

# RAMKISHAN PANTHENA

✉ ramkishan.panthena@gmail.com | ☎ 857-260-8834 | Boston, MA | 🌐 ramkishanpanthena | 🌐 RamkishanPanthena

## Education

Northeastern University, Boston, MA

August 2019

**Master of Science in Data Science, with Thesis**

**Thesis Topic: Word-vector Regularization for text classification algorithms (ML, NLP)**

**Relevant Courses:** Machine Learning, NLP, Information Retrieval, Algorithms, Parallel Data Processing in MapReduce/Spark

**Awards:** GE Aviation Hackathon - Won "[Most Real Impact Team](#)" Award for solving GE's data challenge problem

University of Mumbai, Don Bosco Institute of Technology (DBIT), India

May 2009

**Bachelor of Engineering in Electronics and Telecommunication with First Class Honors**

## Technical Knowledge

**Programming/Scripting Languages:** Python, R, Shell Script, Java, Matlab, Scala, SQL, JavaScript, HTML

**ML Tools/Frameworks:** TensorFlow, NLTK, Scikit-Learn, Pandas, Gensim, Spark MLlib, Weka

**Big Data/Cloud:** Hadoop, Spark, MapReduce, Azure – Databricks/Storage, AWS – EMR/EC2/S3, Heroku

**Databases:** Teradata 15X/14X/13X, Elasticsearch, Oracle, Netezza, SQL Server, MongoDB, SQLite

**Visualizations:** Matplotlib, GGplot2, D3, SVG, Plotly, Seaborn, NetworkX, Tensorboard, Tableau

**NLP algorithms implemented:** Trigram Language Modeling, Part-of-speech tagging, Brown Clustering, Naïve Bayes

**IR algorithms implemented:** Document Indexer, Web Crawler, PageRank, Vector space and Language models

## Research and Professional Experience

Grantham Mayo Van Otterloo & Co., Boston, MA

Aug 2019 – Present

**Data Science/Machine Learning Engineer**

**Earnings Call Transcripts to detect Profit Warnings (R&D – NLP, ML, Big Data)**

- Research project that parsed the language used in the earnings call using NLP techniques to determine linguistic patterns that systematically lead to higher or lower post-call profit-warnings
- Trained ML model with features like company's last quarter/last year performance, Sentiment expressed on forward-looking statements, Fog Index, Vocab Diversity on both the prepared management remarks and analyst QA section
- Achieved F1-score of 54% after extensive hyper-parameter tuning with GridSearchCV

Northeastern University, Boston, MA

May 2018 – August 2019

**Machine Learning/NLP Researcher**

- Implemented a novel regularizer using TensorFlow that improves text classification performance when there are useful signals present in synonymous but rare words
- Outperformed logistic regression to achieve over 45% improvement in Set-Accuracy after testing with multiple datasets

Grantham Mayo Van Otterloo & Co., Boston, MA

May 2018 – Dec 2018

**Data Science Development Co-op**

**EDGAR Topic Modelling (Production Deployment – NLP, ML, Big Data)**

- Deployed LDA model in production using Azure, PySpark and Databricks to identify topics across SEC EDGAR archive on 10-K annual filings and compared topics of each company to detect other companies which discuss similar topics
- Compared topics generated by Python and Spark LDA models by computing the KL-divergence scores between both models given their topics and weights, reducing final model training time from 3 hours to 4 minutes
- Leveraged Pandas UDFs to run native Python code with PySpark, reducing run-time from over 60 minutes to 8 minutes

**Start-up Success Prediction (R&D – ML, Interactive-Visualization) [GitHub](#)**

- Designed and implemented an interactive web-based visualization using D3.js that allows end user to build a ML model to predict start-up success for US companies and visualize the predicted performance of start-ups across each state
- Connected client-side visualization via a REST API to server-side modeling in Python and deployed on [Heroku](#)

**Fast Time Series (R&D – Big Data)**

- Generated and wrote multiple-file HDF5 datasets in parallel using PySpark and Databricks to an Azure Storage Container to augment the current file caching solution, reducing file wait time from 20 minutes to 5 seconds
- Built a REST API with helper functions in MATLAB to cache the files locally from cloud

Teradata, Mumbai, India

June 2010 – Dec 2016

**Technical Consultant**

- Implemented data ingestion pipelines to process streaming raw data using Spark. Integrated about 300 million raw records from 10 different data sources and stored in the database reducing data ingestion time by 80%
- Involved in identifying inefficient queries consuming too many system resources and provided solutions to make them run more efficiently. These efforts led to 30% reducing in the system resource consumption saving millions of CPU cycles
- Performed data cleaning, deduplicating and normalizing using Pandas before it will be loaded into the system
- Developed reusable code and libraries in Python to process different file formats like CSV, XML, JSON etc.
- Designed an automated 'Data Migration Tool' using Python and Teradata Utilities to facilitate effortless migration of data from one Teradata environment to another

- Architected the integration solution to move data from Oracle to Teradata. Used Teradata Utilities like FastLoad, MultiLoad, TPump to complete the migration in the expected time frame
- **Awards:** Teradata ADC Employee of the Quarter (Q4 2014), ADC Project Long Service Award (June 2012 and June 2014)

## Academic Projects

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**Northeastern University**, Boston, MA

### **End-to-end Neural Architecture for Reading Comprehension** [GitHub](#)

- Implemented a match-LSTM and Answer-Pointer model in TensorFlow for machine comprehension that predicts the start and end position of an answer span, given a question and passage
- Achieved an Exact Match score of 63% on the SQuAD Dataset

### **Vertical Search Engine**

- Implemented a web crawler in Python that crawled over 20,000 web links to construct a collection of documents focused on a particular topic while adhering to politeness policy of the websites
- Stored the data in Elasticsearch and tied it up with UI to allow searching through crawled content
- Implemented PageRank algorithm to compute the PageRank for every page in the crawl

### **Foreground-Background Pixel Classification for Brain scans** [GitHub](#)

- Classified a highly unbalanced dataset with over 99.46% data belonging to one class
- Improved training data diversity by performing rotations and mirroring in the X-Y plane; and reduced class imbalance by under-sampling background records
- Achieved a final accuracy of 99.74% using Random Forests and Boosted Trees

### **Movie Recommender System**

- Built a system that examined the ratings of movies provided by users to predict movies that a user might like
- Used K-NN, K-Means, Matrix Factorization, Perceptron for comparison and achieved F1-score of 69.12%

### **Sentence Generation with Language Modelling** [GitHub](#)

- Implemented trigram language model with unknown word handling and smoothing
- Generated plausible sentences and achieved perplexity of 79.8 on the test set using interpolation smoothing

### **Sentiment Analysis of IMDB Movie Reviews**

- Detected the overall sentiment of a text review and achieved an F1-score of 81% on the test set
- Naïve Bayes, Multilayer Perceptron and LSTM using word vector embeddings were used for performance comparison