Jwala Dhamala

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Research Interests

Deep learning, Machine learning, Bayesian optimization, Active learning, Uncertainty quantification, Healthcare applications, Cardiac electrophysiological models.

Education

Ph.D. in Computing and Information Sciences 2014 - 2019
Rochester Institute of Technology, Rochester, NY, US GPA: 3.93/4.00
Advisor: Dr. Linwei Wang

B.E. in Computer Engineering 2008 - 2012
Pulchowk Campus, Tribhuvan University, Nepal with Distinction

Experience

Research Assistant 2014 - 2019
Computational Biomedicine Lab
Rochester Institute of Technology, NY, US
Research focus: Personalization and uncertainty quantification in cardiac electrophysiological models through the integration of physics-based modeling and data-driven machine/deep learning methods

Research Intern 2018
Philips Healthcare, Cambridge, MA, US
Research focus: Unsupervised representation learning and similarity assessment of multi-variate time-series physiological signals

Software Engineer 2012 – 2014
Business Intelligence Department
Logic Information Systems, Nepal

Research Intern 2012
Business Intelligence Department
Logic Information Systems, Nepal

Journal Articles

Embedding High-dimensional Bayesian Optimization via Generative Modeling: Parameter Personalization of Cardiac Electrophysiological Models
Dhamala, J., Arevalo, H. J., Sapp, J., Horáček, M., Wu, K. C., Trayanova, N. A., and Wang, L.
Medical Image Analysis (MedIA), in submission, **invited**

Quantifying the Uncertainty in Model Parameters using Gaussian Process-based Markov Chain Monte Carlo in Cardiac Electrophysiology
Dhamala, J., Arevalo, H. J., Sapp, J., Horáček, M., Wu, K. C., Trayanova, N. A., and Wang, L.
Medical Image Analysis (MedIA), 2018

Multivariate Time-series Similarity Assessment via Unsupervised Representation Learning and Stratified Locality Sensitive Hashing: Application to Early Acute Hypotensive Episode Detection
Dhamala, J., Azuh, E., Al-Dujaili, A., Rubin, J., and O'Reilly, U. M.
IEEE Sensors Letters, 2018

Spatially Adaptive Multi-scale Optimization for Local Parameter Estimation in Cardiacelectrophysiology
Dhamala, J., Arevalo, H. J., Sapp, J., Horáček, M., Wu, K. C., Trayanova, N. A., & Wang, L.
IEEE Transactions on Medical Imaging (IEEE TMI), 2017

Conference Articles

Bayesian Optimization on Large Graphs via a Graph Convolutional Generative Model: Application in Cardiac Model Personalization
Dhamala, J., Ghimire, S., Sapp, J. L., Horáček, B. M., and Wang, L.
Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2019
early acceptance

Improving Generalization of Deep Networks for Inverse Reconstruction of Image Sequences
Ghimire, S., Gyawali, P. K., **Dhamala, J.**, Sapp, J. L., Horáček, M., and Wang, L.
Information Processing in Medical Imaging (IPMI), 2019
oral presentation

High-dimensional Bayesian Optimization of Personalized Cardiac Model Parameters via an Embedded Generative Model
Dhamala, J., Ghimire, S., Sapp, J. L., Horáček, B. M., and Wang, L.
Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2018
oral presentation (acceptance rate $\sim$ 4%), finalist for young scientist award

Generative Modeling and Inverse Imaging of Cardiac Transmembrane Potential
Ghimire, S., **Dhamala, J.**, Gyawali, P. K., Sapp, J. L., Horáček, M., and Wang, L.
Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2018

Quantifying the Uncertainty in Model Parameters using Gaussian Process-based Markov Chain Monte Carlo: an Application to Cardiac Electrophysiological Models
Dhamala, J., Ghimire, S., Sapp, J. L., Horáček, B. M., and Wang, L.
Information Processing in Medical Imaging (IPMI), 2017, **acceptance rate $\sim$ 30%**

Overcoming Barriers to Quantification and Comparison of Electrocardiographic Imaging Methods: a Community-based Approach
Ghimire, S., **Dhamala, J.**, Coll-Font, J., Tate, J.D., Guillem, M.S., Brooks, D.H., MacLeod, R.S. and Wang, L.
Computing in Cardiology (CinC), 2017

The Consortium for Electrocardiographic Imaging
Coll-Font, J., **Dhamala, J.**, Potyagaylo, D., Schulze, W.H., Tate, J.D., Guillem, M.S., Van Dam, P., Dossel, O., Brooks, D.H. and Macleod, R.S.
Computing in Cardiology Conference (CinC), 2016

Spatially-adaptive Multi-scale Optimization for Local Parameter Estimation: Application in Cardiac Electrophysiological Models
Dhamala, J., Sapp, J. L., Horáček, B. M., and Wang, L.
Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2016
early accept, acceptance rate $\sim$ 25%

Workshop Articles

High-dimensional Bayesian Optimization of Personalized Cardiac Model Parameters via an Embedded Generative Model
Dhamala, J., Ghimire, S., Sapp, J. L., Horáček, B. M., and Wang, L.
Women in Machine Learning (WiML), 2018

Multivariate Time-series Similarity Assessment via Unsupervised Representation Learning and Stratified Locality Sensitive Hashing: Application to Early Acute Hypotensive Episode Detection
Dhamala, J., Azuh, E., Al-Dujaili, A., Rubin, J., and O'Reilly, U. M.
NeurIPS Machine Learning in Healthcare (NeurIPS ML4H), 2018

Technical Skills

Languages: Python, MATLAB
Deep Learning Framework: PyTorch
Misc: Bash scripting, LaTeX typesetting, Git
Basic familiarity: R, Java, C, C++, HTML, PHP, MySQL

Scholarships & Awards

Travel Grant, NeurIPS Machine learning for Health Workshop (ML4H) 2018
Travel Grant, Woman in Machine Learning (WiML) 2018
Travel Grant, MICCAI 2016, 2018
IPMI Scholarship for Junior Scientists, IPMI 2017
GCCIS Student Grant, Rochester Institute of Technology 2017
Graduate Student Travel Award, Rochester Institute of Technology 2015
Women in Engineering Scholarship, University Grants Commission, Nepal 2010-2011
The College Fellowship Scholarship, Granted 8/8 semesters based on academic merit, Tribhuvan University 2008-2012
Golden Jubilee Scholarship, Government of India 2008-2012
Full-tuition waiver, Based on the performance on a countrywide university entrance examination, Institute of Engineering, Tribhuvan University 2008-2012
Mahatma Gandhi Scholarship, Government of India 2006-2007

Professional Activities

Reviewing
MICCAI 2017-2019
WiML Workshop 2018
IEEE Sensors Letters 2018
Journal of Biomedical and Health Informatics 2018

Organization
Pre-orientation program 2017
Woman in Computing, Rochester Institute of Technology

Workshop on Premature Ventricular Contractions Localization 2016, 2017
Computing in Cardiology, Consortium of Electrocardiographic Imaging

LOCUS - Technological Festival 2012
Institute of Engineering, Pulchowk Campus

Invited Talks

Model Personalization and Uncertainty Quantification in Cardiac Electrophysiological Models
Ph.D. Colloquium Series
Golisano College of Computing and Information Sciences (GCCIS), Rochester Institute of Technology, Rochester, NY, US

Personalization and Uncertainty Quantification in Cardiac Electrophysiological Models
Signal Processing Imaging Reasoning and Learning (SPIRAL) Seminar
Northeastern University, Boston, MA, US