Prahalathan Sundaramoorthy

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EDUCATION

University of Southern California - Viterbi School of Engineering **January 2019-December 2020**
Master of Science in Electrical Engineering (Machine Learning)
***Coursework**: Probability, Linear Algebra, Pattern Recognition, Machine Learning, Deep Learning, Data Mining*

Anna University **June 2013-April 2017**
Bachelor of Engineering in Electrical and Electronics

TECHNICAL SKILLS

- **Languages:** Python, Java, C/C++, MATLAB, Bash
- **Tools:** NumPy, SciPy, Pandas, Spark, Git, Docker
- **Data Visualization:** Matplotlib, Seaborn, Plotly
- **Deep Learning:** Keras, TensorFlow, PyTorch
- **Databases:** MySQL, MongoDB
- **Vision and Language:** OpenCV, NLTK, Spacy
- **ML and Statistics:** Scikit-learn, Statsmodels
- **Cloud Services:** AWS, GCP

WORK EXPERIENCE

Research Intern **May 2020-August 2020**
HP Inc., Palo Alto

- Devised an end-to-end heart rate calculation model from Photoplethysmography (PPG) time-series sensor data in **Python.** Reduced mean error by **30%** through spectral filtering and statistical validation; collaborated with production team for porting model to **C** for release.
- Achieved **80%** accuracy in predicting cognitive load of individuals through PPG wave morphology. Trained **1D Convolutional Neural Network** to capture shape of data from **450** participants on **AWS EC2**.

NLP & Deep Learning Intern **June 2018-August 2018**
Teknuance Info Solutions Pvt. Ltd, Chennai

- Examined **deep learning** techniques such as seq2seq LSTMs, Word2Vec, GloVe, etc. for performing **NLP** tasks -- text summarization, topic modeling on business data.

Research Assistant **April 2017-June 2018**
Solarillion Foundation, Chennai

- Led a team of four to develop a human activity recognition system from smartphone sensor data with **43 million samples**. Used CNN ensembles to achieve **96%** accuracy, beating state-of-the-art by **3%**.
- Equipped the above model with support for **on-device** incremental learning resulting in an increase in accuracy of **~35%** of least performing end-user.
- Devised a **low-cost** system for non-intrusive load monitoring on Raspberry Pi employing ensemble machine Learning (extremely randomized trees) with inference time of **400ms** and **86%** accuracy.

PROJECTS

Active Learning using Bayesian Convolutional Neural Network

- Developed **ActiveHARNet**, a Bayesian Convolutional Neural Network with uncertainty estimates to update model based on **real-time unlabelled data** for Human Activity Recognition.
- Trained model online using active learning and improved mean accuracy by **~25%** using **50%** new data.

Recommendation system on Yelp data

- Performed collaborative filtering with **MapReduce** technique to predict user ratings on products from Yelp data. Employed **Spark** framework for parallel processing and predicted ratings with RMSE of **1.176.**

- Created **NLP** pipeline to calculate **TF-IDF** scores on text data and built content-based recommender system to recommend similar products based on user history.

BFR Algorithm for large scale K-Means

- Implemented Bradley-Fayyad-Reina algorithm for distributed **K-Means** clustering on Yelp data using Python and Spark; obtained **90%** agreement with ground-truth clusters.

PUBLICATIONS

- Gautham Krishna Gudur, ***Prahalathan Sundaramoorthy***, Venkatesh Umaashankar, **"***ActiveHARNet: Towards On-Device Deep Bayesian Active Learning for Human Activity Recognition", **ACM MobiSys 2019***, 3rd International Workshop on Embedded and Mobile Deep Learning, Seoul, South Korea.
- Gautham Krishna Gudur, ***Prahalathan Sundaramoorthy***, Venkatesh Umaashankar "*Handling Real-time Unlabeled Data in Activity Recognition using Deep Bayesian Active Learning and Data Programming", **MobiUK 2019, University of Oxford*** [Extended Abstract].
- ***Prahalathan Sundaramoorthy***, Gautham Krishna Gudur, Manav Rajiv Moorthy, R Nidhi Bhandari, Vineeth Vijayaraghavan, "*HARNet: Towards On-Device Incremental Learning using Deep Ensembles on Constrained Devices", **ACM MobiSys 2018***, 2nd International Workshop on Embedded and Mobile Deep Learning, Munich, Germany.
- A. K. Jain, S. S. Ahmed, ***P. Sundaramoorthy***, R. Thiruvengadam, V. Vijayaraghavan, "Current peak based Device Classification in NILM on a low-cost embedded platform using Extra-trees," *2017 IEEE MIT Undergraduate Research Technology Conference (URTC)*, ***Massachusetts Institute of Technology, Cambridge, MA, 2017.***

POSTERS

- Gautham Krishna Gudur, Abhijith Ragav, **Prahalathan Sundaramoorthy**, Venkatesh Umaashankar "*Bayesian Active Learning for Wearable and Mobile Health*", **NeurIPS** Europe meetup on Bayesian Deep Learning (BDL 2020).

AWARDS

- **First prize** among 50 participants in project exhibition **PROXPO 2016** organized by Velammal Engineering College, Chennai.
- **Runner up** in **Badminton** at the intramural sports competition among 8 departments conducted by Velammal Engineering College in 2016.

LANGUAGES:

- *Read, write, speak* - English, Tamil
- *Speak* - Hindi, Kannada