Manpa Barman

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Education

- **Universität Stuttgart** — Stuttgart, DE
  M.Sc in INFOTECH; Overall Grade (till date): 1.8 — *Ongoing*
  - **Relevant coursework**: Deep Learning, Machine Learning, Computer Architecture and Organization, Operating Systems, GPU Programming, Acquisition and Analysis of Eye Tracking Data, Advanced Visual Processing
- **Assam Engineering College** — Guwahati, IN
  Bachelor of Engineering in Instrumentation; Thesis Grade: 1.3 — *Aug. 2016 – November. 2020*
  - **Relevant coursework**: Linear algebra, Probability and Statistics, Digital System Design, Data Structures and Algorithms, Embedded Systems, Digital Image Processing
  - **Bachelor Thesis - Image Processing Based Object Tracking Turret**: Built a servo-motor controlled object tracking turret using Raspberry Pi 4B and NVIDIA Jetson Nano board. The device can detect and track objects using a MobileNet model. The motion of the tracking turret was controlled using a PID controller.

Work Experience

- **Mercedes-Benz AG R&D and University of Stuttgart** — Sindelfingen, DE
  Master Thesis and Research Intern
  - **Master Thesis (Oct 2025 - May 2026)**: Designed a two-stage object retrieval framework leveraging vision-language models and transformer-based detection for rare-object search. Additionally, a novel end-to-end object retrieval evaluation metric was also proposed for evaluation on the SearchAD dataset.
  - **Research Intern (Aug 2025 - Sep 2025)**: Worked in the Scene Understanding Department under Jonas Uhrig and Felix Embacher in benchmarking and developing a pipeline to evaluate the in-context learning capabilities of the SOTA VLMs in image classification in the context of image retrieval with rare objects in Autonomous Driving.
- **Carl Zeiss AG** — Oberkochen, DE
  Research Intern — *Oct 2024 - Apr 2024*
  - **Overview**: Worked in the Corporate Research and Technology Department at ZEISS under David Dobbelstein and Daniel Werdehausen. I developed a software solution using the .NET framework to integrate multimodal interfaces for hands-free microscopy control and conducted an extended study on multimodal foundational models and their limitations within the specialized context of microscopic imaging.
- **Ludwig Maximilian University of Munich (DSSGx 2024)** — Munich, DE
  Research Fellow — *Aug 2024 - Sep 2024*
  - **Overview**: Selected as one of the ten research fellows in 2024 to develop AI and software solutions for social good. Collaborated with Nationalparkverwaltung Bayerischer Wald to address overcrowding by building a data management and visitor traffic prediction framework, enabling more efficient resource allocation. [Link]
- **Computational Cognitive Science Department (CCS)** — Stuttgart, DE
  Wissenschaftliche Hilfskraft — *April 2023 - May 2024*
  - **LSLAutoBIDS**: Worked with Prof. Benedikt Ehinger in the development of the open-source Python package LSLAutoBIDS, which automates the conversion of EEG recordings (xdf files) to BIDS format, integrates Datalad and uploads the data to Dataverse, promoting open science by design. [Link]
  - **EEG-eye-tracking**: Worked in the development and organization of large scale EEG/eye tracking projects. Primarily worked with experiment design and post processing of eye tracking data to be used for neuroscience research and HCI.
- **Collaborative Artificial Intelligence Group, Universität Stuttgart** — Stuttgart, DE
  Research Project — *Nov 2023 - July 2024*
  - **Overview**: Worked under Prof. Andreas Bulling and Mayar Alfares to analyze and evaluate the abilities of the open source large language models on cryptographic abilities. Developed an LLM-based benchmarking dataset - CryptoQA, which was finetuned on opensource LLMs. Extensive analysis was done on the finetuned as well as the base models to study the reasoning and logical capabilities. [Link]

Publications

- **Automating Data Integration and Publishing for Neuroimaging via LSLAutoBIDS**:
  M. Barman, J. Range, B. Ehinger
  2025 Aperture Neuro (Special Issue)
- **CryptoQA: A Large-scale Question-answering Dataset for AI-assisted Cryptography**:
  M. Elfares, P. Reisert, T. Dietz, **M. Barman**, A. Zaki, R. Küsters, A. Bulling
  arXiv preprint arXiv:2512.02625, 2025
- **Object Detection and Tracking turret based on Cascade Classifiers and Single Shot Detectors**:
  P. Gogoi, **M. Barman,** M. Deka, U. Rajkonwar, R. Moudgollya
  2020 International Conference on Computational Performance Evaluation (ComPE)
  NEHU, Shillong, India | 2-4 July 2020
- **Deep learning based flood mapping: A Case Study from a flood-vulnerable state in the Northeastern region of India**:
  M. Barman, P. Gogoi, S. Goswami, H. Nagendra
  American Geophysical Union (AGU) Fall Meeting 2022
  Chicago, USA | 12 - 16 Dec 2022

Projects

- **CHATtacker: Role Playing in Large Language Models**: Created and analyzed the effects of role-playing in Large Language Models (LLMs) and explored offensive and defensive measures for the SOTA LLMs.
- **Visual World Paradigm**: Study on how humans predict upcoming words and how phonetical and semantical similarities affect the next word prediction. The study was done with data collected from the Gazepoint eye tracker and the behavior of the participants was analyzed.
- **GPU Implementation of JPEG Encoder**: Implemented a simple JPEG encoder using OpenCL framework and analyzed the speedups in GPU implementations.
- **Research Paper implementations**: Implementation of the state-of-the-art deep learning research papers using Tensorflow and Pytorch Frameworks. The repository consists of popular Computer Vision and Generative Adversarial Network papers.

Achievements

- **DSSGx Fellow**: Selected as one of the ten research fellows in the prestigious Data Science for Social Good Program (DSSGx) for the year 2024, hosted by Ludwig Maximilians Universität München.
- **Winter Overseas Fellowship Program**: Merit scholarship awarded by the Government of India for a summer research visit at the University of Warwick in 2020.
- **Merit Scholarship for academics**: Awarded merit scholarship for the years 2018, 2019 and 2020 for my academic performance during Bachelor's degree.

Technical Skills

Languages: Python, C++
Technologies: PyTorch, Tensorflow, Linux, Git, OpenCL, Opensesame, Google Earth Engine, Hugging Face, MLOps, LangChain, FAISS, Docker, AWS
Soft Skills: Teamwork, Adaptability, Communication, Technical Writing

Languages

Assamese: Native Fluency
English and Hindi: Working Professional Fluency
German: Elementary Fluency

Hobbies

Vocalist, Hiking, Blogging, Playing musical instruments (Keyboard, Ukulele)