Valliappan CA

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Link to my Google-Scholar | Github ID : nappaillav

Research Interest

Deep Learning application in Speech Signal Processing and Computer Vision

Education

- **Birla Institute of Technology and Science, Pilani** — India
  Bachelor of Engineering in Electronics and Instrumentation; GPA: 8.03/10 — *Aug 2013 - Aug 2017*

Bachelor Thesis

- **Study of Broadband Reflectometry Data Using Non-Stationary Signal Processing** — BITS Pilani, India
  Guide: Dr.A.Amalin Prince — *Jan 2017 - May 2017*
  - **Abstract**: Presented a comparative study of linear and non-linear signal processing methods like Wavelet decomposition, Empirical Mode Decomposition & Ensemble Empirical Mode Decomposition on Broadband reflectometry data.[PDF]

Publication

- Renuka Mannem, **C.A.Valliappan**, Prasanta Kumar Ghosh."A SegNet Based Image Enhancement Technique for Air-Tissue Boundary Segmentation in Real-Time Magnetic Resonance Imaging Video", accepted in 25^{th} National Conference on Communications (NCC), 2019.
- **C.A.Valliappan**, Renuka Mannem, Prasanta Kumar Ghosh. "Air-Tissue Boundary Segmentation in Real-Time Magnetic Resonance Imaging Video using Semantic Segmentation with Fully Convolutional Networks", accepted in Interspeech 2018.[Link]
- **C.A.Valliappan**, Anurag Das, Prasanta Kumar Ghosh. "Classification of story-telling and poem recitation using head gesture of the talker", accepted in International Conference on Signal Processing and Communications (SPCOM) 2018. [Link]
- Nalband S, **Valliappan CA**, Prince AA, & Agarwal, "Time frequency based feature extraction for the analysis of vibroarthographic signals", in journal of Computers and Electrical Engineering, Elsevier Publication, 2018. [Link]
- Nalband S, **Valliappan CA**, Gupta R, Prince AA, and Agarwal A, "Feature Extraction and Classification of Knee Joint Disorders Using Hilbert Huang Transform", 14^{th} IEEE Conference of ECTI Society, (ECTI-CON), 2017. [Link]
- Balaji A, Haldar A, Patil K, Ruthvik TS, **C.A. Valliappan**, Jartarkar M, Baths V. "EEG-based classification of bilingual unspoken speech using ANN", in Engineering in Medicine and Biology Society (EMBC), pp. 1022-1025, 2017. [Link]
- **C.A. Valliappan**, Advait Balaji, Sai Ruthvik Thandayam, Piyush Dhingra, and Veeky Baths. " A Portable Real Time ECG Device for Arrhythmia Detection Using Raspberry Pi", in International Conference on Wireless Mobile Communication and Healthcare, pp. 177-184. Springer, Cham, 2016. [Link]

Work Experience

- **Data Scientist at ParallelDots** — Gurgaon, India
  Mentor:Muktabh Mayank — *October 2018 - Present*
  - **Role**: Object tracking and Optical Character Recognition used for shelf monitoring
    - To develop **Automated Retail Auditing Tool** using state of the art object tracking techniques like SSD, YOLO and Faster RCNN. ShelfWatch-Demo Link
    - Generation of artificial dataset from few images of retail products.
    - Implemention of the Adaptive sampling on the dataset for improving the learning of the model.
    - Analyzing the intricate details of the model, to reduce the false positives.
    - OCR is used to supplement the results with addition details from the tracked objects. Custom trained SSD for text detection
- **Research Assistant at SPIRE lab** — IISc, Bangalore, India
  Mentor: Dr.Prasanta Kumar Ghosh — *June 2017 - September 2018*
  - **Topic**: Analysis and Synthesis of Head motion for Human-Computer Interaction
    - 3D-Audio visual Head motion database was created using Motion Capture System(MoCap).

    - Estimating the Translation coordinates & Euler angle from the head trajectory over the entire database.
    - Investigate the nature of head gestures in spontaneous speech in comparison to that in rhythmic speech(singing).
  - **Topic**: Audio-Visual Synthesis for Realistic Agent
    - Extraction of Lip shape from Audio Visual Corpus.**PRAV**
    - Synthesis of Lip movement from the acoustic feature of the speaker using **LSTM** network.
    - Optimal loss lip motion synthesized using Dynamic programming. Video

Projects

- **Decision making system using the reviewer scores and comments for the submitted paper** IISc Bangalore
  Guide:Prof.Prasanta Kumar Ghosh *August 2018*
  - Xgboot model was learnt using the features reviewer comment and scoces. [code]
  - The model was trained on the previous years data and tested on current edition, which gave an accuracy of $\sim 90\%$.

- **Air-Tissue Boundary segmentation in rt-MRI video using semantic segmentation** IISc Bangalore
  Guide:Prof.Prasanta Kumar Ghosh *Dec 2017 - March 2018*
  - Semantic segmentation using the Deep learning architecture called Fully Convolutional Networks and SegNet.
  - Currently, my approach to this ATB segmentation produces $\sim 10\%$ less error rate than the baseline. [code]

- **De-Noising technique for frequency signal recorded from ships** BITS Pilani
  Guide:Prof.Neena Goveas *Jan 2017 - May 2017*
  - This project involved experimenting different sequential models for denoising the frequency signals.
  - Experimented various loss functions other than MSE for deployed model.

- **Comparative study of signal decomposition technique using Time-Frequency Image** BITS Pilani
  Guide:Prof.A. Amalin Prince *Jan 2016 - Dec 2016*
  - Investigated the non-linear decomposition techniques like Wavelet, Empirical Mode Decomposition(EMD) & Ensemble Empirical Mode Decomposition(EEMD) for time-frequency imaging.
  - Analyzed the performance of each method using the features extracted from Time Frequency image.

- **Portable Real Time ECG Device for Arrhythmia Detection Using Raspberry Pi** BITS Pilani
  Guide:Prof.Veeky Baths *Jan 2016 - Dec 2016*
  - Real-Time ECG tracking device with special emphasis on arrhythmia detection, completely Portable with Mobile Application, Build using RasPi-3.[code]
  - The arrhythmia detection algorithm tested on MIT-BIH database and reported an accuracy greater than 95%.

Position of Responsibility

- **Teaching Assistant for EEE-F434 Digital Signal Processing** BITS Pilani
  Set programming assignments for Hardware and Software implementation of DSP algorithms *Jan 2016-May 2016*

- **Teaching Assistant for CS-F111 Computer Programming** BITS Pilani
  Evaluated assignments of the students and ensured smooth functioning of Lab session *Jan 2015-May 2015*

Skills

- **Languages**: C, C++, Python, MATLAB, UNIX Shell Script, LaTeX.
- **Deep Learning Libraries**: Pytorch, Keras and Tensorflow.

Achievements & Awards

- Travel Grant Recipient for INTERSPEECH - 2018.
- Participated at ACM-ICPC Asia Amritapuri Multisite Regional Contest 2016 and 2014.
- Course topper in **Digital Signal Processing , Digital design**
- Awarded the best Student project in Hackathon INOUT 3.0 held in NIT Surat for "The Portable Real Time ECG Device using Raspberry Pi". This work was presented as a paper in Mobhihealth-2016, in Milan.

[1]Last Updated: December 12, 2018