SHABARI S NAIR

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EDUCATION

Indian Institute of Technology (BHU), Varanasi   **Aug 2019 – May 2023**
B.Tech in Computer Science and Engineering - 9.60/10.00 GPA

RESEARCH EXPERIENCE

Automatic Speech Recognition   **July 2023 – Present**
Voice Research Team, Sprinklr
- Developed a novel prompting-based technique for contextual biasing in Whisper, improving WER over the baseline by 45.6% for rare words and 60.8% for out-of-vocab words, with generalization to unseen languages as well
- Modified and fine-tuned the Whisper architecture to act as an end-to-end, largely model-independent word-level confidence estimator, outperforming previous SOTA on out-of-domain datasets and unseen languages
- Spearheaded the ASR latency optimization track and implemented techniques like quantization, speculative decoding, flash attention, and custom inference engines to improve the model latency by 3x

Human Activity Recognition in Videos   **Jan 2022 – May 2023**
Guide - Prof. Pratik Chattopadhyay, Pattern Recognition Lab, IIT BHU
- Proposed a keyframe extraction method, achieving a 2% accuracy improvement with 25% fewer frames using activity recognition models like SlowFast, R(2+1)D, C3D, and DB-LSTM, during inference on benchmark datasets
- Integrated the keyframe extraction method into an efficient HAR pipeline consisting of person detection (Yolov7) and tracking (StrongSORT) for activity recognition (SlowFast) of individual persons in a surveillance video feed

Concept Drift Detection In Graph Streams   **Jan 2021 - May 2021**
Guide - Prof. Kaushal Kumar Shukla, IIT BHU
- Analyzed new trends and insights in the application of a SOTA graph stream drift detection technique (DSDD), to the gradual and abrupt streams concept drifts in the domain of toxicology
- Proved the impact of drift detection in toxicology datasets by obtaining a 27% boost in graph classification accuracy when adapting a new LSTM-based graph classification model to the detected drifts, compared to when not adapted

PUBLICATIONS

- **Adopting Whisper For Confidence Estimation** - Vaibhav Aggarwal*, <u>Shabari S Nair*</u>, Yash Verma*, Yash Jogi - ICASSP'24 (Under Review)

- **Improving Rare-Word Recognition Of Whisper In Zero-Shot Settings** - Yash Jogi*, Vaibhav Aggarwal*, <u>Shabari S Nair</u>, Yash Verma, Aayush Kubba - SLT'24 [paper]

- **Concept Drift Detection In Toxicology Datasets Using Discriminative Subgraph-Based Drift Detector**-Vandana Bharti, <u>Shabari S Nair</u>, Akshat Jain, Kaushal Kumar Shukla, Bhaskar Biswas - Briefings in Bioinformatic'23 [paper]

PROFESSIONAL EXPERIENCE

Sprinklr

AI Product Engineer, Voice Team   **July 2023 – Present**
- Implemented infrastructural solutions to bring down the latency of streaming speech recognition service by 50%
- Owned the bulk of Text-to-Speech (TTS) client deployments (70+), including their maintainance, bug fixes, and alerts
- Developed internal demoing tool for clients to test Sprinklr TTS services

AI Product Engineer Intern   **May 2022 – July 2022**
- Developed modular and dependency-graph models for the task of Structured Sentiment Analysis
- Used methods like LLM-based data augmentation to improve performance by 15% over the baseline, across 5 languages
- Adapted the model to work for Asian languages like Mandarin, as well as for sarcastic texts through Multi-Task learning

GotIIT   **Dec 2020 - Feb 2021**
Flutter Developer Intern
- Core team member of an early-stage ed-tech startup aimed at creating a Q/A platform for students and mentors
- Implemented engaging user interfaces using Flutter, ensuring low latency and cross-platform compatibility
- Participated in code reviews while providing constructive feedback to other developers

SELECTED PROJECTS

Intelligent Snake Game Bot using Genetic Algorithm and Reinforcement Learning [code] **Nov 2021**
- Trained human-level competent agents for the classical snake game using Deep Q Learning and Genetic Algorithm
- Developed UI using Pygame for continuous monitoring of the agent

Autonomous Bot Simulation Using Image Processing and A* Algorithm [code] **Feb 2022**
- Built an autonomous bot simulation for finding the shortest path in a complicated environment from a live video feed
- Used A* algorithm to determine the shortest path, OpenCV for image processing, and PyBullet for physics simulation

E-Commerce Webapp for a Bakery [code] **Aug 2021 - Nov 2021**
- Developed a full stack e-commerce web app using Spring Boot and MySQL and hosted the same on Heroku
- Implemented features such as smart searching, blogging, order placement and tracking

Graph Search Algorithms Visualizer [code] **Sep 2020**
- Interactive tool using Pygame to visualize the working of various graph search algorithms
- Supports Depth-first, Breadth-first, Dijikastra, and A* algorithms

AI-Enabled Doctor Consultation Platform [code] **Aug 2020 - Nov 2020**
- Built an online platform for connecting patients with nearby doctors of their choice based on speciality, proximity etc
- Provided AI-enabled disease diagnosis based on user-input symptoms using a Naive Bayes based model

Employee Management Web App [code] **Aug 2020 – Nov 2020**
- Developed a full stack Django-based web app for companies to manage their employees' data
- Supports features such as leave functionality, multiparameter search of employee information and profile management

TECHNICAL SKILLS

Languages: Python, C, C++, Java, Dart, HTML/CSS, Javascript
Technologies/Frameworks: Pytorch, Docker, Kubernetes, Helm, MySQL, MongoDB, Django, Spring Boot

ACHIEVEMENTS AND EXTRACURRICULARS

- **Academic Achievements:**
  * All India Rank 4122 in JEE Advanced 2019 out of over 1.1 million candidates
  * All India Rank 10 in COMEDK Under Graduate Entrance Test 2019 for Engineering, among over 50k candidates
  * State Rank 56 in KCET (Karnataka Common Entrance Test) 2019 for Engineering out of nearly 200k candidates
- **Competitive Programming Achievements:**
  * Recipient of the AlphaGrep Merit scholarship 2022
  * Global Rank 344 and 401 in Google Kickstart 2022 Round C and F respectively
  * Expert rated on Codeforces (Handle: dvseven)
- **Volunteering Activities:**
  * Conducted weekly meetup sessions for freshers as a Student Induction Mentor for 2020-21 at IIT BHU
  * Took career guidance sessions for underprivileged students at Team Everest NGO
  * Promoted women empowerment in the villages of Ramnagara, Bangalore as part of SACRED organization
- **Other Extracurriculars:**
  * Winner of Goldberg's Alley, Technex'20 at IIT BHU, a creative contraption designing contest
  * Runner up in CryptX (Analytics Competition) by IIM Bangalore
  * Vocalist in the Western Music Club at IIT BHU
  * Member of the Research Innovation and Entrepreneurship Unit (RIEU) at IIT BHU