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SUMMARY

Computer Scientist working in **Machine Learning** with 8+ years research experience seeking full-time opportunities

INTERESTS

Machine Learning, Deep Learning, Natural Language Processing, Materials Informatics, Social Media Analytics

EDUCATION

Northwestern University, Evanston, Illinois USA **Jul '19**
Ph.D. Candidate, Computer Engineering (expected)
Master of Science, Computer Science **Sep '14**

Birla Institute of Technology & Science, Pilani, Rajasthan India
Master of Engineering (with Honors), Software Systems **May '12**
Bachelor of Engineering (with Honors), Chemical Engineering **Dec '09**

PROGRAMMING SKILLS

Proficient: Python, Keras, Scikit-Learn, Tensorflow, Selenium, Pandas, OpenCV, XGBoost
Familiar: PySpark, R, MATLAB, C, C++, PySpark, Java, LAMP, SQL, weka, Javascript, HTML/CSS

PROFESSIONAL EXPERIENCE

Data Science Intern, **Northwestern Mutual**, Milwaukee, Wisconsin **Jun - Aug '18**

- Developed distributed OCR algorithms for detecting responses from scanned questionnaires
- Designed a noise reduction algorithm to de-noise scanned and photocopied questionnaires

Data Science Consultant, **EDT** **Jun '17 - Jan '18**

- Designed models for profanity detection from company-wide email databases

Research Intern, **Boeing Cybersecurity (Narus)**, Sunnyvale, California **Jun - Sep '13**

- 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

Research Assistant, **Northwestern University**, Evanston, Illinois **Sep '12** -

- Developed Deep Learning-based Predictive Model for Additive Manufacturing (Tensorflow, Keras)
  - ◇ Created time series models for temporal analysis of heat flux data
  - ◇ Investigated Recurrent Neural Network models to predict point-wise temperature information for accelerating additive manufacturing simulations

- Chemical Property Prediction using Molecular Fingerprints (Tensorflow, Scikit Learn)
  - ◇ 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
  - ◇ Designed Deep Neural Network and Random Forest models for predicting power conversion efficiency of solar cells using chemical fingerprints, and achieved mean square percentage error between 1.5-2 %

- Very Deep Neural Networks for Predicting Formation Stability (Tensorflow)
  - ◇ Constructed Neural Network Models with 18-25 layers to predict formation energy of a chemical compound
  - ◇ Attained 20 % higher accuracy than the state-of-the-art models using Random Forests that would allow domain scientists to explore millions of possible compounds

- Ensemble Learning-based Guided Optimization for Aircraft Design (MATLAB, Python)
  - ◇ 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

- Convolutional Neural Nets for Thematic Image Classification in Pinterest (Torch)
  - ◇ Harnessed Association Rule Mining for thematic label curation
  - ◇ Developed ConvNet Models for hierarchical classification that led to automated image categorization based on themes

- Classification of Anonymous Posts using Recurrent Neural Networks (Tensorflow)
  - ◇ Generated vectorizer models using Word2vec trained on crowd-sourced (Urban Dictionary) & psycho-lingual (LIWC) dictionaries (Gensim)
  - ◇ Attained prediction accuracy of 79.8 % and 78.1 % using LSTMs and ensemble models respectively

Select Publications (10 of 17)

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 of Neural Networks, 2019*

A. Paul, W. Liao, A. Choudhary and A. Agrawal. "**Text Translation as Data Augmentation for Neural Network Modeling of Mental Health Confessions**", *Journal of Health Informatics (in preparation)*

A. Paul, M.Mozaffar, W. Liao, A. Choudhary, J.Cao and A. Agrawal."**A real-time iterative approach for temperature profile prediction in additive manufacturing processes**", *25th ACM Conference on Knowledge Discovery and Data Mining (KDD) (under review)*

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**", *NIPS Workshop on Machine Learning for Molecules and Materials, 2018*

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*

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*

A. Paul, P. Acar, R.Liu, W. Liao, A. Choudhary,V.Sundararaghavan and A. Agrawal. "**Data Sampling Schemes for Microstructure Design with Vibrational Tuning Constraints**", *Journal of American Institute of Aeronautics and Astronautics, 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. "**PinterNet: A Thematic Label Curation Tool for Large Image Datasets**", *Proceedings of the Workshop on Open Science in Big Data at IEEE Bigdata Conference, 2016.*

A. Paul, A. Agrawal, W. Liao and A. Choudhary. "**AnonyMine: Mining anonymous social media posts using psycho-lingual and crowd-sourced dictionaries**", *Proceedings of the Workshop on Sentiment Mining at 22nd Annual ACM Conference on Knowledge Discovery and Data Mining, 2016.*

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 '17**

- ◇ Prepared and delivered weekly lectures for 20-50 students
- ◇ Supervised course projects and provided subject matter expertise
- ◇ Courses: Social Media Mining, Data Structures , Introduction to Programming (Python)

President/Vice-President/Treasurer, **Northwestern Toastmasters** **Sep '15 -**

- ◇ Lead the Northwestern chapter of Toastmasters with over 30 graduate students, post doctoral fellows from 10 different departments
- ◇ Organized 1.5 hour weekly meetings to improve student public speaking skills
- ◇ Co-wrote proposal to The Graduate school and obtained 3000 USD to fund programming
- ◇ Managed finances, prepared budgets for auditing and reconciled dues

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

Organizer & Instructor, Machine Learning Workshop, **Northwestern University** **Jul '16**

- ◇ Delivered and prepared talk attended by 70 graduate students and professors
- ◇ Designed coding assignments for the participants