

SATYA NARAYAN SHUKLA

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81 Belchertown Road, 160 Colonial Village, Amherst, MA, 01002

EDUCATION

University of Massachusetts Amherst

Fall 2016 - Present

MS/Ph.D. in Computer Science

CGPA - 4.0/4.0

Indian Institute of Technology Kharagpur

July 2010 - May 2015

Dual Degree: Bachelors - Electrical Engineering, Masters - Instrumentation & Signal Processing

CGPA - 9.25/10.0 (Rank - 1/30)

PUBLICATIONS

- Satya Narayan Shukla and Benjamin Marlin. “Modeling Irregularly Sampled Clinical Time Series.” *Machine Learning for Health Workshop, NeurIPS 2018*.
- Satya Narayan Shukla and Benjamin Marlin. “Interpolation-Prediction Networks for Irregularly Sampled Time Series.” *Under review at ICLR 2019*.
- Abhishek Sengupta, Prathosh AP, Satya Narayan Shukla, Vaibhav Rajan and Chandan K Reddy. “Prediction and Imputation in Irregularly Sampled Clinical Time Series Data using Hierarchical Linear Dynamical Models.” *EMBC 2017*.
- Satya Narayan Shukla. “Estimation of Blood Pressure from Non-invasive Data.” *EMBC 2017*.
- Satya Narayan Shukla, Karan Kakwani, et al. “Non-invasive Cuffless Blood Pressure Measurement by Vascular Transit Time.” *VLSID 2015*.

PATENTS

- System and Method of Modeling Irregularly Sampled Temporal Data using Kalman Filters
- Forecasting Patient Vital Measurements for Healthcare Analytics

EMPLOYMENT

Research Intern

Microsoft Research Redmond

Summer 2017

Time Series Forecasting with Uncertainty Estimates using Deep Neural Networks

- Investigated the effectiveness of likelihood-based loss functions in quantifying uncertainty estimates for time series forecasts.
- Developed a multi-time scale ensemble approach to improve the uncertainty estimates for long horizon forecasts.

Research Assistant

University of Massachusetts Amherst

Fall 2016 - Present

Interpolation-Prediction Networks for Irregularly Sampled Time Series

- Proposed a new deep learning architecture for addressing the problem of supervised learning with sparse and irregularly sampled multivariate time series.
- Our model outperformed a range of baseline and recently proposed models on both classification and regression tasks.

Learning Shallow Detection Cascades for Wearable Mobile Health Applications

- Proposed a new approach to cascaded classifier learning using an architecture that better matches the hard decisions that are made when the cascade is applied at detection time.
- Our architecture outperforms the soft cascade architecture in terms of a speed-accuracy trade-off.

Research Intern

Xerox Research Centre India

Summer 2015

- Improved the prediction results in modeling irregularly sampled physiological signals over the state-of-the-art Multi Task Gaussian Process method which inherently fits the irregular sampling through temporal kernels.

- Addressed the challenge of irregular sampling by incorporating a temporal difference variable within the state equation of the Kalman filter model whose parameters are estimated using observed data.

Research Intern

Samsung Electronics, Korea

Summer 2013

- Developed an emotion detection system based on Active Shape Models to identify human alertness and emotions.

PROJECTS

Analysis of Dropout in Deep Networks

Oct 2017 - Dec 2017

- Exposed surprising differences between the behavior of dropout and more traditional regularizers like weight decay.
- Presented a counterpoint to the suggestion that dropout discourages co-adaptation of weights.

Deep Learning Approach to Generate Image Captions

Oct 2016 - Dec 2016

- Developed a model with Deep Convolutional network to encode an image into a fixed-length vector representation and Long Short Term Memory (also experimented with RNNs) to decode this representation into a caption.
- Our model with LSTM as language model yielded comparable results with the state-of-the-art models.

Aspect Based Sentiment Analysis using Deep Learning

Oct 2016 - Dec 2016

- Implemented a Convolutional Neural Network to identify the aspects present in a review and predicted their sentiment/polarity; and also experimented with adding additional features such as POS tags.
- Our model yielded better results than the top teams at Semantic Evaluation 2015 Competition in aspect identification task for Laptop domain data while ranked 3rd for Restaurant domain data.

Blood Pressure Estimation from Photoplethysmogram signal

Aug 2014 - Apr 2015

- Estimated blood pressure (BP) from the features of the PPG using NNs and Multi-Task Gaussian Processes.
- Evaluated both the models on 100 patient data extracted from the MIMIC database and found that the proposed methods give better results in comparison to other non-invasive techniques used for BP estimation.

Non-invasive Cuffless Blood Pressure Measurement

Aug 2013 - Apr 2014

- Project deals with the estimation of human blood pressure from using PCG and PPG signals.
- Estimated the BP with an accuracy of more than 94% when compared to conventional BP measuring devices.

AWARDS AND HONORS

- Institute Silver Medal, *IIT Kharagpur 2015*
- Best Project Award for Master's Thesis, *IIT Kharagpur 2015*
- Samsung Innovation Award, *Samsung R&D Institute India 2014*
- WISE scholarship for research internship at *RWTH Aachen Germany 2014*.

TECHNICAL SKILLS

Python; PyTorch; Keras; TensorFlow; SQL; C; Perl; Java; MATLAB; R; Verilog; git; L^AT_EX