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| SUMMARY | Computer Scientist working in Machine Learning with 8+ years research experience. | | |
| INTERESTS | Machine Learning, Deep Learning, Natural Language Processing | | |
| EDUCATION | Northwestern University , Evanston, Illinois USA | | |
| | Ph.D., Computer Science | | Sep '19 |
| | Master of Science, Computer Science | | |
| | Birla Institute of Technology & Science , Pilani, Rajasthan India | | |
| | Master of Engineering, Software Systems | | May '12 |
| | Bachelor of Engineering, Chemical Engineering | | |
| PROGRAMMING SKILLS | Proficient: Python, Keras/Tensorflow, Scikit-Learn, Dash/Plotly, Matplotlib/Seaborn, Pandas, FastAI, XGBoost/LightGBM, Shapley, NLTK, Gensim, Selenium Familiar: OpenCV, Spacy, PySpark, PyTorch, R, MATLAB, C, C++, Java, LAMP, SQL, weka, HTML/CSS | | |
| PROFESSIONAL EXPERIENCE | <i>Machine Learning Scientist</i> , American Family Insurance , Madison, Wisconsin | | Oct'19- |
| | <ul style="list-style-type: none">• Designing insurance-based language models for predicting claims fraud• Developed SARIMAX and deep learning forecasting financial metrics for next calendar year• Develop a machine learning system for estimating motor vehicle violation risk | | |
| | <i>Data Science Intern</i> , Northwestern Mutual , Milwaukee, Wisconsin | | Jun - Aug '18 |
| | <ul style="list-style-type: none">• Developed distributed OCR algorithms for detecting responses from scanned questionnaires• Designed a noise reduction algorithm to de-noise scanned and photocopied questionnaires | | |
| | <i>Research Intern</i> , Boeing Cybersecurity , Sunnyvale, California | | Jun - Sep '13 |
| | <ul style="list-style-type: none">• Generated synthetic user profiles with different demographic and interest features for analyzing ads across profiles• Developed a machine learning model for predicting user demographics and interests from ads | | |
| RESEARCH PROJECTS | <i>Research Assistant</i> , Northwestern University , Evanston, Illinois | | Sep '12 - Aug'19 - |
| | <ul style="list-style-type: none">• Chemical Property Prediction using Molecular Fingerprints (Tensorflow, Scikit Learn)<ul style="list-style-type: none">◊ Developed a multi-input input neural network architecture by merging different molecular representations (SMILES and fingerprints) for predicting chemical properties and reduced the mean absolute error by half compared to state-of-the-art architectures (CheMixNet architecture)◊ Designed Bagged Ensemble models for predicting power conversion efficiency of solar cells using chemical fingerprints, and achieved mean absolute percentage error between 1.5-2 %◊ Developed a transfer learning solution to predict solar cell properties with mean absolute percentage error below 1 % (SINet architecture)• Developed Predictive Model for Additive Manufacturing (Tensorflow, Keras)<ul style="list-style-type: none">◊ Created time series models for temporal analysis of temperature and heat flux data◊ Investigated Recurrent Neural Network models to predict point-wise temperature information for accelerating additive manufacturing simulations◊ Developed an iterative real-time predictive model using bagged decision trees• Ensemble Learning-based Guided Optimization for Aircraft Design (MATLAB, Python)<ul style="list-style-type: none">◊ Created intelligent sampling algorithms to explore the constrained search space for candidate microstructures◊ Developed Feature Ranking-based Technique for Search Space Reduction of Constrained Non-Convex Optimization◊ Achieved 100x more solutions compared to state-of-the-art methods that can accelerate the design-to-experiment life-cycle• Classification of Anonymous Posts using Recurrent Neural Networks (Keras, Scikit Learn)<ul style="list-style-type: none">◊ Developed customized vector model using crowd-sourced (Urban Dictionary) & psycho-lingual (LIWC) dictionaries◊ Explored Word2vec, GloVe and FastText embedding schemes (Gensim)◊ Attained prediction accuracy of 79.8 % and 78.1 % using ensemble and LSTM models respectively | | |

SELECT
PUBLICATIONS
(14 OF 21)

- K.Ness, **A. Paul**, L. Sun and Z. Zhang. “**Physics-based feature engineering for machine learning predictions of thermal fields in Additive Manufacturing**”, *Journal of Materials Processing Technology - Special Issue on AI in Advanced Manufacturing (under review)*
- A.Dimri, **A.Paul**, D.Girish, P.Lee, S.Afra and A. Jakubowski. “**A Multi-input Multi-label Claims Channeling System Using Insurance-Based Language Models Expert Systems With Applications**”, *Expert Systems With Applications (under review)*
- R.Richards, and **A. Paul**. “**An Attention-driven LSTM Network for High Throughput Virtual Screening of Organic Photovoltaic Candidate Molecules**”, *Solar Energy*, 2021
- A. Paul**, W. Liao, A. Choudhary and A. Agrawal. “**Harnessing Psycho-lingual and Crowd-Sourced Dictionaries for Predicting Taboos in Written Emotional Disclosure in Anonymous Confession Boards**”, *Journal of Health Informatics Research*, 2021
- Z.Yang, D. Jha, **A. Paul**, W. Liao, A. Choudhary and A. Agrawal. “**A General Framework Combining Generative Adversarial Networks and Mixture Density Networks for Inverse Modeling in Microstructural Materials Design**”, *NeurIPS Workshop on Machine Learning for Engineering Modeling, Simulation and Design*, 2020
- D.Jha, L.Ward, **A. Paul**, W. Liao, A. Agrawal, A. Choudhary and C. Wolverton.“**ElemNet: Deep Learning the Chemistry of Materials From Only Elemental Composition**”, *Nature Scientific Reports*, 2018
- A. Paul**, M.Mozaffar, Z. Yang, W. Liao, A. Choudhary, J.Cao and A. Agrawal.“**A real-time iterative approach for temperature profile prediction in additive manufacturing processes**”, *6th IEEE International Conference on Data Science and Advanced Analytics (DSAA)*
- A. Paul**, D.Jha, R. Al-Bahrani, W. Liao, A. Choudhary and A. Agrawal.“**Transfer Learning Using Ensemble Neural Nets for Organic Solar Cell Screening**”, *International Joint Conference on Neural Networks*, 2019
- A. Paul**, A. Furmanchuk, W. Liao, A. Choudhary and A. Agrawal. “**Property Prediction of Organic Donor Molecules for Photovoltaic Applications using Extremely Randomized Trees**”, *Journal of Molecular Informatics*, 2019
- A. Paul**, P. Acar, W. Liao, A. Choudhary, V.Sundararaghavan and A. Agrawal. “**Microstructure Optimization with Constrained Design Objectives using Machine Learning-Based Feedback-Aware Data-Generation**”, *Journal of Computational Materials Science*, 2019
- A. Paul**, D.Jha, R. Al-Bahrani, W. Liao, A. Choudhary and A. Agrawal.“**CheMixNet: Mixed DNN Architectures for Predicting Chemical Properties using Multiple Molecular Representations**”, *NeurIPS Workshop on Machine Learning for Molecules and Materials*, 2018
- M.Mozaffar, **A. Paul**, R. Al-Bahrani, S. Wolff, A. Choudhary, A. Agrawal, K. Ehmann and J.Cao.“**Data-Driven Prediction of the High-Dimensional Thermal History in Directed Energy Deposition Processes via Recurrent Neural Networks**”, *Manufacturing Letters*, 2018
- J.Birnholtz, N.A.R. Merola, and **A. Paul**. “**Is it Weird to Still Be a Virgin?: Anonymous, Locally Targeted Questions on Facebook Confession Boards**”, *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems. ACM*, 2015.
- R. Liu, D. Palsetia, **A. Paul**, R. Al-Bahrani, D. Jha, W. Liao, A. Agrawal and A. Choudhary. “**Pinter-Net: A Thematic Label Curation Tool for Large Image Datasets**”, *Proceedings of the Workshop on Open Science in Big Data at IEEE Bigdata Conference*, 2016.

FELLOWSHIPS

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| McCormick Dean’s Commendation Fellowship | ’18 Spring |
| Predictive Science and Engineering Design Fellowship | ’16-’17 |
| Segal Design Fellowship | ’14-’15 |
| Walter P. Murphy Fellowship | ’12-’13 |

SELECTED TEACHING
AND LEADERSHIP

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| <i>Teaching Assistant & Guest Lecturer, Northwestern University</i> | Jan’14- Jun’19 |
| <ul style="list-style-type: none"> ◊ Prepared and delivered weekly lectures for 20-50 students ◊ Courses: Social Media Mining, Data Structures , Introduction to Programming (Python) | |
| <i>President/Vice-President/Treasurer, Northwestern Toastmasters</i> | Sep ’15 -May ’18 |
| <ul style="list-style-type: none"> ◊ Lead the Northwestern chapter of Toastmasters with over 30 graduate students, post doctoral fellows from 10 different departments ◊ Co-wrote proposal to The Graduate school and obtained 3000 USD to fund programming | |
| <i>Co-Facilitator, Northwestern Dialogue Group</i> | Oct ’16 - Sep ’17 |
| <ul style="list-style-type: none"> ◊ Facilitated dialogue in safe spaces for cultural exchange across international and domestic students ◊ Organized social events to enhance group cohesion | |