Sathyanarayanan Ramamoorthy

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Education

Carnegie Mellon University - School of Computer Science (MS) — Pittsburgh, USA
Master of Computational Data Science at Language Technologies Institute (LTI) - (GPA: 3.95) — *08/22 – 05/24*

Indian Institute of Information Technology (BS) — Sricity, India
Bachelor of Technology in Computer Science and Engineering (CGPA: 9.13/10) — *07/18 – 06/22*

Academic/Research Experience (Scholar Profile)

Research Associate - Full Time — 01/24 – Present
Carnegie Mellon University at LTI, Advisor: ***Prof. Graham Neubig*** — *Pittsburgh, PA, USA*

- Working on Multimodal Multilingual language-agnostic **entity linking problems** using LLMs
- Developed a system, with dataset, baseline methods and work under review at **TACL 2024.**
- Researched **Vision-Language diffusion models** through image transcreation, co-authored work accepted at **EMNLP Main 2024** (Link) and got best paper award (Link)
- Contributed to the open-source multilingual multicultural multimodal LLM project called **Pangea** (Link)

Research Intern - Internship — 01/22 – 06/22
Artificial Intelligence Institute at University of South Carolina — *Columbia, USA*

- Developed a **BERT** based deep learning approach, for multimodal joint embeddings.
- Worked on a **GPT-based medical chatbot** and enhanced its capability through context-driven learning.
- Achieved this through context-driven learning using Knowledge Graphs, Coreference Resolution, NER.

Research Intern - Internship — 06/21 – 12/21
Wipro Artificial Intelligence Labs — *Bangalore, India*

- Proposed an approach to generate multimodal vision-text joint embeddings using transformer models.
- Achieved **SOTA** on meme emotion analysis task and presented the work at **AAAI 2022** (Link).
- Was an Organizing Committee Coordinator for the workshop, DE-FACTIFY, co-located at AAAI 2022.

Industry Experience

Applied Scientist Intern - Internship — 05/23 – 08/23
Amazon Alexa, Invocation Science — *Cambridge, MA, USA*

- Part of the wakeword invocation team under the **Amazon Alexa Perceptual Technologies Organization**.
- Performed data augmentation with synthetic data using **generative methods** to support speech technology development, particularly with the help of Large Language Models (LLMs), ASR and TTS Models.
- Implemented a pipeline for synthesis and trained, researched, evaluated and analyzed wakeword models.
- Improved the existing wakeword baseline model performance by **28%**.

Select Publications

- Nethra Gunti, Sathyanarayanan Ramamoorthy, Parth Patwa and Amitava Das, **"Memotion Analysis through the Lens of Joint Embedding (Student Abstract) "**, In Proceedings of the **AAAI** Conference on Artificial Intelligence, 2022.

- Simran Khanuja, Sathyanarayanan Ramamoorthy, Yueqi Song, Graham Neubig, **"An image speaks a thousand words, but can everyone listen? On image transcreation for cultural relevance"**, In Proceedings of the 2024 Conference on Empirical Methods in Natural Language Processing (**Best Paper Award at the conference**)

Projects

High Performance Web Service using Cloud | *Python, Java, MySQL* 02/23 – 04/23

- Designed and implemented a complete web-service solution with three microservices for querying big data.
- Optimized algorithms and deployed on AWS, **achieving 75000 RPS** with minimum cost through Kubernetes.
- Developed auto-scalable, load-balanced and fault-tolerant applications with MySQL optimization and ETL using tools like Spark, Scala, Hadoop, Amazon RDS, EKS, and Docker.

Image Domain Translation | *PyTorch, Django* 01/21 – 12/21

- Achieved image to image translation from Night-time Infrared (IR) domain to Day-time RGB domain.
- Used **Generative Adversarial Networks (GANs)** like Pix2Pix, CycleGAN, Self-attention-GAN models.
- Incorporated Knowledge Distillation to compress the model by 95% and deployed using Django and ReactJS

Drug-Drug Interaction Prediction | *PyTorch Geometric, PyTorch* 02/21 – 05/21

- Detected Drug-Drug side effect interactions using Graph Neural Networks with a best AUROC score of 90.4%
- Extracted network features using a Relational Graph Convolution Network Encoder
- Node features were initialized by Node2Vec and MLP decoder predicted the presence of interactions between nodes

Technical Skills

Languages: Python, C/C++, SQL, Java
Tools & Technologies: Pytorch, Tensorflow, Transformers, Pandas, NumPy, AWS, GCP, Scipy