RAJ SANGANI

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GitHub | Portfolio | LinkedIn | Medium

EDUCATION

University of California at Davis, California, USA **May 2024**
Master of Science in Computer Science **GPA: 4.0/4.0**
Relevant Courses: Machine Learning and Discovery, Optimization

Vellore Institute of Technology, Chennai, India **June 2022**
Bachelor of Technology in Computer Science and Engineering **CGPA: 9.13/10.00**
Relevant Courses: Artificial Intelligence, Natural Language Processing, Problem Solving **(Top 10 %)**

PROFESSIONAL EXPERIENCE

Techsquadeg (now Stackzy), Cairo, Egypt **March 2022 – September 2022**
Machine Learning Engineer

- Created a Title Generator for sports news articles tuning a Pegasus model on scraped news articles which achieved a ROUGE-LSum of 31.70 and averages 2000 monthly downloads on the HuggingFace Hub
- Designed a pipeline using various models to generate diverse titles for articles and select the best title on the basis of content relevance, title length and grammaticality to improve the SEO ranking for the articles
- Deployed the pipeline using Ray Serve and FASTAPI and optimized the pipeline for CPU inference on Intel Ice Lake based instances, reaching 24 queries per second for models over 2.2 GB in size.
- Fine-tuned GPT-3 (Curie) to generate constrained titles using synthetic data generated from GPT-3 (Davinci) in order to reduce inference cost by 80 %.

Quantiphi Inc, Mumbai, India **January 2022 – June 2022**
Applied Research Intern (Machine Learning)

- Tuned a bi-encoder model using Generative Pseudo Labeling to improve token embeddings used for entity and relation canonicalization (using clustering) in a knowledge graph, which reduced noise in the graph by 7 %
- Integrated a Multi-Hop Dense Retriever (from FAIR) with a fine-tuned MiniLM Reader for domain-specific question answering systems to be used in an open-domain setting
- Improved the Reader's F1-Score by 9 points using domain-specific pre-training and set up evaluation pipelines for end-to-end evaluation of the Question Answering System

NextWealth, Bangalore, India **July 2021 – September 2021**
Intern - Machine Learning Engineer

- Designed the first chatbot at the company to aid in navigating the company's website and provide insights about the company's services through rich responses
- Developed a tool using Python to automatically evaluate the annotation training process for the employees by calculating IoU scores for annotations used in object-detection and segmentation tasks

RESEARCH AND PUBLICATIONS

Professor Fukuoka's Group, University of California, San Francisco **January 2023 – Present**
Graduate Student Researcher

- Working with Prof. Yoshimi Fukuoka and Prof. Kenji Sagae on developing a sms-based chatbot to create awareness for heart diseases in women.

Prasant Mohapatra Lab, University of California, Davis **September 2022 – Present**
NLP Researcher

- Working on the problem of Fair Extractive Text Summarization using Transformers and Deep Fair Clustering under the guidance of Prof. Prasant Mohapatra.

Phonetics Lab, University of California, Davis **September 2022 – Present**
Human-Computer Interaction Researcher

- Working on quantifying the effect of Convergence and Shadowing between Humans and Voice-AI agents using Audio Models under the guidance of Prof. Georgia Zellou

Vellore Institute of Technology, Chennai, India **February 2021 – June 2021**

Deep Learning Research Intern

- Prototyped and trained various Deep LSTM and Neural Network models to analyze sentiment on the Amazon Fine Food Reviews dataset
- Applied model-agnostic explainable AI algorithms such as LIME and SHAP on these deep models to interpret their predictions and identify algorithmic bias

Comparing Deep Sentiment Models Using Quantified Local Explanations **[DOI]**

- **R. B. Sangani**, A. Shukla and R. S. B. **Published** in the *International Conference on Smart Technologies, Communication and Robotics (STCR), 2021*, pp. 1-6, 13th November, 2021.

Large-Scale Knowledge Synthesis and Complex Information Retrieval from Biomedical Documents

- Shreya Saxena, **Raj Sangani**, Siva Prasad, and Shubham Kumar, Mihir Athale, Rohan Awhad, Vishal Vaddina. **Accepted for publication** at the *IEEE International Conference on Big Data, Osaka, Japan , 2022*

ACHIEVEMENTS

- **Amassed 100,000 views** for technical Machine Learning blogs on **Towards Data Science** as of **December 2022**
- **Lead-Artificial Intelligence** for the project "Intelligent Online Teaching-Learning Portal for Enhanced Problem-Solving" funded by the *Ministry of Electronics and Information Technology India*. (**Funding of approximately 210,000 USD**), chosen in **April 2022**
- **Featured in the Editor's Choice Tips and Tricks Column** at **Towards Data Science** for an article titled "*Dealing with features that have high cardinality*" in **August 2021**
- **Teaching Assistant** for the undergraduate course: Problem Solving and Object-Oriented Programming (CSE1002). Conducted weekly classes on coding, as well as took revision classes from **February to June 2021**
- **Winner** of the 24 Hour **Hackathon** for the project **"Pharmacat"** conducted by the **Microsoft Innovations Club, VIT Chennai and GeeksForGeeks** in **October 2019**

PROJECTS

Shoppster - Multimodal Search System **[DOCS]**

- Created a transformer-based multimodal system to support text to image and text plus image to image search
- Trained a network consisting of ViT Base and MPNet using a contrastive margin loss to jointly represent images and text in the same vector space and achieved a Recall@100 of 41
- Pre-trained the Vision Encoder in the Network using techniques from SimMIM and VitMAE on fashion images to improve recall of the system
- Technologies used: Hugging Face, PyTorch

Zero-Shot Auto-Knowledge Graph Construction

- Designed a pipeline to generate event-specific knowledge graphs from news articles collected from GNews
- Used OpenIE to extract triplets from relevant articles and designed a BART and DeBERTa based ensemble of Zero-Shot-Classifiers to remove irrelevant triplets
- Merged triplets with similar semantics using a cross-encoder and fuzzy string matching (using FuzzyWuzzy)
- Technologies used: Hugging Face, GNews, LazyNLP, SpaCy, OpenIE, FuzzyWuzzy

OUTREACH ACTIVITIES

- **Machine Learning Advisor** for the Google Developer Student Club at UC Davis in **2022**
- **Machine Learning Mentor** at the Zero Bugs Club, conducted a month-long Machine Learning workshop in, teaching fundamental concepts to over 100 undergraduates in **2021**
- **Member of the OWASP student chapter** where I developed a password strength analyzer using a character level LSTM and also contributed to a parallelized SSH brute-forcing tool in **2020**
- **Math Tutor** at U&I Prem Niketan (an orphanage) in **2021** & **English Tutor** at a Melakottaiyur public school (Chennai) in **2019 and 2020**.