

SUMMARY	Computer Scientist working in Machine Learning with 10+ years of 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	Experienced: Python, Tensorflow, H2O, Scikit-Learn, Dash/Plotly, Matplotlib/Seaborn, Pandas, XG-Boost, Selenium Familiar: SQL, Shapley, NLTK, HuggingFace, Gensim, Spacy, CatBoost/LightGBM, PySpark, PyTorch/FastAI, HTML/CSS		
PROFESSIONAL EXPERIENCE	<i>Data & Applied Scientist</i> , American Family Insurance , Greater Boston, Massachusetts		Oct'19-
	<ul style="list-style-type: none">• User-Based Insurance (in collaboration with major US automaker) :<ul style="list-style-type: none">◊ Developed generalized linear and additive models for usage-based auto insurance based on telematics features◊ Performed benchmarking using neural network and gradient boosting modeling• Claims-Channeling System:<ul style="list-style-type: none">◊ Co-Designed a multi-input, multi-label claims channeling system to route claims to relevant domain experts using the information (tabular + text) present in the claim which harnesses an insurance based language model using transfer learning to process the text data and thereby increase the accuracy of various downstream tasks◊ Performed an ablation study based on different models, input/output type and day information to select the best models which get feed into a web based user interface• Financial Forecasting<ul style="list-style-type: none">◊ Developed long and mid-term financial forecasting of KPIs using an ensemble ESRNN+SARIMA◊ Designed a niche Monte Carlo - based time series confidence interval using 100+ scenarios◊ Deployed a dashboard using flask which gets updated monthly• Motor Vehicle Violation:<ul style="list-style-type: none">◊ Developed an ML decision system for predicting motor vehicle violation risk◊ Explored ordinal models using tree and neural networks including creating a custom ordinal loss function• Leadership/Outreach:<ul style="list-style-type: none">◊ Co-host of the AmFam Fairness Seminar◊ Collaborate with UW-Madison professors as part of Amfam Data Science Institute◊ Mentored rotational associate data scientists◊ Invited panelist for company-wide data privacy week for discussions on fairness, privacy, bias in a multicultural inter-connected world		
	<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)
 - ◊ 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
- Classification of Anonymous Posts using Recurrent Neural Networks (Keras, Scikit Learn)
 - ◊ 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
(11 OF 23)

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*, 2022

Y.Mao, Z.Yang, D.Jha, **A. Paul**, W. Liao, A. Choudhary and A. Agrawal. “**Generative Adversarial Networks and Mixture Density Networks based Inverse Modeling for Microstructural Materials Design**”, *Integrating Materials and Manufacturing Innovation Journal*

K.Ness, **A. Paul**, L. Sun and Z. Zhang. “**Towards a generic physics-based machine learning model for geometry invariant thermal history prediction in additive manufacturing**”, *Journal of Materials Processing Technology*, 2022 (Special Issue on AI in Advanced Manufacturing)

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)*, 2018

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, 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.

FELLOWSHIPS

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

Teaching Assistant & Guest Lecturer, Northwestern University Jan’14- Jun’19

- ◊ Prepared and delivered weekly lectures for 20-50 students
- ◊ Courses: Social Media Mining, Data Structures , Introduction to Programming (Python)

President/Vice-President/Treasurer, Northwestern Toastmasters Sep ’15 -May ’18

- ◊ Lead the Northwestern chapter of Toastmasters with over 30 graduate students and researchers
- ◊ Co-wrote proposal to The Graduate school and obtained 3000 USD to fund programming

Co-Facilitator, Northwestern Dialogue Group Oct ’16 - Sep ’17

- ◊ Facilitated dialogue in safe spaces for cultural exchange across international and domestic students
- ◊ Organized social events to enhance group cohesion