Kunal Rathore

Curriculum Vitae

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Interests

Statistical Inference, Data modeling, Machine Learning, Deep learning, Computer Vision, NLP, Numerical Computing, Stochastic Optimization, High Performance Computing,

Education

2017-2019 **Master of Technology in Modeling and Simulation**,
Centre for Modeling and Simulation , Pune, INDIA.
CGPA: 7.2

2013-2017 **Undergraduate Degree in Engineering**,
Savitribai Phule Pune University, Pune, INDIA.
CGPA: 8.0

Publication & Thesis

A Simple Method of Solution For Multi-label Feature Selection,
2019 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT).
Jayaraman K Valadi; Prasad T Ovhal; Kunal J Rathore

RA2Vec: Distributed Representation of Protein Sequences with Reduced Alphabet Embedding,
ACM Conference on Bioinformatics 2020.
Rajitha Yasas Wijesekara, Ashwin Lahorkar, Kunal Rathore, Jayaraman Valadi

Recurrence Plots and Deep Convolutional Neural Networks for Splice Site Identification,
International Conference on Bioinformatics and Systems Biology (under publication).

Master's Thesis **Interpretations of Deep learning models for prediction of Intracellular skin diseases.**,
Thesis Supervisor: Dr. Jayaraman Valadi; Thesis Co-Supervisor: Dr. Bhushan Garware.

Experience

Jan 2019 -Today **Senior Software Engineer (Data Science)**,
Persistent Systems , Pune, INDIA.

Projects

Feb 2021 **Semantic matching, knowledge extraction and representations**, *ML*, NLP.
- Exploring and implementing the semantic modeling on textual data.
- Knowledge extraction using NER models and setup pipeline for larger datasets. Knowledge graph representation using graphical visualization tools.

Sep 2020 **Data driven modeling in Privilege access management system**, *ML*, Cyber-security.
- Exploring and modeling the required data as per the defined privilege recommendation use-cases.
- Feature engineering and model selection with appropriate validations and testing.

Jan 2020 **Time-series forecasting and anomaly detection via network traffic learning**, *ML*, Cyber security.
- Exploration and implementation of Time-series forecasting and anomaly detection algorithms.
- Generating scalable and deploy-able models for the same.

August 2019 **Organizational Network Analysis and link predictions**, *Graph Theory*.
- Building Network connection data model.
- Analysis and visualization using Cytoscape open source application.
- Building a dashboard for data filtering and network visualization using Python packages.
- Tools: Cytoscape, Gephi, Neo4j, Python-Bokeh, Dash

April 2019 **Deep learning model Interpretations**, *ML*, Computer Vision.

- Comprised of post hoc explanation of deep learning models for prediction of Intra-cellular skin diseases. I have explored & the implemented:
  - LIME(Local Interpretable Model Agnostic Explanation) ,
  - SHAP(SHapley Additive exPlanations),
  - GRAD-CAM (Gradient-weighted Class Activation Mapping),

  all these techniques provide local instance explanations, and I obtained a Model-Agnostic Framework, which can be employed on any pre-trained Neural Net model.
- Tools: PyTorch, TensorFlow, Keras, Numpy.

October 2018 **Recurrence Quantification Analysis on Time-series datasets**, *Time-series, ML*.

- In this project, we employed two different approaches to classify the Uni-variate Time-series datasets; using recurrence features to classify the Time-series instances.
- And employing Recurrence plots to classify the instances using Convolution Neural Networks.
- Tools: PyTorch, TensorFlow, Keras,

June 2018 **Feature Selection for Multi-label classification models**, *Presented paper at IEEE ICECCT conference 2019*.

- Upgraded Multi-label Informed feature selection algorithm using factorization method, which also takes label correlation into consideration and gives out the feature ranks computed via weight matrix. And comparison is done with the existing Multi-label feature selection algorithms.

2017-18 **Academic Projects**.

- Feature selection using Ant colony Optimization(ACO).
- Clustering using Ant Colony Optimization.
- SVM model parameters optimization using Simulated Annealing(SA) algorithm.
- Feature selection using Genetic algorithm(GA).
- Study of Time-series models viz. MA, AR ,ARMA ,ARIMA ,ARCH ,GARCH.
- Study of density estimation and outlier detection techniques.
- Detailed study of advance stochastic optimization techniques viz. Swarm Particle optimization algorithm, Intelligent Water drop algorithm, Group search algorithm, Multi-canonical Jump Walk Annealing, Multi-objective Simulated Annealing(SMOSA, UMOSA, PDMOSA).

Achievements

Academic

- Participated in group projects for Modeling and Simulation viz n-body simulation, SIR model simulation in **NetLogo**.
- Completed course work on **Nonlinear Dynamics: Mathematical and Computational Approaches. Provided at Complexity Explorer** | **Santafe institute** by Prof. Elizabeth Bradley.

Extra Curricular

- **Certification:** AWS Certified Cloud Practitioner.
- Conducted **Machine learning Hands-on training session at Cummin's Womens college, Pune**
- Presented on **"Interpretable Machine learning"at Computer Science symposium, Flame university, Pune**
- Lead **Team Revolution as Team captain at Formula Bharat 2017, Coimbatore**
  Successfully completed the design, analysis, fabrication and testing of the formula style vehicle.Passed all technical tests and got placed under the top 10 teams.

Technical Skills

Programming Languages: R, Python, C, Scilab/Matlab, Cytoscape , Netlogo

Software Packages: Numpy, Pandas, Scikit-learn, Statsmodels, Tensorflow, PyTorch, Keras, PySpark, Python-Kafka, NLTK, Gensim, Seaborn, Bokeh, Dash, Plotly, Gephi; Hypermesh, OpenFoam, LaTeX

Relevant Coursework

Master's course work

Undergrad course work