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 (top 4% in the department)***

RESEARCH EXPERIENCE

Automatic Speech Recognition   **Nov 2023 – Present**
Voice Research Team, Sprinklr
- Developed a novel zero-shot 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
- Proposed a method for finetuning Whisper architecture for end-to-end, model-independent word-level confidence estimation, outperforming prior SOTA based on manually extracted features by 0.17 NCE on out-of-domain datasets
- Spearheaded the ASR latency optimization track, conducting in-depth study and implementing techniques like quantization, speculative decoding, flash attention, and specialized inference engines,achieving a 3x latency improvement

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 gradual and abrupt concept drifts present in graph stream data 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*, Shabari S Nair*, Yash Verma*, Yash Jogi - ICASSP'25 (Under Review)

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

- **Concept Drift Detection In Toxicology Datasets Using Discriminative Subgraph-Based Drift Detector** - Vandana Bharti*, Shabari S Nair*, Akshat Jain, Kaushal Kumar Shukla, Bhaskar Biswas - Briefings in Bioinformatics'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 maintenance, bug fixes, and alerts
- Developed 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 F1 score 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 (Pixelate'22) [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

TECHNICAL SKILLS

Languages: Python, Java, C, C++, 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 JEE 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