RAKESH MAHESH

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EDUCATION

University of Illinois, Urbana-Champaign *Dec 2022*
Master of Engineering - Electrical and Computer Engineering ***GPA:*** *3.95/4*
Focus Area: *Machine Learning and Signal Processing*

National Institute of Technology, Tiruchirappalli (NIT Trichy) *Jul 2020*
Bachelor of Technology - Electronics and Communication Engineering ***GPA:*** *9.51/10*
Minor - Computer Science and Engineering

Relevant Coursework: Automatic Speech Recognition, Pattern Recognition, Random Processes, Computer Vision, Artificial Intelligence, Data Structures & Algorithms, Multimedia Signal Processing, Natural Language Processing

TECHNICAL SKILLS

- **Programming Languages:** Python, C++, C, MATLAB, Bash, Java
- **Softwares/Tools/Frameworks**: Kaldi, scikit-learn, TensorFlow, Keras, PyTorch, Git, LaTeX

EXPERIENCE

Amazon - Alexa AI [*Applied Scientist Intern***]** *May 2022 - Aug 2022*
- Employed a Coarse-to-Fine Reasoning Backbone that uses glove embeddings of question and image features (obtained from GRU and Faster-RCNN respectively) to perform Visual Question Answering (VQA).
- Trained an end-to-end explainable VQA system by integrating LSTM & Transformer Decoder with the VQA backbone.
- Achieved a VQA accuracy of 77.16% on GQA-REX and 71.55% on VQA-E datasets by training with explanations.
- Generated explanations for answers in VQA-E and GQA-REX datasets without compromising VQA performance.

SPIRE Lab, Indian Institute of Science, Bengaluru [*Junior Research Fellow***]** *Jul 2020 - Jul 2021*
- Validated and curated multilingual speech data using metrics (Word Error Rate & Acoustic likelihood) from an Automatic Speech Recognition (ASR) system for the Multilingual and Code-Switching ASR challenge (MUCS 2021).
- Trained a baseline Multilingual baseline ASR system in Kaldi (achieved 30% Word Error Rate) for 6 Indian languages.
- Collaborated with Microsoft Research India, IBM and Navana Tech and published a manuscript at **Interspeech 2021.**

University of New Brunswick, Fredericton, Canada [*MITACS Globalink Research Scholar***]** *May 2019 - Aug 2019*
- Developed an air-writing sentence recognition system using data from Electromyography and Inertial Measurement Unit sensors embedded on a wrist-based device, by training a deep learning model (LSTM + CTC scoring).

Indian Institute of Science, Bengaluru [*Research Intern***]** *May 2018 - Jul 2018*
- Analyzed airplane sensor data with Machine Learning algorithms to predict the status of blockage of an inlet air-nozzle, and concluded that Support Vector Machines produced the best result (86% accuracy).

PUBLICATIONS

- ***NeurIPS 2022: TSRML workshop -*** Towards Reasoning-Aware Explainable VQA *[Link]*.
- ***O-COCOSDA 2021*** - A study on Native American English Speech Recognition By Indian Listeners With Varying Word Familiarity Level *[Link]*.
- ***Interspeech 2021 -*** MUCS 2021: Multilingual and Code-Switching ASR Challenges for Low Resource Indian Languages*[Link]*.
- ***IMICPW 2019*** - Analysis Of Machine Learning Algorithms For Wi-Fi-based Indoor Positioning System *[Link]*.

PROJECTS

Dimension Estimation from Depth-Map of monocular Images [Code, Article] *Dec 2019 - Mar 2020*
- Trained a deep learning model based on Convolutional Autoencoder-Artificial Neural Network architecture to estimate the distance (in 3D space) between two arbitrary points on a 2D image, and achieved a Mean Deviation Error of 0.059 meters.

Indoor Location Utility Service (ILocUS) [Code, Working Video] *Dec 2017 - Mar 2018*
- Implemented an indoor positioning system for indoor navigation using Wi-Fi, with signal values from 3 NodeMCU modules using k-Nearest Neighbors Algorithm (75% accuracy).
- Secured 1st place (among 16 teams) in a Product Ideation event organized by Qualcomm.

EXTRACURRICULARS AND LEADERSHIP

- ***Rubik's Puzzle Coach at XOOG*** - One of the Top 4 coaches in May 2021 (among over 40 coaches); Mentored and coached over 20 kids aged 6-15 to solve the Rubik's Cube and motivated them to pursue advanced levels.
- Planned and Coordinated *Pragyan Cube Open 2019* (over 50 Participants) as the head of the organizing team, demonstrating leadership and teamwork; Organized *MUCS 2021 Workshop* (over 150 participants).