Pravallika Devineni

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Applied data scientist with 5+ years of experience in working with domain experts to provide machine learning solutions to a wide variety of applications. As part of this work, I design and deploy scalable end-to-end machine learning pipelines.

Professional Experience

- **OAK RIDGE NATIONAL LABORATORY** **Oak Ridge, TN**
  Research Scientist in Data Analytics, Computer Science and Mathematics Division *Jan 2020 – Present*
  - *URBAN-NET*: Built network cascade prediction models to simulate real-time failures in interdependent critical infrastructures.
  - *Gather What You Need (GWYN)*: Designed a tool that uses Natural Language Processing to identify potential candidates for open research positions at ORNL.
  - *ATLAS*: Designed and built an anomaly detection tool to outlying patterns in employee expense reporting.
  - *Scan Point Estimation*: Combined Bayesian Learning with tensor decompositions to identify the next best scan point for real-time sampling of microscopy images from materials.
- **OAK RIDGE NATIONAL LABORATORY** **Oak Ridge, TN**
  Postdoctoral Researcher, Computational Data Analytics Group. *Oct 2018 – Dec 2019*
  - Optimized Deep Neural Networks (DNN) to run at scale. Compressed convolutional autoencoder to 20% of its original size without losing accuracy.
  - Designed DNNs for object detection for autonomous vehicles and reduced inference latency in YOLOv2 by 25%.
  - Developed SVM regression models that fuse sensor data from nuclear power plants and used random forest classifier to identify sensor faults.
- **LAWRENCE LIVERMORE NATIONAL LABORATORY** **Livermore, CA**
  Computation Intern and Data Science Summer Institute (DSSI) Intern. *Summer 2017*
  - Designed and tested a variety of time series classification models (k-NN, DTW, SVMs, CNNs, autoencoders) to identify mesh zone tangling failures in multi-physics simulations.
  - Used linear and cubic interpolation methods to adjust varied failure rates and time series augmentation methods to rectify class imbalance.

Education

- **UNIVERSITY OF CALIFORNIA–RIVERSIDE** **Riverside, CA**
  Ph.D., Computer Science. *2015 – 2018*
  Dissertation Title: "From Social Networks To Smartphones: Modeling And Understanding Online Human Behavior"
- **UNIVERSITY OF NEW MEXICO** **Albuquerque, NM**
  Ph.D., Computer Science. *2012 – 2015*
- **MANIPAL INSTITUTE OF TECHNOLOGY** **Manipal, India**
  M.Tech., Computer Science. *2009 – 2011*
  Thesis Title: "Using Inductive Logic Programming to Visualize Large Datasets"
- **L.B.R. COLLEGE OF ENGINEERING, JNTU-KAKINADA** **Mylavaram, India**
  B.Tech., Computer Science. *2005 – 2009*

Technical Skills

Programming Languages, Libraries, and Tools
8 years experience in Python (including Pandas, Matplotlib, Seaborn, scikit-learn, PyTorch, and Keras), R, SQL, MongoDB, Neo4j, Bash, Git, SVN, MATLAB. 1 year experience in HTML, CSS, and Javascript.
Machine Learning and other Data Science Methods
Supervised learning (logistic regression, random forest, gradient boosting, SVMs), unsupervised learning (clustering, k-NN, anomaly detection, expectation maximization), deep learning (convolutional neural networks, LSTMs, convolutional autoencoders, Word2Vec, Doc2Vec), dimensionality reduction (SVD, NMF, PCA, tensor decomposition methods), ensemble methods, unstructured data analysis, time series analysis.

Research Experience

- **University of California Riverside, Graduate Student Researcher** *2015-2018*
  Privacy-aware Pattern Mining (ASONAM 2018)
  - Used PARAFAC2 tensor decomposition to model smartphone sensor data at varying levels of temporal granularity.

  Asymmetric Time-Evolving User Profile Mining (ASONAM 2017)
  - Analyzed Facebook user friendship graphs using network analysis techniques to identify the optimal window size for streaming user interactions.
  - Developed algorithmic framework that aggregates time-evolving interactions with varying granularity to reflect user behavioral changes and visualizes the identified changes.
- **University of New Mexico, Research Assistant** *2013-2015*
  Discovering Anomalies in Skewed Multi-dimensional Data (SDM 2016)
  - Proposed *FusionRP*, a Yule-Simon process to model 5D Facebook user activity data (skewed multi-dimensional data), and used this to identify user outliers and spamming applications.

  Identifying Anomalies in Facebook Wallposts (ASONAM 2015, SNAM 2017)
  - Proposed *PowerWall*, a heavy-tailed distribution to model Facebook users' behaviors and used this to identify interesting outliers.

Publications

Selected Publications (peer-reviewed)

- Uday Singh Saini, **Pravallika Devineni**, and Evangelos E Papalexakis. Subspace Clustering Based Analysis of Neural Networks. pages 697–712, 2021.
- Ravdeep S Pasricha, **Devineni, Pravallika**, Evangelos E Papalexakis, and Ramakrishnan Kannan. Tensorized Feature Spaces for Feature Explosion. *ICPR*, pages 6298–6304, 2021.
- **Pravallika Devineni**, Bill Kay, Hao Lu, Anika Tabassum, Supriya Chintavali, and Sangkeun Matt Lee. Toward Quantifying Vulnerabilities in Critical Infrastructure Systems. *IEEE BigData BTSD Workshop*, 2020.
- Steven Young, **Pravallika Devineni**, Travis Johnston, and Catherine Schuman et al. Evolving Energy Efficient Convolutional Neural Networks. *IEEE BigData Energy Efficient ML Workshop*, 2019.
- **Pravallika Devineni**, Evangelos E. Papalexakis, Kalina J. Michalska, and Michalis Faloutsos. MIMiS: Minimally Intrusive Mining Of Smartphone User Behaviors. *IEEE/ACM ASONAM*, 2018.
- **Pravallika Devineni**, Evangelos E. Papalexakis, Danai Koutra, A. Seza Doğruöz, and Michalis Faloutsos. One Size Does Not Fit All: Profiling Personalized Time-Evolving User Behaviors. *IEEE/ACM ASONAM*, 2017.
- **Pravallika Devineni**, Danai Koutra, Michalis Faloutsos, and Christos Faloutsos. Facebook Wall Posts: A Model Of User Behaviors. *Springer Social Network Analysis and Mining (SNAM)*, 7(1):6, February 2017.
- **Pravallika Devineni**, Danai Koutra, Michalis Faloutsos, and Christos Faloutsos. If Walls Could Talk: Patterns and Anomalies in Facebook Wallposts. *IEEE/ACM ASONAM*, 2015.

Professional Service

- **Organizing Committee Member:** Publicity Co-chair for SIAM SDM 2022, Co-organizer for BTSD Workshop at IEEE BigData 2021, AI Track co-chair Grace Hopper Conference 2021, and Chair of Smoky Mountain Data Challenge 2021.
- **Program Committee Member:** SoCal NLP 2018, IEEE/ACM ASONAM 2018, 2019, and 2020, Grace Hopper AI and DS tracks 2019 and 2020, Tapia Conference 2019, NeurIPS ML4PS Workshop 2019, WSDM 2020, PAKDD 2020, KDD 2020, IJCAI 2020.
- **Journal Reviewer:** IEEE TMC, Springer SNAM, IEEE DAMI, ACM TKDD, and IEEE TNNLS.
- **Mentorship:** JaCoya Thompson (Summer 2021), Thomas Reichel (Summer 2021), Ravdeep Pasricha (Summer 2019), and Maribel Cardiel (Fall 2014 and Spring 2015).