HARINI SUDHA JEMBU GANESHBABU

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Harini Sudha | harini-sudha | YoursHarini

Aachen, Germany

EDUCATION

- **Indian Institute of Science Education and Research, Pune** *2018 - 2023*
  BS MS (Dual Degree) Pune, India
- **Sindhi Model Senior Secondary School** *2016 - 2018*
  High School Chennai, India

SKILLS

- **Programming Languages:** Python, MATLAB, R, C++, JavaScript
- **Machine Learning:** NumPy, PyTorch, OpenCV, HuggingFace, DeepSpeed, Git
- **Neuroscience tools:** PyNN, PyschoPy
- **Embedded Systems:** Arduino, Raspberry Pi, SpiNNaker
- **Sensors:** Event-based cameras, LIDAR

RESEARCH EXPERIENCE

- **Multimodal Scene Understanding and Reasoning** *Sept 2023 - Now*
  Research Assistant | Forschungszentrum Jülich, Germany PI: Dr.Emre Neftci
  - Implementing a multimodal transformer model for understanding dynamic scenes with fast-moving objects for real-time applications.
  - Exploiting the sparsity of event-camera data by building a Spiking Neural Network (SNN) encoder and interfacing it with LLMs.
  - Interfacing modalities using self-supervised models to reduce computational necessities.
  - Presented findings as a poster at Pucon Learning and AI Summit(PLENA) 2024, Chile.

- **Event-based Line Tracking using Neuromorphic systems** *June 2022 - May 2023*
  Master Thesis | KTH Royal Institute of Technology, Sweden PI: Jórg Conradt
  - Developed a SNN algorithm for event-based cameras for performing low latency line and line segment tracking.
  - Implemented SNN algorithm in neuromorphic hardware (SpiNNaker) and GPUs.
  - Contributed by fixing issues and improving documentation to an open-source, deep-learning SNN library, Norse, that interphases with PyTorch.
  - Master thesis link

- **Autonomous Drone for Rescue Operations** *Sept 2021 - Dec 2021*
  Independent Project | National Institute of Science Education and Research, India RoboTech Club
  - Won All India Hackathon and had the opportunity to pursue to project idea
  - Implemented object detection and collision avoidance through ROS modules and checked its feasibility on drones with Gazebo simulations to spearhead the project

- **Bio-inspired Neural Network for Emotion Detection** *May 2021 - Jan 2022 (Remote)*
  Research Intern | Indian Institute of Technology, Kanpur, India PI: Dr. Arjun Ramakrishnan, Dr. Bishak Bhattacharya
  - Conceptualised a neural network model by taking inspirations from the functioning of the human brain's fear recognition pathway for later integration into Human Robot Interactions.

- **Connecting Working Memory and Decision making** *Aug 2020 - May 2021 (Remote)*
  Research Intern | Indian Institute Technology, Kanpur, India PI: Dr. Arjun Ramakrishnan
  - Designed online foraging experiments in PsychoPy to study decision-making and working memory relationship by analysing the strategies that participants use to forage most efficiently.

- Developed a Reinforcement Learning agent and analysed how it would perform on the foraging task compared to human participants.

- **Understanding C. elegans locomotion** *May 2019 - July 2019*
  Summer Intern | *Institute of Mathematical Science, Chennai, India* PI: Dr. Sitabhra Sinha
  - Studied the forward locomotion of C. elegans in low Reynolds number media like agar.
  - Re-implemented in MATLAB a simulation of the neural circuitry of proprioception that aids forward locomotion using simple neural inputs.

PROJECTS

- **Frugal Bio-foundries for Distributed Enzyme Manufacturing** *May 2021 - Oct 2021*
  Student Team Lead | *Open Science Global 2021* Friendzymes project
  - Student lead and project managed an internationally distributed team of over 10 nationalities and 4 community laboratories that won a Gold medal in iGEM 2021.
  - Learnt Synthetic Biology software design principles from experts across the world; Curated content for the Wiki.

- **Small Object Detection in Aerial Drone images** *July 2021 - Aug 2021*
  Interactive Track Student | *NeuroMatch Deep Learning 2021*
  - Implemented YOLOv3 standard object detection algorithm from scratch on drone images as a part of 3 member team.
  - Improved YOLOv3 by 3% with data augmentation and normalisation techniques.

- **Personalised Brain State Targeting via Reinforcement Learning** *July 2020 - Oct 2020*
  Observer Track Student | *NeuroMatch Neuroscience 2020* final ppt
  - Built a proof of concept of a device that incorporates Reinforcement learning to help individuals achieve sleep state from an active state.
  - Presented the project in NeuroMatch 3.0 Conference

CONFERENCES AND SCHOOLS

- **Bernstein Conference**, Frankfurt, Germany *2024*
- **Teaching Assistant**, Brain Inspired Computing and Engg., RWTH Aachen University *Spring 2024*
- International Conference for Neuromorphic Computing and Engineering**(ICNCE), Germany** *2024*
- Pucon Learning and AI summit**(PLENA), Chile** *2024*
- Science of Intelligence Summer school(**Scioi) at Berlin, Germany** *2023*
- **Workshop Tutor** for Norse library, Human Brain Project Student **HBP Conference, Madrid, Spain** *2023*
- NeuroMatch Summer School, NeuroMatch Conference 3.0 *2021,2020*
- Federation of European Neuroscience Forum **(FENS)** *2020*
- Monsoon Brain Meeting attendee *2020*
- Frugal Science BIOE271 course by Manu Prakash, Stanford (remote) *2020*

AWARDS

- ALBA-FKNE-YIBRO Diversity Grant for Attending FENS Forum *2020*
- INSPIRE Scholarship (Top 1% high school students in India) *2018-2023*
- Cleared National Eligibility Entrance Test (NEET) and Joint Entrance Exam (JEE), Mains *2018*
- SOF Olympiad School level winner (Science and English) *2016,2017*

Extracurricular

- **Co-founder and core team member of IISER-Pune's Yoga club, Yogen** *Apr 2020 - Jul 2021*
  Coordinated activities throughout the year to spread the practice and benefits of Yoga within the IISER community
- **Design Coordinator for Mimamsa** *Aug 2020 - Sept 2021*
  Created posters, artworks for promoting All-India Science Quiz organized by IISER Pune, Mimamsa
- **Volunteer for OUR PYSCHE** *Mar 2021 - Jun 2021*
  Events for high schoolers to tackle mental health during the pandemic
- **Volunteer for DISHA, IISER Pune** *2019*
  Science and English outreach education to rural kids

Additional Information

Languages: English (Proficient), Hindi (Proficient), Tamil (Proficient), French (A2 level)

Interests: Graphic Design, Badminton, Writing poetry, Hiking, Yoga, Bouldering