Saandeep Aathreya

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RESEARCH INTEREST

Deep learning, Machine Learning, Computer Vision, Affective Computing, OOD Detection

EDUCATION

PhD in Computer Science — Tampa, FL | Spring 2025
University of South Florida
Advised by Prof. Shaun Canavan

MS in Computer Science — Tampa, FL | May 2022
University of South Florida
GPA: 3.8/4.0

Bachelor of Science in Computer Science — Mysore, India | July 2015
Visvesvaraya Technological University

PUBLICATIONS

- **FlowCon: Out-of-Distribution Detection using Flow-Based Contrastive Learning** — ECCV | 2024
  S. Aathreya S. Canavan (Accepted)
- **Multimodal Behavior Analysis and Impact of Culture on Affect** — ACII | 2024
  T. Nourivandi, S. Aathreya, and S. Canavan (Accepted)
- **Multimodal Context-Based Continuous Authentication** — IJCB | 2023
  S. Aathreya, M. Chaudhary, T. Neal, and S. Canavan
- **An Automated Data Cleaning Framework for Improving Facial Expression Classification** — ACII | 2023
  A. Elebiary, S. Aathreya, and S. Canavan
- **Expression Recognition using a Flow-based Latent-space Representation** — AMAR | 2022
  S. Aathreya, S. Canavan
- **Task-based Classification of Reflective Thinking Using Mixture of Classifiers** — ACII | 2021
  S. Aathreya, L. Jivnani, S. Srivastava, S. Hinduja, S. Canavan
- **Recognizing Emotion in the Wild using Multimodal Data** — ICMI | 2020
  S. Srivastava, S. Aathreya, S. Hinduja, S. Jannat, H. Elhamdadi, S. Canavan
- **Three-level Training of Multi-Head Architecture for Pain Detection** — FG | 2019
  S. Aathreya, S. Hinduja, S. Canavan

RESEARCH EXPERIENCE

GALILEO GROUP, INC | AI Research Intern — Tampa, FL (Hybrid) | May 2024 - Aug 2024

- *Project*: Designed a low-cost Road Quality Assessment system using micro-sensor data.
- *Contribution*: Proposed XGBoost ensemble using Fourier features computed via accelerometer and gyro signals.
- *Outcome*: Solution was published on HuggingFace as part of deployment.

ZIPPIN | AI Research Intern — Tampa, FL (Remote) | May 2022 - Aug 2022

- *Project*: Designed method to facilitate automatic checkout shopping to identify customers responsible for triggering specific shelf event.
- *Contribution*: Proposed transformer network with Fourier positional encoding leveraging the video and whole body keypoint information.
- *Outcome*: Proposed solution was deployed in production successfully.

UNIVERSITY OF SOUTH FLORIDA | Research Assistant (RA) Tampa, FL | July 2020 - Present

- Involved in various collaborative funded projects with *National Science Foundation (NSF)*, *Defense Advanced Research Projects Agency (DARPA)*, *and Intelligence Advanced Research projects Activity (IARPA)*.
- NSF: Designed a context-based multimodal continuous authentication dataset wherein face video and physiological data of 27 subjects were collected over three different sessions. Each context was a specific emotion elicited by the subject.
- DIA: Created realistic deepfake dataset (face image and video) using SOTA methods. This was accompanied by development of CNN-based deep fake detection techniques.
- IARPA: Developed face recognition system under unregulated and uncontrolled settings using CNN based methods. These include large distances, varying pose, and atmospheric conditions.

WORK EXPERIENCE

INFOSYS | Technology Analyst Mysore, India | Sep 2015 – July 2019

- Acting lead for a team involved in development and maintenance of 40+ mortgage business applications.
- Designed end-user reports and dashboards leveraging SQL/SSIS to submit to business users.
- Developed enterprise level applications from scratch under Agile methodology.

AWARDS

- **BEST DOCTORAL CONSORTIUM AWARD** FG 2023
  Towards Explainable Affective Computing using Efficient and Tractable Representation Learning
- **BEST PAPER AWARD** ACII 2021
  Classification of Reflective Thinking Using Mixture of Classifiers

PROJECTS

DISTRIBUTED TRAINING WITH WEBDATASETS WebDatasets, Torch DDP, SLURM
Performs large-scale training under distributed setting with an efficient IO operations. The large dataset is first saved as tar files with custom specficiation for each tar files. The training happens under multiple GPU settings where the tar files are loaded as WebDatasets.

TORCHOPENFACE C++, LibTorch
Implemented a Torch C++ frontend to bind OpenFace, a pure C++ tool with PyTorch/python. All the external libraries such as OpenCV, OpenBLAS, Dlib, PyTorch+CUDA, and TorchVision are built from source inside a conda environment.

LLM UNDER THE HOOD NLP, LLMs, PyTorch, DDP
Follows Karpathy's popular tutorial on building LLMs from scratch.

AUTOMATIC POISSON BLENDING Python, PyTorch
Performs Poisson blending on images for fake object creation. The pipeline included image segmentation using Detectron2.

REALNVP Python, PyTorch, shell
Re-implementation of RealNVP **generative** algorithm in PyTorch framework to generate realisitic fake images on multiple GPU nodes.

REALTIME DASHBOARD FOR DEEP LEARNING Python, Javascript, D3, Flask
Developed a D3/JS based web tool to observe the training metrics of deep learning in realtime. The tool also highlighted any common deep learning issues such as overfitting and vanishing gradient problem.

SKILLS

Languages: Python, C++, SQL, C, C#
Libraries/Frameworks: PyTorch, TensorFlow, scikit-learn, Pandas, Plotly
Others: Git, LaTeX, VSCode, Linux, SLURM, Distributed Computing in PyTorch, YACS, Flask, SHAP