Jaswanth Reddy Katthi

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Education

- **Indian Institute of Science** **Bengaluru, KA**
  M.Tech (Research) Electrical Engineering , CGPA: 8.2/10 *2018–Present*
  Courses: Machine Learning for Signal Processing, Speech Information Processing, Time-Frequency Analysis, Compressed Sensing and Sparse Signal Processing, Data Analysis and Visualization, Matrix Theory, Linear and Nonlinear Optimization, Stochastic Models and Applications, Data Structures and Algorithms.
- **Jawaharlal Nehru Technological University, Anantapur** **Anantapur, A.P**
  B.Tech, Electronics and Communication Engineering, Percentage: 74.57 % (FCD) *2013–2017*
  Courses: Data Structures, Signals and Systems; Analog and Digital Communications; Digital Signal Processing; Digital Image Processing; Electronic Circuit Analysis; Neural Networks and Fuzzy Logic; Calculus

Research Interests

Machine Learning, Computational Neuroscience, Language Technologies, Cognition, Memory, Reinforcement Learning

Publications

- **Conference:** Deep Multiway Canonical Correlation Analysis for Multi-Subject EEG Normalization, *Jaswanth Reddy Katthi and Sriram Ganapathy*, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP 2021)
- **Conference:** Deep Canonical Correlation Analysis For Decoding The Auditory Brain, *Jaswanth Reddy Katthi, Sriram Ganapathy, Sandeep Kothinti and Malcolm Slaney*, 42nd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2020)
- **Journal:** Deep Correlation Analysis for Audio-EEG Decoding, *Jaswanth Reddy Katthi and Sriram Ganapathy*, IEEE Transactions on Neural Systems and Rehabilitation Engineering (2021). (Under Review)

Research Experience

- **Reconstructing speech stimuli from EEG Recordings** **Dr. Sriram Ganapathy**
  Department of Electrical Engineering, Indian Institute of Science *Spring 2021 - Ongoing*
  We are studying various non-linear models like CNN, LSTMs and transformers for reconstructing speech stimuli from their corresponding EEG responses in single-trial analysis setting. The preliminary experiments have shown positive results.
- **Deep Correlation Analysis for Audio-EEG Decoding** **Dr. Sriram Ganapathy**
  Department of Electrical Engineering, Indian Institute of Science *Fall 2020*
  We have proposed neural network based correlation analysis framework, for intra- and inter-subject analyses, that significantly improves over the linear methods for auditory stimuli. A deeper study into the models' performance over naturalistic speech and music datasets is performed.
- **Deep MCCA for Multi-Subject EEG Normalization** **Dr. Sriram Ganapathy**
  Department of Electrical Engineering, Indian Institute of Science *2020*
  We have proposed a shared autoencoder-style neural network that helps to align multiple subjects' EEG readings

for a common stimulus. We have shown that the proposed model increases the correlation among the multiple subjects' EEG readings and the intra-subject stimulus-correlation analysis for each subject.

- **Deep CCA For Decoding The Auditory Brain** **Dr. Sriram Ganapathy**
  Department of Electrical Engineering, Indian Institute of Science *Fall 2019*

  We have proposed a deep learning based model which improves over the hybrid linear single trial analysis methods. New representations for the naturalistic auditory stimuli and their corresponding EEG responses with high correlation are obtained.

- **Estimating depth of skin lesions for Melanoma patients** **Prof. M N Giri Prasad**
  Department of Electronics and Communication Engineering, JNTU Anantapur *Fall 2015*

  The major focus of the project was to reconstruct the 3D lesion surface from the 2D non-invasive dermoscopic images. I worked as a research assistant in this project, and assisted the professor in analysing the acquired data.

Projects

Course Projects

- **Change-Point Detection and Estimation of Peice-wise Constant Parameters using Sparse Linear Regression.** **Prof. K.V.S Hari**
  Compressed Sensing and Sparse Signal Processing, Indian Institute of Science *Spring 2019*

  I have tried to leverage the quasi-stationarity of speech signals to estimate time-varying (TV) piece-wise constant auto-regressive (AR) coefficients. These AR coefficients can be used to compress the speech signal.

- **Which factor correlates with the crime rate in India?** **Prof. Phaneendra K. Yalavarthy**
  Data Analysis and Visualization, Indian Institute of Science *Spring 2019*

  I have visualized the crime rates in India against various factors like crime against women, population density, total and female education enrolments, total and female literacy rate and poverty using Tableau. The data used is publicly available by the government of India. It showed that no single factor was correlated with the crime rates.

Other Projects

- **Biologically Inspired Optimization and Learning** **Dr. Edward Kim**
  Neuromatch Academy *Fall 2020*

  It was a one week project for the summer workshop of Neuromatch Academy. We have tried Predictive Coding (PC) based learning algorithm to compare with Gradient Descent. Explored the Nengo framework.

- **Smart Automotives** **Srinivas Rao**
  Department of ECE, JNTU Anantapur *Spring 2017*

  Using MSP430, supervising the conditions in an automobile through IoT to inform family, other automobiles and emergency services nearby in the hour of need. As our final year project, I have designed and implemented the project as the team lead.

- **Telebot** **Prof. E. Keshava Reddy**
  Department of Mathematics, JNTU Anantapur *Fall 2016*

  I involved in the design and implementation of 2 prototypes for tele-presence robot, Telebot, which is controllable by an android device. It was aimed at educational and medical sectors.

- **Artificial Intelligence Development Board** **Prof. E. Keshava Reddy**
  Department of Mathematics, JNTU Anantapur *Spring 2016*

  I have worked as a research assistant in this project. We designed and implemented an ATMEGA 328 based low power and low memory neural network of 16 neurons with 4 digital inputs and 4 digital outputs.

Scholastic Achievements

- Secured an All India Rank of 68 -99.9 percentile- in GATE (EC) 2018.
- Acquired a score of 220/360 -99 percentile all over India- in JEE MAINS 2013.
- Got a 1078 Rank in EAMCET 2013, a state common entrance test for B. Tech in Andhra Pradesh.
- Appreciated by the South Central Railway Office for academic excellence.

Intern Experience

- **Robolabs (Startup)** - *Intern* **Anantapur, 2016**
  Participated in multiple embedded systems projects. Notably, I have worked on design and implementation of a coin based mobile charging point which looked similar to a pay-and-talk telephone, and prototypes of tele-presence robot project, Telebot.
- **Smaya (Startup)** - *UI/UX and Prototype Design* **Anantapur, 2015**
  The major focus of the startup was to develop a wearable smart assistant device (like smart watch). I have worked on the UI/UX design of the device. Also designed the prototype's features and configurations.

Teaching Experience

- **Teaching Assistant for Deep Learning (CCE Course)**, Indian Institute of Science
  Maintaining course website, setting assignments, examinations and tutorial sessions.(Spring 2020)
- **Teaching Assistant for E9:309 (Advanced Deep Learning)**, Indian Institute of Science
  Maintaining course website, setting assignments, examinations and tutorial sessions. (Fall 2020)

Technical and Personal Skills

- **Programming Languages:** Python, MatLab, C, C++, Embedded C, HTML, CSS, JavaScript, VHDL, LaTeX, Bash.
- **Frameworks/ Libraries**: Pytorch, Scikit, Librosa, Praat, Tensorflow, VueJS.
- **Technical Knowledge**: Speech Processing, Computer Vision, Natural Language Processing, Reinforcement Learning, Computational Neuroscience.
- **Other:** Adobe Photoshop, Illustrator, Audition, Logic Pro X, excited by teamwork, good listener.
- **Languages**: Telugu, Hindi, English, Kannada, Tamizh, French (currently learning).

Workshops and Extra-curricular

- Actively participated and organized the annual 'Open Day' for LEAP lab in 2019 and 2020.
- Attended workshops like 'Brain, Computer and Learning', 'Indo-French Centre for Applied Mathematics', 'CNS 2020' and numerous talks visiting our Institute.
- Attended 'Winter School on Speech and Audio Processing, 2020' ; theme was 'Machine Listening'.
- Member of students theatre club - Rangmanch, worked for three different plays.
- Topped at "Embedded Systems" workshop at NIT Warangal, 2014 and got selected for Nationals at IIT Madras.
- Coordinated and organized a 3 days personality development program "IMPACT" at Anantapur, in 2016.
- An active member of NSS Club and worked as coordinator for ECE student's body during my Bachelor's.
- Completed multiple online courses including projects and assignments on ML and DL covering CS229, CS230, CS231n and CS224n, offered by Stanford and Coursera.
- Other: Design, Running, Languages, Movies, Music, Philosophy, Emotions, Theatre, Writing, Sci-fi.