

Ram Charan Chandra Shekar




7220, McCallum Blvd, Apt #1704 • Dallas, State • Texas, Country • USA, VISA • F1, Nationality • Indian
CELL • (+1)469-275-2391, E-MAIL • ramcharanmc@gmail.com, rmc160030@utdallas.edu

OBJECTIVE: Seeking a Research Position. Experienced in applying Signal Processing, and Deep learning techniques to solve challenging problems in Real-time Speech, Non-Linguistic/Environment/Noise and Audio Analysis for Hearing Aids/Cochlear Implants

SUMMARY: A PhD-EE Student (Advisor: Prof. [John H.L. Hansen](#)), with following interests/experiences:

- ❖ Audio Signal Processing: Sound Recognition, Speech Enhancement-IQP, VAD, Compression, HA/CI
- ❖ Deep Learning: Student-Teacher, Model Compression, Knowledge Transfer, CNN, DNN, Auto Encoders, U-Net
- ❖ ML: Linear-Logistic Regression, MLP, SVM, Decision Trees, Random Forest, KNN, Naive-Bayes, and Clustering
- ❖ Speech & Speaker Recognition: MFCC/LPC, HMM, GMM-UBM: MAP Adaptation, MLLR & ASR
- ❖ Multichannel Analysis-Synthesis Filter Banks: Gammatone, Fitting Models for Hearing Aids & Auditory Filters
- ❖ System Identification and Adaptive Filters: LMS, NLMS, RLS, Wiener Filtering & Affine Projections Algorithms






EDUCATION

- ❖ **Ph.D.** | Electrical Engineering (2016-Till Date) | GPA* 3.50 | UTDallas, USA 
 - **Dissertation: Non-linguistic Sound Analysis and Safety Evaluation Framework for Cochlear Implants/Hearing Aid Technology.** The focus of this dissertation is as follows:
 - Analysis and safety evaluation of Research Platforms for all acoustic and electrical stimuli parameters,
 - CNN based analysis of non-linguistic sound classification, confusability, and perception among NH vs CI listeners,
 - Approaches for non-linguistic sound enhancement for CI listeners, and
 - Advancing speech and non-linguistic source separation and identification among CI listeners
- ❖ **Master of Technology** | Digital Electronics and Communication Systems (2010-2012) | 80.4% | VTU, India 
 - **Master's Thesis: Implementation of ANN on FPGA for Image Compression**
- ❖ **Bachelor of Engineering** | Electronics and Communication (2006-2010) | 76.7% | VTU, India 
 - **Undergraduate Project: Design of Speaker Recognition System**

SKILLS

- ❖ **Programming:** Matlab, C, Python (Keras,TF,Scikit), Visual C/C++, Verilog/VHDL programming, Simulink,8085/8086 Microprocessor and 8051 Microcontroller Assembly Language, Basics of Perl, Linux Shell Scripting and Java.
- ❖ **Tools:** Visual C/C++ Studio, Kaldi. [Intel CILK](#), [Android Studio](#), Code Compiler Studio, Xilinx SDK, [Intel C++ Studio XE](#), [Intel Parallel Studio](#), Microwind/Modelsim, [Keil up vision](#), [Code Composer Studio](#), [GNU Radio](#), Oracle.
- ❖ **Hardware Design:** FPGA, RF Daughterboard - [RFX-2400](#), [WBX](#), [XCVR2450](#) Installation and Configuration on USRPs ([USRPN210](#)). Developed 4 x 4 MIMO RF setup.
- ❖ **Compiler Optimization:** GCC/ICC Compiler flags.
- ❖ **Environment:** Android, Linux – Ubuntu and SUSE, UNIX, Windows

RESEARCH AND PROFESSIONAL EXPERIENCE

- ❖ **Research Intern** at [Facebook Reality Labs](#), Washington, USA 
 - **Spatial Audio and Hear through Analysis:** Applied Signal Processing for Head-Related Transfer Function, Hear Through and Spatial Audio Research; Efficient sound representation, and spatial audio analysis for hearable device users
- ❖ **Machine Learning Intern** at [Texas Instruments](#), Dallas, Texas, USA 
 - **Obstacle Recognition and Localization:** Optimal ultrasonic sensor arrangement, Grid Map based scalable/adaptable and robust (addressing problems) acoustical data collection design, explored CNN based architectures + Feature Engineering, which resulted in very high accuracy of more than at least 96+%
- ❖ **Speech & Hearing Researcher** at [University of Colorado, Boulder](#), Boulder, Colorado, USA 
 - **Room Reverberation, Head Related Transfer Function Analysis and Remote Externalization:** Binaural acoustic measurements using 4 microphones varying Room reverberation times by simulating a One-One talker, Distant Talker and Ambient Noise Conditions.
- ❖ **Teaching/Research Assistant** at [University Of Texas at Dallas](#), Richardson, Texas, USA 
 - **Senior Design: (TA - Advisory Role)**
 - Acoustic 3D Audio Lab Setup
 - Raspberry Pi - IoT based Localization of Acoustic Sources - supported by Air Force Research Lab
 - Raspberry Pi based smart-interactive real-time environmental sniffing, analysis, and characterization for CIs
 - Real-time command recognition implementation on TI device - supported by Texas Instruments 



- **Android-based sound processor for SP16 (Cochlear Corp.):** A real-time CI sound processing implementation & streaming setup
- **An individualized real time single microphone Speech Enhancement using JMAP:** Proposed Speech Enhancement approach customizes Speech Quality and Intelligibility based on user's listening preferences
- **Coursework Projects:**
 - **Speaker Recognition on NASA's Apollo 11 Corpus:** VAD and MFCC based speaker features based i-Vector model built on Kaldi and backend - cosine distance scoring
 - **Detecting Speech Activity Using Convolutional Neural Network (CNN) Classifier:** A low memory and a computationally efficient CNN classifier to segregate speech and non-speech segments using MFSC
 - **System Identification using LMS, NLMS, RLS and Wiener Filter for Real Data:** Identify Estimating an optimal LTI causal system to model unknown system



- ❖ **Associate Software Engineer** at [IBM India Pvt Limited](#), Bangalore, Karnataka, India. (2013-2016)
- **IBM ORION AWARD – 2014:** For best performance



- ❖ **Teaching Assistant** at [P.E.S.I.T, VTU](#), Bangalore, Karnataka, India
- **Prof. MRD Merit Scholarship Recipient** For good academic standing
- **Design and Implementation of 4 x 4 MIMO in RF Environment:** Developed 4 x 4 MIMO transceivers on Interactive Python based GUI GNU Radio Companion and evaluated its performance using OFDM modulated signals

RELEVANT COURSES

RANDOM PROCESS	PATTERN RECOGNITION	DIGITAL SIGNAL PROCESSING
LINEAR ALGEBRA	MODERN DIGITAL SIGNAL PROCESSING	SPEECH AND SPEAKER RECOGNITION
SIGNALS AND SYSTEMS	DSP ALGORITHMS AND ARCHITECTURE	MACHINE LEARNING

PUBLICATIONS

- ❖ [Ram C M C Shekar](#) and John H. L. Hansen, **CCI-MOBILE: ANALYSIS AND EVALUATION OF NON-LINGUISTIC SOUND ENHANCEMENT FOR COCHLEAR IMPLANT RECIPIENTS** In 2021 CIAP (pp. 219)
- ❖ [Ram C M C Shekar](#) and John H. L. Hansen, **CCI-MOBILE: Comparative Analysis Of CNN-Based Models Vs Human Sound Recognition Among Cochlear Implant And Normal Hearing Subjects** In 2021 CIAP (pp. 53)
- ❖ John H.L. Hansen Juliana N. Saba, Nursadul Mamun, Ria Ghosh, [Ram C.M.C. Shekar](#), Avamarie Brueggeman, Hazem Younis, **Hands On With CCI-MOBILE: A Cochlear Implant and Hearing-Aid Research Platform** In ARO 2021
- ❖ [Shekar, R. C.](#), Belitz, C., & Hansen, J. H. **Development of CNN-Based Cochlear Implant and Normal Hearing Sound Recognition Models Using Natural and Auralized Environmental Audio.** In 2021 IEEE (SLT) (pp. 728-733). IEEE
- ❖ [Shekar, R. C.](#), & Hansen, J. H. (2021). **An evaluation framework for research platforms to advance cochlear implant/hearing aid technology: A case study with CCI-MOBILE.** JASA, 149(1), 229-245
- ❖ Ghosh, R., [Shekar, R. C. C.](#), & Hansen, J. H. (2020, July). **Portable Smart-Space Research Interface to Predetermine Environment Acoustics for Cochlear implant and Hearing aid users with CCI-MOBILE.** In 2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC) (pp. 4221-4224). IEEE
- ❖ [Ram Charan M C](#) and John H. L. Hansen, **CCI-MOBILE: Safety and Performance Evaluation** CIAP- 2019
- ❖ Hansen, J. H., Ali, H., Saba, J. N., [Charan, M. R.](#), Mamun, N., Ghosh, R., & Brueggeman, A. **CCI-MOBILE: Design and evaluation of a cochlear implant and hearing aid research platform for speech scientists and engineers.** In 2019 IEEE EMBS (BHI) (pp. 1-4). IEEE
- ❖ [Chandra Shekar, R. C. M.](#), & Hansen, J. H. (2019). **Development and analysis of synoptic evaluation strategy for research platforms for Cochlear Implants and hearing aids.** The Journal of the Acoustical Society of America, 146(4), 2916-2916
- ❖ [Ram Charan M C](#), Hussnain Ali and John H. L. Hansen, **Testing paradigms for assistive hearing devices in diverse acoustic environments** 2-6 September 2018, Hyderabad 2018
- ❖ Yiya Hao, [Ram Charan M C](#), Gautam S Bhat and Issa M.S. Panahi, **Robust Real-time Sound Pressure Level Stabilizer for Multi-Channel Hearing Aids Compression for Dynamically Changing Acoustic Environment** Asilomar Conference on Signals, Systems and Computers – OCTOBER 2017
- ❖ Chandan K A Reddy, Nikhil Shankar, Gautam S Bhat, [Ram Charan M C](#) and Issa Panahi **An individualized Super Gaussian single microphone Speech Enhancement for hearing aid users with smartphone as an assistive device** IEEE Signal Processing Letters- NOVEMBER 2017

REFERENCES: Available upon request.