Karan THAKKAR

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EDUCATION

AUG 2021 - PRESENT Baltimore, USA	PhD ELECTRICAL AND COMPUTER ENGINEERING Johns Hopkins University	CGPA: **3.94/4.0** Advisor: Prof. Mounya ELHILALI
JUL 2016 - JUN 2020 Vellore, India	B.TECH ELECTRONICS AND COMMUNICATION ENGINEERING Vellore Institute of Technology (VIT)	CGPA: **9.33/10.0** Advisor: Prof. Budhaditya BHATTACHARYYA

RESEARCH AND TECHNICAL EXPERIENCE

AUG 2021 - PRESENT — Baltimore, USA

Research Assistant at LABORATORY FOR COMPUTATIONAL AUDIO PERCEPTION
Independent Researcher working towards a Ph.D. degree

- Investigated the auditory attention mechanism by studying and replicating temporal coherence in order to better understand the brain's remarkable complexity and adaptability.
- Developed the Explicit Memory Multi-resolution Adaptive (EMMA) framework for speech and music separation, inspired by the hierarchical auditory pathway in the human brain, leading to a journal article submission.
- Collaborated with the Neural Systems Laboratory at the University of Maryland on an experiment comparing the neural encoding of a Ferret's brain to artificial neurons in the EMMA network designed to focus on a single speaker in a two-speaker mixture.
- Currently focused on modeling the mappings between brain response (EEG) and audio stimuli as a dynamical system, with the goal of exploring the dynamical mapping between EEG and stimulus using explicit memory as a prior for decoding in continuous time.

Reference: Prof. Mounya ELHILALI

JUL 2020 - JUL 2021 — Delhi, India

Machine Learning Engineer at DEEPSYNC TECHNOLOGIES
Part of the core research and product development team

- Investigated the performance of auto-regressive Text-to-Speech (TTS) models vs non auto-regressive models.
- Built a fast, efficient and high quality end to end TTS system from scratch inspired by Microsoft's FastSpeech2.
- Increased speech inference time by 7x when compared to Tachotron.
- Designed a test and automated the pre-processing for any TTS dataset.

Reference: Rishikesh KUMAR (CTO, DeepSync Technologies)

JUL 2018 - APR 2020 — Vellore, India

Undergraduate Research Fellow - DEEP LEARNING | SPEECH PROCESSING | SIGNAL PROCESSING | WIRELESS COMMUNICATIONS
Undergraduate Research Experience - URE004 at VIT VELLORE

- Reviewed various channel estimation and deep learning techniques applied in communication system to further research. | Conference Paper
- Proposed system faster($O(n)$) when compared to traditional estimation algorithms MMSE and LS $O(n^3)$ for signal detection.
- Introduced DL based recovery and denoising block in OFDM systems. System robust to noise and Cyclic prefix independent. | Submitted Paper
- Derived audio features, unlike the conventional features to classify 7 emotions on speech signals(5 male and 5 female) from the EMODB dataset.

Reference: Prof Budhaditya BHATTACHARYYA And Prof Sudhakar M S

APR 2019 - MAY 2019 Baroda, India	**Electrical Engineering Intern at MUNJAL AUTO INDUSTRIES LTD - HERO HONDA GROUP** Automation Team

- Created a prototype for machine cycle calculation of MIG Welding Robot using Image Processing on Raspberry Pi, Pi Cam, and OpenCV. | Demo Video
- Contributed in automation of Hydraulic Press Machine integrating various sensors.
- Optimised code for MIG Welding operation that reduced the time of operation by 3 secs/process (Yashkawa Robot; PLC Coding).

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

MAY 2018 - JUL 2018 Singapore	**Academic Intern at NATIONAL UNIVERSITY OF SINGAPORE (NUS) AND HEWLETT-PACKARD EDU.** Summer Internship and Skill Training

- Machine Learning and Data Mining Academic intern under the guidance of Dr Tan Wee Kek and Dr Wee Wang.
- Built NLP tool for sentiment analysis of consumer review data with 92.2 percent accuracy (top among competitors).
- Explored Hadoop architecture, system administration and power distributed NN training.
- Gained experience in working with Hadoop, Cloudera, Apache Spark, SQL, VMware and AWS.

Reference: Dr Tan WEE KEK and Dr Wei WANG

PUBLICATIONS AND 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 and De-noising of Signals in Communication Systems". International Journal of Intelligent Networks. [Link to Publication]

3. Bellur, A., Thakkar, K. Elhilali, M. Explicit-memory multiresolution adaptive framework for speech and music separation. J AUDIO SPEECH MUSIC PROC. 2023, 20 (2023). https://doi.org/10.1186/s13636-023-00286-7

4. Reviewed for the journal "Transactions on Emerging Telecommunications Technologies", and, "IEEE Transactions on Multimedia." [Verified Review on Publons]

SKILLS AND COURSE-WORK

Coding :	PYTHON, MATLAB, JAVA, C++	Frameworks :	PYTORCH, TENSORFLOW 2.0, KALDI
Tech. :	AZURE, GCP, GANs, UBUNTU & LINUX	Non Tech. :	PAINTING, SKETCHING, VIOLIN, SURFING
Coursework :	Digital Signal Processing; Deep Learning Specialisation (Andrew NG); Wireless Communication Systems; Data Structures and Algorithms; Digital Image Processing; Statistics for Engineers.		

SELECTIVE ACADEMIC 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) Agricultural. (Assisted farmers with the use of low-cost technology in farming) [Report]

ADDITIONAL EXPERIENCE

FEB 2020 - APR 2020 Vellore, India	**Student Intern at VELLORE INSTITUTE OF TECHNOLOGY (VIT) VICE PRESIDENT'S OFFICE** Fellow of Education and Startup Resources Assessment Identified 4 startups on behalf of the Vice President's Office to provide the required support. Evaluated the curriculum at VIT Bhopal Campus in contrast with VIT Vellore Campus to improve diversity in the curriculum. Collaborated with a team of 5 to reduce drug and alcohol use near Vellore Region. Reference: Kadhambari S. VISWANATHAN (Assistant Vice President VIT)

Achievements and Extra-Curricular Activities

- Won 2 Business Case Competitions: Ideathon 2020 and Finixic 2018.

- VITEEE Scholarship awardee worth Rs. 2 Lakh.

- Art Achievement - Bronze medal at 40th International Children's art exhibition Japan 2010, Avantika Talent Search Certificate of Honour, Exhibited two paintings at Maharaja Sayajirao University Fine Arts department.

- Indian Record - Mentioned in LIMCA Book of Records for the Largest Warli Painting of the World (2014) based on the theme of Ramayana – The Great Indian Mythology.

- Regional winner of National Robotics Championship 2014; Winner Mathematical Convention 2013.

- Best performer at Entrepreneurship Development Institute of India, Ahmedabad - Summer 2013.

- Model Rocketry Championship 2013 Finalist; with the design recognized as the most innovative one.