Karan Thakkar

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Education

PhD Electrical and Computer Engineering — Aug 2021 - Present
Johns Hopkins University | CGPA: 3.94/4.0 — Baltimore, USA
Advisor: Prof. Mounya Elhilali — Course Curriculum

B.Tech Electronics and Communication Engineering — Jul 2016 - Jun 2020
Vellore Institute of Technology (VIT) | CGPA: 9.33/10.0 — Vellore, India
Advisor: Prof. Budhaditya Bhattacharyya — Detailed List of Exams

Skills & Coursework

Coding : Python, Matlab, Java, C++ | **Frameworks** : Pytorch, Tensorflow 2.0, Hugging Face, Kaldi
Tech. : Azure, GCP, GANs, Diffusion, Ubuntu & linux | **Non Tech.** : Painting, Sketching, Surfing
Coursework: Audio Signal Processing; Machine Learning for Signal Processing; Self Supervised Learning; Foundations of Probabilistic Machine Learning; Deep Learning; Data Structures and Algorithms; Information Extraction from Speech and Text; Operating Systems; Statistical Theory.

Research & Technical Experience

Research Assistant - Laboratory for Computational Audio Perception — Aug 2021 - Present
Independent Researcher — Baltimore, USA
- Inventing bio-inspired DNNs for Speech Enhancement and Source Separation based on temporal coherence.
- Investigating how the human brain adapts to a specific audio stream through psycho-acoustic experiments.
- Analyzing experiment results and comparing them to state-of-the-art downstream model performance.

Reference: Prof Mounya Elhilali (PhD Advisor)

Machine Learning Engineer - DeepSync Technologies — Jul 2020 - Jul 2021
Part of the Startup's core research and product development team — Delhi, India
- Investigated the performance of auto-regressive Text-to-Speech (TTS) models vs non-auto-regressive models.
- Built a fast (7x compared to Tachotron), efficient, and high-quality end-to-end TTS system from scratch inspired by Microsoft's FastSpeech2.
- Automated the TTS pre-processing pipeline for any raw speech dataset and designed a test to measure the fidelity and diversity of TTS dataset.

Reference: Rishikesh Kumar (CTO, DeepSync Technologies)

Undergraduate Research Fellow - Deep Learning | Speech Processing | Signal Processing — Jul 2018 - Apr 2020
Undergraduate Research Experience - URE004 at VIT Vellore — Vellore, India
Thesis - Emergence of Deep Learning as a potential solution for Detection, Recovery, and De-noising of Signals in Communication Systems
- Reviewed various channel estimation and deep learning techniques applied in communication systems to further research. | pdf
- Proposed a system faster(O(n)) when compared to traditional MMSE and LS O(n^3) estimators for signal detection.
- Introduced DL-based recovery and denoising block in OFDM systems. System is robust to noise (relatively) and cyclic prefix independent. | pdf

Project - Speech Emotion Recognition using non-traditional features
- Derived audio features based on chirp wavelet to classify 7 emotions on speech(5M & 5F) from the EMODB dataset. (Acc - 90.2%)

Reference: Prof Budhaditya Bhattacharyya And Prof Sudhakar M S

Electrical Engineering Intern - Munjal Auto Industries Ltd, Hero Honda Group — APR 2019 - May 2019
Automation Team — Baroda, India
- Created a prototype for machine cycle calculation of MIG Welding Robot using Image Processing on RPi, Pi Cam, and OpenCV. | Demo Video
- Optimised code for MIG welding operation, effectively reducing the operation time by 3 secs/process (Yashkawa Robot; PLC Coding).

Reference: Amit Salunke (Head Industrial Engineering, Munjal Auto)

Academic Intern - National University of Singapore (NUS) and Hewlett-Packard Edu. — MAY 2018 - JUL 2018
Machine Learning and Data Mining Academic intern and Skill Training — Singapore
- Built NLP tool (LSTMS) for sentiment analysis of consumer review data with 92.2 percent accuracy (top among competitors).
- Gained experience in working with Hadoop, Cloudera, Apache Spark, SQL, VMware and AWS.

Reference: Dr Tan Wee Kek and Dr Wei Wang

Projects

Smart Goggle for blind people to see using ears [Report] ❙ International Robotics Championship 2017 IITB ❙ Fidget spinner based RPM detector and stress analyzer [Report] ❙ Face Emotion Recognition using CNN and Harr Cascade [Report] ❙ Adaptive source encoding scheme using logarithms [Report] ❙ Deep Learning from scratch [Repository] ❙ Quizousie innovative Bingo in the format of Quiz [Play] ❙ EPICS (Engineering Projects in Community Service) in IEEE VIT Purdue University (USA)(Assisted farmers with low-cost technology in farming) [Report]

Publications & Academic Service

1. K. Thakkar, A. Goyal and B. Bhattacharyya, "Deep Learning and Channel Estimation," 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), Coimbatore, India, 2020, pp. 745-751, doi: 10.1109/ICACCS48705.2020.9074414. [Link to Publication]
2. K. Thakkar, A. Goyal and B. Bhattacharyya, "Emergence of Deep Learning as a potential solution for Detection, Recovery andDe-noising of Signals in Communication Systems". International Journal of Intelligent Networks. [Link to Publication]
3. Reviewed for the journal "Transactions on Emerging Telecommunications Technologies". [Verified Review on Publons]
4. (Two more publications in following year - 1 Journal, 1 conference)