

RAKESH VAIDEESWARAN MAHESH

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EDUCATION

University of Illinois, Urbana-Champaign

Master of Engineering - Electrical and Computer Engineering
Focus Area: Machine Learning and Signal Processing

Dec 2022

GPA: 3.95/4

National Institute of Technology, Tiruchirappalli (NIT Trichy)

Bachelor of Technology - Electronics and Communication Engineering
Minor - Computer Science and Engineering

Jul 2020

GPA: 9.51/10

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
- **Frameworks:** PyTorch, TensorFlow, Keras, scikit-learn, OpenCV, Kaldi, vLLM
- **Data & Infrastructure:** SQL, Snowflake, Kubernetes
- **Other tools:** Git (version control), LaTeX (research manuscripts)

EXPERIENCE

Amazon - Artificial General Intelligence (AGI Foundations)

Sunnyvale, CA

Applied Scientist II

Dec 2023 - Present

- Building the Amazon Nova Family of Foundation Models (pretraining, post-training, and evaluation of generative AI models).
- Contributed to the research, development and release of **Nova 1 Lite, Pro** [Dec 2024], **Nova Premier** [Apr 2025], **Nova 2 Lite, Pro** [Dec 2025] foundation models, with a focus on text and multimodal understanding capabilities across knowledge and reasoning tasks.
- Designed and implemented scalable pipelines to curate high-quality training and validation datasets for LLM/VLM pretraining and post-training, improving key model evaluation metrics.

Discover Financial Services - Account Takeover (ATO) Fraud Strategy

Riverwoods, IL

Senior Data Science Analyst

Feb 2023 - Dec 2023

- Led the development of fraud prevention strategies targeting Account Takeover (ATO) type fraud across multiple channels, particularly Zelle, reducing fraud losses significantly.
- Owned and facilitated regular fraud case review meetings to assess new fraud trends and update detection/mitigation systems in near real-time.
- Played a key role in saving hundreds of thousands of dollars in potential fraud losses by aligning technical solutions with evolving threat landscapes.

Amazon - Alexa AI

Sunnyvale, CA

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.
- Generated explanations for answers in VQA-E and GQA-REX datasets without compromising VQA performance.

Indian Institute of Science [SPIRE Lab]

Bengaluru, India

Junior Research Fellow (Guide: Dr. Prasanta Kumar Ghosh)

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 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.

- 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).

- Analyzed airplane sensor data (simulated) with traditional 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 / TECHNICAL REPORTS

(* denotes equal contribution)

1. **Amazon Nova 2: Multimodal reasoning and generation models** [[Link](#)]
Amazon Artificial General Intelligence
Amazon Science, 2025
2. **Amazon Nova Premier: Technical report and model card** [[Link](#)]
Amazon Artificial General Intelligence
Amazon Science, 2025
3. **The Amazon Nova Family of Models: Technical Report and Model Card** [[Link](#)]
Amazon Artificial General Intelligence (see "Correspondence and Contributors" section for list of all contributors)
Amazon Science, 2024
4. **Can the decoded text from automatic speech recognition effectively detect spoken grammar errors?** [[Link](#)]
Chowdam Venkata Thirumala Kumar, Meenakshi Sirigiraju, Rakesh Vaideeswaran, Prasanta Kumar Ghosh, Chiranjeevi Yarra
SLATE workshop, Interspeech, 2023
5. **Towards Reasoning-Aware Explainable VQA** [[Link](#)]
Rakesh Vaideeswaran, Feng Gao, Abhinav Mathur, Govind Thattai
TSRML Workshop, NeurIPS, 2022
6. **A study on native American English speech recognition by Indian listeners with varying word familiarity level** [[Link](#)]
Abhayjeet Singh, Achuth Rao, Rakesh Vaideeswaran, Chiranjeevi Yarra, Prasanta Kumar Ghosh
O-COCOSDA, 2021
7. **Multilingual and code-switching ASR challenges for low resource Indian languages** [[Link](#)]
Anuj Diwan*, Rakesh Vaideeswaran*, Sanket Shah*, Ankita Singh*, Srinivasa Raghavan, Shreya Khare, Vinit Unni, Saurabh Vyas, Akash Rajpuria, Chiranjeevi Yarra, Ashish Mittal, Prasanta Kumar Ghosh, Preethi Jyothi, Kalika Bali, Vivek Seshadri, Sunayana Sitaram, Samarth Bharadwaj, Jai Nanavati, Raoul Nanavati, Karthik Sankaranarayanan, Tejaswi Seeram, Basil Abraham
Interspeech, 2021
8. **Analysis of machine learning algorithms for wi-fi-based indoor positioning system** [[Link](#)]
R Abishek*, KR Abishek*, N Hariharan*, Rakesh Vaideeswaran*, C Sundara Paripooranan*
IMICPW, 2019

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 (now Famyo)** - 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).