: Detection and Classification of Power Quality Events using Machine Learning Techniques in Real-time Domain'.

Journal Submissions/Under Preparation:

1. Xiangbo Zhang; Gang Liu; **Durga Prasad Bavirisetti;** XiangBo Zhang, Gang Xiao. "FusionFRFCM: An Image Fusion Approach Driven by Non-global Fuzzy Pre-Enhancement Framework", IEEE *Transactions on Industrial Informatics,* **SCI, IF: 10.2 (under third review, minor).**
2. Saritha Saladi, Yepuganti karuna, **Durga Prasad Bavirisetti,** G R Reddy. "ENHANCED INTUITIONISTIC FUZZY C-MEANS WITH GAUSSIAN KERNEL FOR MR BRAIN IMAGE SEGMENTATION", *International Journal of Imaging Systems and Technology,* **SCI, IF: 1.925 (under review).**
3. Tiantian Xiao; Gang Liu; **Durga Prasad Bavirisetti;** Yejun Yang; DaweiWang. "PSIM: A Pose State Iterative Memory Rule for End-to-End Camera Relocation", IEEE *Transactions on Industrial Informatics,* **SCI, IF: 10.2 (under review).**
4. Jian sun, Gang Liu, Xiangbo Zhang, **Durga Prasad Bavirisetti,** Lili Tang. Short-Term Building Energy Consumption Prediction Based on Difference-Augmented Fuzzy-Stacking Framework, *Energy & Buildings,* **SCI, IF: 5.87 (under review).**

Journal Publications:

1. Xu, Xiang, Gang Liu, **Durga Prasad Bavirisetti,** Xiangbo Zhang, Boyang Sun, and Gang Xiao. "Fast Detection Fusion Network (FDFnet): An End to End Object Detection Framework Based on Heterogeneous Image Fusion for Power Facility Inspection." IEEE Transactions on Power Delivery (2022), **SCI, IF: 4.83.**

2. Zhou, Xihong, Gang Liu, Xiangbo Zhang, **Durga Prasad Bavirisetti**, Xinjie Gu, and Yonghua Li. "Re2FAD: A differential image registration and robust image fusion method framework for power thermal anomaly detection." Optik (2022): 168817, **SCI, IF: 2.84**.

3. Tang, LiLi, Gang Liu, Gang Xiao, **Durga Prasad Bavirisetti**, and XiangBo Zhang. "Infrared and visible image fusion based on guided hybrid model and generative adversarial network." Infrared Physics and Technology 120 (2022): 103914, **SCI, IF: 2.99**.

4. Peng, Yao, Gang Liu, Xiang Xu, **Durga Prasad Bavirisetti**, Xinjie Gu, and Xiangbo Zhang. "MFDetection: A highly generalized object detection network unified with multilevel heterogeneous image fusion." Optik 266 (2022): 169599. **SCI, IF: 2.84**

5. Polinati, Srinivasu, **Durga Prasad Bavirisetti**, Kandala NVPS Rajesh, Ganesh R. Naik, and Ravindra Dhuli. "The Fusion of MRI and CT Medical Images Using Variational Mode Decomposition." Applied Sciences 11, no. 22 (2021): 10975, **SCI, IF: 2.84.**

6. Polinati, Srinivasu, Durga Prasad Bavirisetti, Rajesh KNVPS, and Ravindra Dhuli. "Multimodal medical image fusion based on content-based decomposition and PCA-Sigmoid." Current Medical Imaging (2021). **SCI, IF: 1.32.**

7. Junhao Zhao, Gang Xiao, Xingchen Zhang, and **Durga Prasad Bavirisetti.** "An improved long-term correlation tracking method with occlusion handling," Chinese Optics Letters, OSA Publications, 17, 031001- (2019). **SCI, IF: 2.56**

8. **Durga Prasad Bavirisetti**, et al. "Multi-scale Guided Image and Video Fusion: A Fast and Efficient Approach." *Circuits, Systems, and Signal Processing, Springer* (2019): 1-30. **SCI, IF: 2.31**

9. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Fusion of Infrared and Visible Sensor Images Based on Anisotropic Diffusion and Karhunen-Loeve Transform." IEEE Sensors Journal, 16.1 (2016): 203-209. **SCI, IF: 4.35**

10. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Two-scale image fusion of visible and infrared images using saliency detection." Infrared Physics & Technology, Elsevier, 76 (2016): 52-64." **SCI, IF: 2.99**

11. **Durga Prasad Bavirisetti**., Kollu, V., Gang, X., & Dhuli, R. Fusion of MRI and CT images using guided image filter and image statistics. *International Journal of Imaging Systems and Technology*, Wiley publications, 27(3), (2017): 227-237. **SCI, IF: 2.18**

12. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Multi-focus image fusion using multi-scale image decomposition and saliency detection." Ain Shams Engineering Journal (2016). **SCI, IF: 4.79**

13. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Multi-focus image fusion using maximum symmetric surround saliency detection." *Electronic Letters on Computer Vision and Image Analysis (ELCVIA)*, 14.2 (2016): 58-73. **(Scopus)**

14. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Multi-filteringbased edge preserving image fusion technique." *International Journal of Services Technology and Management*, Inderscience publishers. **(SCIE)**

15. **Durga Prasad Bavirisetti**, and Ravindra Dhuli. "Multi-sensor image fusion based on visual saliency detection." *International journal of Tomography and simulations*, CESER publications, 29.2 (2016): 102-111. **(Scopus)**

16. GAO, Xue-Qin, Gang LIU, Gang XIAO, **Durga Prasad Bavirisetti**, and Kai-Lei SHI. "Fusion Algorithm of Infrared and Visible Images Based on FPDE." Acta Automatica Sinica 46, no. 4: 796-804. **(Scopus)**

Conference Publications

1. **Durga Prasad Bavirisetti,** Gang Xiao*, Junhao Zhao, Xingchen Zhang, Pengbo Wang. A New Image and Video Fusion Method Based on Cross-Bilateral Filter [C]. 2018 21th International Conference on Information Fusion (FUSION), 2018, University of Cambridge, United Kingdom.

2. Ningwen Xu, Gang Xiao, Xingchen Zhang, **Durga Prasad Bavirisetti**. Relative Object Tracking Algorithm Based on Convolutional Neural Network for Visible and Infrared Video Sequences[C]. 2018 4th International Conference on Virtual Reality, 2018, Hong Kong, China.

3. Ningwen Xu, Gang Xiao, Fang He, Xingchen Zhang, **Durga Prasad Bavirisetti**. Object Tracking via Deep Multi-View Compressive Model for Visible and Infrared Video Sequences[C]. 2018 21th International Conference on Information Fusion (FUSION), 2018, University of Cambridge, United Kingdom.

4. **Durga Prasad Bavirisetti**, Xiao Gang, Liu Gang. "Multi-sensor image fusion using fourth order partial differential equations", International conference on information fusion, Xian, 2017.

5. Xingchen Zhang, Gang Xiao*, Ke Gong, Junhao Zhao, **Durga Prasad Bavirisetti**. Automatic Power Line Detection for Low Altitude Aircraft Safety Based on Deep Learning[C]. International Conference onAerospace System Science and Engineering, 2018, Moscow, Russia.

6. Junhao Zhao, Gang Xiao**, Xing Chen Zhang, **Durga Prasad Bavirisetti**. A Survey on Object Tracking in Aerial Surveillance [C]. International Conference on Aerospace System Science and Engineering, 2018, Moscow, Russia.

7. Mandru Nagendra Prasad, **Durga Prasad Bavirisetti**, Yepuganti Karuna, and Ravindra Dhuli. "Complete analysis of the Eigen functions of Fourier transform." In Computer Communication and Informatics (ICCCI), 2013 International Conference on, pp. 1-6. IEEE, 2013.

8. **Durga Prasad Bavirisetti**, Lavanya Chappidi, Nagendra Prasad Mandru, Yepuganti Karuna, and Ravindra Dhuli. "Real and complex Eigen functions: An analysis of the 2-D Fourier transform." In Computer Communication and Informatics (ICCCI), 2012 International Conference on, pp. 1-6. IEEE, 2012.

Patent

Xiao Gang, **Durga Prasad Bavirisetti**, and Zhao Junhao, "A fast and efficient Image and video fusion using multi-scale guided image filter", Patent application number: cn 201711272467.1. (Chinese national patent).

Book Publication

Xiao, Gang Liu, **Durga Prasad Bavirisetti**, Gang Liu Xingchen Zhang. Image Fusion: Theories and Applications. ISBN No. 9789811548666, Springer Nature Publications, 2020.

Open Source Contribution

Academic research work is open-sourced at Mathworks

Academic Services

Journal Reviewer

Nature Scientific Reports
PLOS ONE
IEEE Consumer Electronics Magazine
IET Computer Vision
IEEE Transactions on Cybernetics
IEEE Transactions on Instrumentation and Measurement
IEEE Transactions on Multimedia,
IEEE Sensors Journal
IEEE Access Journal
IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
Information Fusion
Journal of Visual Communication and Image Representation
Infrared Physics & Technology
Neurocomputing
Multimedia Systems
Journal of Ambient Intelligence and Humanized Computing
International Journal of Imaging Systems and Technology
International Journal of Pattern Recognition and Artificial Intelligence

Optik
3D Research
Computer Methods and Programs in Biomedicine
Computer Vision and Image Understanding
Microprocessors and Microsystems
Multimedia Tools and Applications
Mathematical Problems in Engineering
Knowledge-Based Systems
Automation in Construction

Conference Reviewer

Information Fusion 2018

ICSP 2018

CVIP 2018, 2020, 2022

Professional Activities

- Session chair for Information Fusion conference, Xian 2017. Attended Civil Avionics International Forum 2017, Shanghai, China.

- Attended the lecture on "Deep Learning and AI: Past, Present and Future" by Prof. Yaan Lecun, Director of AI Research, Facebook at Shanghai Jiao Tong University, China.

- Attended the lecture on "Alpha Go & AI for Everyone: by Mr. Scott Beaumont, president of Google GreaterChina at Shanghai Jiao Tong University, China.

- Organized an "International Symposium of Information Fusion" at Shanghai, China.

Scholarships/Awards

- Selected as one of the young scientists representing India in the prestigious 6th BRICS Young ScientistConclave Bengaluru, India.
- Selected for prestigious ERCIM Postdoctoral Research Fellowship by the European Research Consortium for Informatics and Mathematics for a year from June 2020 to May 2021.
- Research Fellowship from the School of Aeronautics and Astronautics, Shanghai Jiao Tong University, fromDec 2016 to Nov 2018.
- Doctoral Fellowship from the School of Civil Engineering, University of British Columbia.
- Doctoral Fellowship from the School of Electronics, Vellore Institute of Technology, From July 2013 to April2016.

Technical Skills

Programming Languages:
Python, Matlab, Octave, Scilab, C++

Operating Systems:
Linux/Unix, Windows and Mac OS.

Applications and code Editors:
TensorFlow 2.0, Pytorch, Mxnet, OpenCV, Open3D, ROS, PIL, MS OFFICE, LTEX, Lyx, Smart Draw, Math Type,Visual Studio, Mendeley reference manager, PyCharm, Jupiter notebook, Atom, Vim, VScode.

Hardware:
Intel D435 Depth camera, RoboSense 16-line and 32-line and Ouster 128-line LiDAR sensors and monocular cameras.

References:

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