# Murthy L R D

✉ lrd.murthy@mercedes-benz.com    |    ⌂ https://scholar.google.com/citations?user=TmOU3goAAAAJ

## Academic Qualifications

**Indian Institute of Science**                                                                      *Bangalore*
PHD IN ENGINEERING                                                                                   *2017 - 2023*
- Thesis Title: Gaze Estimation in the Wild - Models, Datasets and Applications
- Advisor: Prof. Pradipta Biswas

**SASTRA University**                                                                                *Thanjavur*
B.TECH IN ELECTRICAL AND ELECTRONICS ENGINEERING                                                     *2011 - 2015*
- Thesis Title: Impulse Breakdown Testing on Nanofluids
- Thesis research advisor: Prof. Andrea Cavallini, University of Bologna, Italy

## Professional Experience and Internships

**Mercedes-Benz Research and Development India**                                                      *Bangalore*
SENIOR TECHNICAL LEAD                                                                                *April 2023 - Now*
- Developed Infra-red Illuminated Multi-Camera based Eye Tracking System for Automotive applications
- Developing algorithms and software systems for multi-sensor calibration in the context of Interior Driver Monitoring and Autonomous Driving applications
- Research activities involving computer vision, deep learning, active learning, and online calibration of cameras and Lidar in automotive domain.

**I3D Lab, CPDM, Indian Institute of Science**                                                        *Bangalore*
RESEARCH ASSISTANT                                                                                   *October 2022 - March 2023*
- Lead the project sponsored by Collins Aerospace to build Mixed Reality based application that guides the novice workers to perform complex manual assembly tasks for aircraft.
- Supervised various Masters' students at the University for their thesis, mainly focused on the areas of Virtual Reality, Gaze Estimation and Forecasting and Augmented Reality

**TATA Elxsi**                                                                                        *Trivandrum*
ENGINEER                                                                                             *June 2015 - July 2017*
- Developed Test Automation tool for testing Electronic Control Units (ECU)s in automobiles using NI LabView
- Hardware-In-Loop-Systems (HILS) test engineer for Camera ECUs of Infotainment System.

**University of Sussex**                                                                              *Brighton, United Kingdom*
VISITING RESEARCHER                                                                                  *April 2019 – June 2019*
- Our team at Interact Lab worked on Acoustic Cloaking using Scattering cancellation method. We used combinatorial optimization methods and pattern recognition approaches to achieve acoustic cloaking.

**University of Bologna**                                                                             *Bologna, Italy*
RESEARCH INTERN                                                                                      *Jan 2015 – April 2015*
- I investigated the behavior of nanofluids under impulse voltages. I used ferrofluids and a series of impulse breakdown tests were conducted on different samples of ferrofluids.

# Publications

## *Published*

Purma, Vishnuvardhan., Gummadi, Vignan Kumar., and **Murthy L.R.D.** S3PL : Self-Supervised Segmentation for Robust Pupil Localization. ACM Symposium on Eye Tracking Research & Applications (ETRA). 2025.

Mitra, Mukund, Ameya Avinash Patil, Gvs Mothish, Gyanig Kumar, Abhishek Mukhopadhyay, **Murthy L.R.D.**, Partha Pratim Chakraborty, and Pradipta Biswas. Multimodal Target Prediction for Rapid Human-Robot Interaction. In Companion Proceedings of the 29th International Conference on Intelligent User Interfaces, pp. 18-23. 2024.

Raj, S., **Murthy, L. R. D.,** Shanmugam, T. A., Kumar, G., Chakrabarti, A., & Biswas, P. (2024). Augmented reality and deep learning based system for assisting assembly process. Journal on Multimodal User Interfaces, 18(1), 119-133.

Krishna Sharma, V., **Murthy, L. R. D.,** and Biswas, P. (2022). Enabling Learning through Play: Inclusive Gaze-Controlled Human-Robot Interface for Joystick-based Toys. International conference on social robotics 2022.

Mukhopadhyay, Abhishek, **Murthy, L. R. D.,** Imon Mukherjee, and Pradipta Biswas. A Hybrid Lane Detection Model for Wild Road Conditions. IEEE Transactions on Artificial Intelligence (2022).

**Murthy, L. R. D.,** Gyanig Kumar, and Pradipta Biswas. Efficient Interaction with Automotive Heads-Up Displays using Appearance-based Gaze Tracking. In Adjunct Proceedings of the 14th International Conference on Automotive User Interfaces and Interactive Vehicular Applications, pp. 99-102. 2022.

Krishna Sharma, Vinay, **Murthy, L. R. D.,** and Pradipta Biswas. Comparing Two Safe Distance Maintenance Algorithms for a Gaze-Controlled HRI Involving Users with SSMI. ACM Transactions on Accessible Computing (TACCESS) 15, no. 3 (2022): 1-23.

**Murthy, L. R. D.,** Mukhopadhyay, A., and Biswas, P. (2022, March). Distraction Detection in Automotive Environment using Appearance-based Gaze Estimation. In 27th International Conference on Intelligent User Interfaces (pp. 38-41).

**Murthy, L. R. D.,** Mukhopadhyay, A., Anand, K., Aggarwal, S., and Biswas, P. (2022, March). PARKS-Gaze-A Precision-focused Gaze Estimation Dataset in the Wild under Extreme Head Poses. In 27th International Conference on Intelligent User Interfaces (pp. 81-84).

**Murthy, L. R. D.,** and Pradipta Biswas. Deep Learning-based Eye Gaze Estimation for Military Aviation. In 2022 IEEE Aerospace Conference (AERO), pp. 1-8. IEEE, 2022.

**Murthy, L. R. D.,** Mukhopadhyay, A., Arjun, S., Yelleti, V., Thomas, P., Mohan, D. B., & Biswas, P. (2022). Eye-gaze-controlled HMDS and MFD for military aircraft. Journal of Aviation Technology and Engineering (JATE), 10(2), 34-50.

Arjun, S., **Murthy, L. R. D.,** & Biswas, P. (2022). Interactive sensor dashboard for smart manufacturing. Procedia Computer Science, 200, 49-61.

Mukhopadhyay, A., Reddy, G. R., Ghosh, S., **Murthy, L.R.D.,** and Biswas, P. (2021, December). Validating social distancing through deep learning and VR-based digital twins. In Proceedings of the 27th ACM Symposium on Virtual Reality Software and Technology (pp. 1-2).

**Murthy, L. R. D.,** Brahmbhatt, S., Arjun, S., and Biswas, P. (2021). I2DNet-Design and real-time evaluation of an appearance-based gaze estimation system. Journal of Eye Movement Research, 14(4).

**Murthy, L. R. D.,** and Biswas, P. (2021, June). Appearance-based Gaze Estimation using Attention and Difference Mechanism. In 2021 IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW) (pp. 3137-3146). IEEE.

G. Prabhakar, A. Mukhopadhyay, **Murthy, L. R. D.,** M. Madan, S. Deshmukh and P. Biswas, Cognitive load estimation using Ocular Parameters in Automotive, Transportation Engineering, Elsevier 2020.

Biswas, P., Saluja, K. S., Arjun, S., **Murthy, L. R. D.,** Prabhakar, G., Sharma, V. K., & Dv, J. S. (2020). COVID-19 data visualization through automatic phase detection. Digital Government: Research and Practice, 1(4), 1-8.

**Murthy, L.R.D.,** A. Mukhopadhyay, V Yelleti, S Arjun, P Thomas, MD Babu, KPS Saluja, JeevithaShree DV and P. Biswas, Evaluating Accuracy of Eye Gaze Controlled Interface in Military Aviation Environment, IEEE Aerospace 2020.

**Murthy, L. R. D.** 2020. Multimodal Interaction for Real and Virtual Environments. In Proceedings of the 25th International Conference on Intelligent User Interfaces Companion (IUI '20). Association for Computing Machinery, New York, NY, USA, 29–30.

VK Sharma, **Murthy, L. R. D.,** KPS Saluja, V Mollyn, G Sharma and P Biswas, Webcam Controlled Robotic Arm for Persons with SSMI, Technology and Disability 32 (3), IOS Press 2020.

Prabhakar, G., Ramakrishnan, A., Madan, M., **Murthy, L. R. D.,** Sharma, V. K., Deshmukh, S., and Biswas, P. (2019). Interactive gaze and finger controlled HUD for cars. Journal on Multimodal User Interfaces, 1-21.

Mukhopadhyay, A., **Murthy, L. R. D.**, Arora, M., Chakrabarti, A., Mukherjee, I., & Biswas, P. (2019). PCB inspection in the context of smart manufacturing. In Research into Design for a Connected World: Proceedings of ICoRD 2019 Volume 1 (pp. 655-663). Springer Singapore.

Shree DV, J., **Murthy, L. R. D.,** Saluja, K. S., & Biswas, P. (2018). Operating different displays in military fast jets using eye gaze tracker. Journal of Aviation Technology and Engineering, 8(1), 31.

### *In Review*

**Murthy L.R.D.,** Abhishek Mukhopadhyay, Shambhavi Aggarwal, Ketan Anand, and Pradipta Biswas. Towards precision in appearance-based gaze estimation in the wild. arXiv e-prints (2023): arXiv-2302. Under Review

**Murthy L.R.D.,** Gyanig Kumar, Himanshu Vishwakarma and Pradipta Biswas. Design and Development of an Accurate and Precise Wearable Helmet-Mounted Eye Tracking System. Under Review.

### *In Prep*

Sharma, Manthan., Priyadarshi, Devraj., and **Murthy L.R.D.** A Robust and Crisp Edge Detection Method using Large-Scale Learned Encoders. 2025.

## Awards, Fellowships, & Grants

| 2022 | **Finalist at Graduate Day Forum**, IEEE International Conference on Signal Processing and Communications (SPCOM) | |
|---|---|---|
| 2022 | **Winner of Toycathon, Physical Edition**, A hackathon organized by AICTE and seven ministries under Central Govt. of India | ₹ 25,000 |
| 2020 | **ACM IUI 2020 Student Travel Grant**, ACM SIGCHI | $ 1,300 |
| 2015 | **Desh-Videsh Scholarship for Research Internship Travel**, SASTRA University | $ 1,000 |

## Patents

### FILED

**Murthy, L.R.D.,** Purma, Vishnuvardhan., Gummadi, Vignan Kumar., Poovaiah, Ashwini., AN EYE GAZE TRACKING SYSTEM AND METHOD THEREOF. Indian Application No: 202411101185. Filing Year: 2024

**Murthy, L.R.D.,** Payyoor, Harikumar., Govindaraj, Deepanraj., Pillai, Balaji., Venukumar, Pran., SYSTEM AND METHOD FOR ADJUSTING A DISPLAY UNIT BASED ON VISUAL ORIENTATION OF A USER. Indian Application No: 202411101183. Filing Year: 2024

Sharma, Manthan., **Murthy, L.R.D.,** Paul, Debanjan., Sarkar, Souvik., Poovaiah, Ashwini., SYSTEM AND METHOD FOR ESTIMATING FACIAL METRICS OF A USER WITHIN A VEHICLE. Indian Application No: 202411098850. German Application No: 102024138355.0. Filing Year: 2024

Kasi, Jaswin., Vishwakarma, Omprakash., **Murthy, L.R.D.,** Ahmed, Shuaib., Pratap, Aparna., Krishnan, Ajay., Bhatt, Praveen., A METHOD AND A SYSTEM FOR CLASSIFYING DRIVER GAZE USING HYBRID QUANTUM-CLASSICAL TECHNIQUE. Great Britain Application No: 2417491.4. Filing Year: 2024

Sharma, Manthan., **Murthy, L.R.D.,** Venkataraman, Raghul., Poovaiah, Ashwini., A METHOD OF DYNAMICALLY CALIBRATING AN IN-VEHICLE CAMERA, AND A SYSTEM THEREOF. Indian Application No: 202441086808. German Application No: 102024138167.1. Filing Year: 2024

**Murthy, L.R.D.,** Vishwakarma, Himanshu., Kumar, Suresh., Biswas, Pradipta., HELMET-MOUNTED EYE GAZE TRACKER. Indian Application No: 202341010174. Filing Year: 2023

## D.2.8. Invited Talks

March 2023. *Gaze Estimation in the Wild - Models, Datasets and Applications*. Online Invited talk to Prof. Andreas Bulling's research group at University of Stuttgart.

October 2023. *Collaboration between Humans and Intelligent Agents - Past, Present and Future*. Guest Lecture, A course on Human Computer Interaction, Indian Institute of Technology, Kanpur, India.

## D.2.9. Important service roles

### SERVICE

| | |
|---|---|
| 2021-22 | **Research in Product Design (RPD), CPDM, IISc Research Seminar Series**, Session Judge |
| 2019 | **Research in Product Design (RPD), CPDM, IISc Research Seminar Series**, Organizer |
| 2018 | **Smart India Hardware Hackathon Final Event**, Center Organizer, IISc Bangalore |

### PEER REVIEW

**Journals** :

Pattern Recognition, IEEE Sensors Journal, Multimedia Systems, AIEDAM, International Journal on Social Robotics, Engineering Applications of Artificial Intelligence, Pervasive and Mobile Computing, Robotics and autonomous systems, Information Fusion, ACM IMWUT

**Conferences** :

EuroVis'20, ACM UMAP'22, ACM Computer Human Interaction'23, ACM Intelligent User Interfaces 2023, 2024 and 2025