Shoumik Roychoudhury

CONTACT INFORMATION

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EDUCATION

Temple University, Philadelphia, PA, USA

PhD candidate, Computer and Information Science, December 2019 (expected)

- Research expertise: Temporal pattern discovery, Time-series classification, Interpretable machine learning, Deep sequence modeling, Health informatics.

Masters of Science, Electrical and Computer Engineering, December 2011

- Research Area: Computer vision, Moving object tracking, Thermal video analysis
- Thesis Topic: *Tracking Human in Thermal Vision using Multi-feature Histogram.*

TECHNICAL SKILLS

Programming Languages : Java, Python, Matlab, SQL.
Frameworks used: TensorFlow, PyTorch, MySQL, PostgreSQL, Hive.

RESEARCH EXPERIENCE

Mitsubishi Electric Research Laboratories (MERL), Cambridge, MA, USA
Research Intern — May 2018 - August 2018

- Investigated fast pattern matching methods to identify and extract unique temporal patterns characterizing home electrical appliances from signals collected through Home Energy Management System (HEMS) for modeling smart home behaviors.

Temple University, Philadelphia, PA, USA
PhD Research Assistant — January 2013 - present

- **IQVIA funded research project**
  - Created and analyzed longitudinal patient visits from a multi-domain EHR repository of 40 million patients by leveraging the OMOP CDM architecture.
  - Developed disease-agnostic multi-domain stacked deep sequence model which significantly improved disease detection predictive performance in terms of AUPRC by more than 10% on average compared to the individual domain models as well as joint domain model.
- **National Science Foundation funded BIGDATA project**
  - Significantly improved the time-series classification accuracy by extracting novel temporal subsequence order information from multivariate time-series data.
  - Improved identification of Poll-score trends in US Presidential election from temporal information extracted from large scale twitter data of 12 million tweets via a ensemble based multivariate time-series classification model.
  - Major improvement in classification accuracy for across 18 highly imbalanced time-series datasets via a novel cost-sensitive learning framework.
- **US Dept. of the Navy, Office of Naval Research, Auxiliary System Sensor Fusion (subcontract to Technical Documentation Inc.)**
  - Proposed interpretable cost-sensitive framework for early classification of cardiac arrhythmia alarms from bedside monitors in ICU.

- Statistically significantly improvement in terms of classification accuracy over state-of-the-art methods achieving 34% false alarm suppression with 100% true alarm detection rates.

- **Defense Advanced Research Projects Agency (DARPA) funded project**
  - Proposed a novel data driven approach to discover proxies for target diagnosis from large scale hospital discharge records databases.

- **Temple University Office of Vice Provost for Undergraduate Studies funded research project**
  - Investigated and compared multiple machine learning frameworks for identifying high risk students in order to reduce attrition rate among freshman students at Temple University.

Peer-reviewed Publications

- **Roychoudhury, S**., Zhou, F., Obradovic, Z. "Leveraging Subsequence-orders for Univariate and Multivariate Time-series Classification," *Proc. 19th SIAM Intl Conf. Data Mining (SDM)*, Calgary, Canada, May 2019.

- **Roychoudhury, S**., Ghalwash, M., Obradovic, Z. "Cost-sensitive Time-series classification," *Proc. European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD)*, Skopje, Macedonia, September 2017.

- **Roychoudhury, S**., Ghalwash, M., Obradovic, Z. "False Alarm Suppression in Early Prediction of Cardiac Arrhythmia," *Proc. 15th IEEE International Conference on Bioinformatics and Bioengineering*, Belgrade, Serbia, November 2015.

- Kezunovic, M., Obradovic, Z., Dokic, T., **Roychoudhury, S**. "Systematic Framework for Integration of Weather Data into Prediction Models for the Electric Grid Outage and Asset Management Applications," *Proc. 51st IEEE Hawaii International Conference on System Science (HICSS)*, Big Island, Hawaii, January 2018.

- Mirowski, T., **Roychoudhury, S**., Zhou, F., Obradovic, Z. "Predicting Poll Trends using Twitter and Multivariate Time-series Classification," *Proc. 8th Int'l Conf. Social Informatics (SocInfo)*, Seattle, WA, November 2016.

- Ramljak, D., Davey, A., Uversky, A., **Roychoudhury, S**., Obradovic, Z. "Casting a Wider Net: Data Driven Discovery of Proxies for Target Diagnoses," *AMIA 2015 Annual symposium*, San Francisco, November 2015.

- Ramljak, D., Davey, A., Uversky, A., **Roychoudhury, S**., Obradovic, Z. "Hospital Corners and Wrapping Patients in Markov Blankets," *4th Workshop on Data Mining for Medicine and Healthcare at SIAM SDM*, May 2015.

Publications (in submission)

- **Roychoudhury, S**., Cao, X.H., Ljubic, B., Pavlovski, M., Glass, L., Nair, R., Obradovic, Z. " Multi-domain Stacking Deep Sequence Model for Disease Diagnosis," *in preparation.*

- **Roychoudhury, S**., Zhou, F., Obradovic, Z. "Learning Temporal Dependency Among Pairwise Shapelets,"*in preparation.*

- Ljubic, B., **Roychoudhury, S**., Cao, X.H., Pavlovski, M., Nair, R., Glass, L., Obradovic, Z. " Influence of Cohort Selection on Deep Learning for Alzheimer's Disease Prediction," *submitted to Journal of Biomedical Informatics, Elsevier.*

- Cao, X.H., Ljubic, B., Pavlovski, M., **Roychoudhury, S.**,Glass, L., Obradovic, Z. " Learning Input and Output Kernels for Time-to-Event Prediction on High-Dimensional Gene Expression Data," *submitted to IEEE Journal of of Biomedical and Health Informatics.*