

ISHA DUA

(+91) 7997078740 • isha.dua@mercedes-benz.com • duaisha1994@gmail.com

EDUCATION

International Institute of Information Technology Hyderabad

2016–2019

MS by Research in Computer Science and Engineering

GPA: 8.2/10

- Supervisor: **Prof. C.V. Jawahar**, Centre for Visual Information Technology (CVIT)

College of Engineering Roorkee

2012–2016

BTech in Computer Science and Engineering

Aggregate: 80.2%

- Secured second position in the Computer Science and Engineering Department.

EXPERIENCE

Mercedes Benz R&D, India

Senior ML Engineer

Sept 2019 – Present

- **Mobile Bounding Box Detection in Cars using Synthetic Data**
 - Led the initiative to integrate mobile detection capabilities within cars exclusively using synthetic data.
 - Developed a novel training strategy leveraging a pre-trained model, enabling mobile detection on resource-constrained devices.
 - Led the dataset team, establishing comprehensive guidelines for generating high-quality synthetic datasets for mobile bounding box detection.
 - Achieved the first production deployment using solely synthetic data for training.
 - Presented demos to leadership, earning high praise for innovation and effectiveness.
 - Generated significant cost savings for the company by eliminating the need for extensive data collection and annotation, saving millions of dollars.
- **Seat Occupancy Detection (SOD) in Cars using Unsupervised Domain Adaptation (UDA)**
 - Led the development of multiperson human pose estimation using synthetic datasets in IR images.
 - Created an innovative unsupervised domain adaptation training strategy that leverages synthetic data, achieving robust real-world performance.
 - Directed the development and generation of photorealistic synthetic data.
 - Received the Process Innovation Award 2022 from Mercedes-Benz R&D.
 - Saved the company millions by employing synthetic data for deep learning model training.
- **Resolution of Human Pose Estimation Failure Cases using Semi-Supervised Domain Adaptation (SSDA)**
 - Developed a training strategy using synthetic data to address challenging failure cases in human pose estimation, while preserving performance on real-world data.
 - Successfully integrated the solution into the production line, directly improving the company's product capabilities.
 - Advanced the company's capability to handle complex scenarios with synthetic data.
- **Effective Data Sampling for Human Pose Estimation**
 - Created an innovative data sampling strategy for human pose estimation that significantly improved performance on complex and rare poses.
 - Mentored an intern at Mercedes-Benz R&D, guiding them in research advancement and paper submissions to top-tier conferences.

- Achieved acceptance of the workshop paper at NeurIPS 2023 and submitted the extended work as a full paper to arXiv.
- Received the Technical Publication Award 2023 from Mercedes-Benz R&D.

- **Dailib: Accelerated Deep Learning Framework**

- Spearheaded the development of a Python library to significantly accelerate deep learning model training.
- Demonstrated a 6x reduction in training time for a multi-person human pose estimation model.
- Secured a patent for the technology and received the Patent Award 2022 from Mercedes-Benz R&D.
- Received the Silver Star Award, and Process Innovation Award (2021) by Mercedes-Benz R&D.
- Training Cost: 6x Faster Training.

Microsoft Research, India

Research Intern

May 2018 – July 2018

- **Mentors: Dr. Venkat Padmanabhan and Dr. Akshay Nambi.**

- **AutoRate: How Attentive is the Driver?**

- Led a project to predict driver attention ratings by integrating spatio-temporal features based on driver state and behavior, such as head pose, eye gaze, eye closure, yawns, and cellphone use.
- The work was accepted as an **oral paper** at Faces and Gestures 2019.

- **Evaluation and Visualization of Driver Inattention Rating from Facial Features**

- Enhanced AutoRate by adding a soft attention mechanism, improving accuracy by 10%. Utilized temporal and spatial attention to visualize key frames and actions that justified the model's predicted ratings.
- The work was accepted as a journal paper in TBIOM, IEEE Biometrics 2019.

AIML Course

Mentor

Jan 2018 – May 2018

- Teaching Assistant at AIML course conducted by Professor C.V. Jawahar and Professor Anoop M. Namboodiri in collaboration with Talent Sprint.

PATENTS

- **Isha Dua**, Thrupthi Ann John, C.V. Jawahar, **System and Method for Generating Gaze Mapping Dataset and Predicting Gaze Point on Environment**, The Patent Office, Government of India. Indian Patent Application No. 202041052016. Filed: November 2020. Granted: Feb 2025, Status: Published.

PUBLICATIONS

- **Isha Dua***, Arjun Sharma*, Shuaib Ahmed, Rahul Tallamraju, **ACTUPose: Active Curriculum Training for Unsupervised Domain Adaptation in Pose Estimation**, *Synthetic Data for Computer Vision Workshop, CVPR 2025*.
- **Isha Dua***, Arjun Sharma*, Shuaib Ahmed, Rahul Tallamraju, **Towards Effective Synthetic Data Sampling for Domain Adaptive Pose Estimation**, *Synthetic Data Generation with Generative AI, NeurIPS 2023*.
- Abhay Rawat, **Isha Dua**, Saurav Gupta, Rahul Tallamraju, **Semi-Supervised Domain Adaptation by Similarity based Pseudo-label Injection**, *L2ID Workshop at European Conference on Computer Vision, ECCV 2022*. [paper]

* denotes equal contribution

* denotes equal contribution

- Thrupthi Ann John, Isha Dua, Vineeth N Balasubramanian, C.V. Jawahar, **ETL: Efficient Transfer Learning for Face Tasks**, *VISAPP 2022*. [paper]
- Isha Dua, Thrupthi Ann John, Riya Gupta, C.V. Jawahar, **DGAZE: Driver Gaze Mapping on Road**, *International Conference on Intelligent Robots and Systems, IROS 2020*. [paper]
- Isha Dua, Akshay Uttama Nambi, Venkat Padmanabhan, C.V. Jawahar, **Evaluation and Visualization of Driver Inattention Rating from Facial Features**, *IEEE Transactions on Biometrics, Behavior, and Identity Science, TBIOM 2019*. [paper]
- Isha Dua, Akshay Uttama Nambi, Venkat Padmanabhan, C.V. Jawahar, **AutoRate: How Attentive is the Driver?**, *IEEE International Conference on Automatic Face and Gesture Recognition, FG 2019 (Oral paper)*. [paper]
- Thrupthi Ann John, Isha Dua, Vineeth Balasubramanian, C.V. Jawahar, **Low Cost Transfer Learning of Face Tasks**, *Arxiv preprint*. [paper]
- Isha Dua, Pushkar Shukla, Ankush Mittal, **A Computer Vision Framework for Detecting and Preventing Human-Elephant Collisions**, *Visual Wildlife Monitoring Workshop, International Conference on Computer Vision, ICCV 2017*. [paper]
- Isha Dua, Pushkar Shukla, Ankush Mittal, **A Vision-Based Human-Elephant Collision Detection System**, *International Conference on Image Information Processing, ICIIP 2015*. [paper]

ACHIEVEMENTS AND AWARDS

- **Silver Star Award 2024:** Awarded by Brijesh Pillai and Arpit Awasthi for outstanding contribution in applying synthetic data for perception tasks.
- **AAAI Program Committee Member 2025:** Contributed as a reviewer and evaluator for the Good-Data Workshop at AAAI 2025.
- **Speaker 2023:** Presented work on Synthetic Data for Intelligent Interiors at **Mercedes-Benz R&D AI Day 2023**.
- **Technical Publication Award 2023:** Awarded by Mercedes-Benz R&D India for research on effective synthetic data sampling for domain adaptive pose estimation.
- **Patent Award 2022:** Received for a patented system improving keypoints localization and its method.
- **Process Innovation Award 2022:** Recognized by Mercedes-Benz R&D for innovation in multiperson human pose estimation using synthetic datasets.
- **Process Innovation Award 2021:** Awarded by Mercedes-Benz R&D for developing an accelerated deep learning framework for efficient and faster training.
- **Silver Star Award 2021:** Received from manager Brijesh Pillai for novel contributions to the team, including the accelerated deep learning library and bridging the domain gap between synthetic and real data.
- **Outstanding Mentor Award:** Recognized at the Foundations of AIML course led by Talent Sprint in collaboration with Prof. C.V. Jawahar.
- **First Prize, ML Track:** Won at Google Hackathon 2018 for a project on waste segregation using machine learning.
- **First Position:** Secured at Microsoft Code.Fun.Do 2018.
- **6th Position:** Achieved in the Grand Finale of IndiaHacks 2017 Hackathon.
- **Second Position:** Secured in CSE Department, B.Tech 2016.
- **PyTorch Tutorials:** Conducted at CVIT Summer School in 2018 and 2019.
- **Reviewer and Volunteer:** Served as a reviewer and volunteer at top Computer Vision and Machine Learning conferences, including NeurIPS, ECCV, CVPR.

PROJECTS

- Eye Gaze Gaming** 2017
- Advisors: Prof. C.V. Jawahar
 - Developed a webcam-based first-person shooter game controlled by head pose and eye gaze, enhancing the gaming experience.
 - Extended the algorithm for article browsing, demonstrating its versatility.
- As-Projective-As-Possible Image Stitching with Moving DLT** 2017
- Advisors: Prof. Anoop Namboodiri
 - Improved image stitching by proposing as-projective-as-possible (APAP) warps.
 - Addressed local non-projective deviations to enhance image stitching accuracy.
- Animation Effects using Image Morphing** 2016
- Advisors: Prof. Vineet Gandhi
 - Utilized the Triangulation method for morphing between human faces.
 - Generated intermediate images to represent the transition between original images.
- Breathing Rate using Camera** 2017
- Developed a computer vision algorithm to determine breathing rate using a webcam or mobile camera.
 - Potential applications include healthcare and fitness monitoring.

REFERENCES

- **Prof. C.V. Jawahar**
Director, CVIT
International Institute of Information Technology, Hyderabad
c.v.jawahar@iiit.ac.in
- **Prof. Venkat Padmanabhan**
Managing Director, Microsoft Research India
padmanab@microsoft.com
- **Dr. Brijesh Pillai**
Manager, Mercedes-Benz R&D India
brijesh.pillai@mercedes-benz.com
- **Prof. Anoop Namboodiri**
Associate Professor, CVIT
International Institute of Information Technology, Hyderabad
anoop@iiit.ac.in
- **Prof. Vineeth N Balasubramanian**
Professor, Indian Institute of Technology, Hyderabad
vineethnb@iith.ac.in