Ramesh Oswal

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Objective – Seeking roles in the field of Data Science specializing in Machine Learning and Big Data Analytics

Education

- **Master of Science - Language Technologies Institute (School of Computer Science)** **Aug'16 - May'18**
  Carnegie Mellon University, PA
- **Bachelors in Computer Engineering** **Aug'10 - May'14**
  University of Pune, IN. Division: First Class with Distinction

Relevant Coursework

- Intro To Machine Learning
- Intro to Deep Learning
- ML for Signal Processing
- Machine Learning for Large Datasets
- Language & Statistics
- Big Data in Practice

Technical Skills

	Proficient	Familiar
Core Languages:	C, Python, Core Java, Visual Basic,	C++, R, Javascript, SAS, MATLAB, Scala
Databases:	Oracle, MySQL, Hive, Cassandra	MS Access, MongoDB
Development/Productivity Tools:	Turbo C, Informatica, Excel, Anaconda	VS'10 & '14, Jupyter Notebook, Hadoop, Spark

Academic Projects

Machine Learning Engineer. **Noble.AI** **June'18 – Current**

- Built offline ML Pipeline to extract & structure information in semi-structured docx as a part of UIE using Transfer Learning.
- Worked on preprocessing the documents and creating client visualization for the unstructured documents presented to clients
- Created Data Visualization for R&D experiment dataset showing various issues like variance in the dependent variable.
- Built first working MVP for Intelligent Recommendation Engine.
- **Tools Used: Python, sklearn, matplotlib, luminoth, Tensorboard, Django**

Real Time Audio Event Detection on Edge (RA - Prof Yuvraj Agarwal, Synergy Labs, mites.io) **Jan'18 – May'18**

- Built from scratch the entire ML and Data Pipeline, stages include – Feature Extraction, Feature Engg, Hyper Parameter Tuning etc.
- Ran Multiple Experiment using classical ML algorithms like Logistic Regression and SVM's automatically detect Audio Events like Vacuum Cleaner, Drill Machine, Faucet Running etc.
- Built a parallel pipeline running multiple experiments for each label tuning hyperparameter.
- Performed Data Analysis to debug ML algorithm performance using dimensional reduction algo like PCA.
- **Tools Used – python, librosa, sklearn, jupyter.**

Speech Recognition using Wall Street Journal Data (Professor Bhiksha Raj) **Jan'18 – May'18**

- Used the WSJ labelled dataset at frame and phoneme level to recognize unlabeled speech signal.
- Built a 3 layer Neural Network on frame level data to train & make predictions resulting in accuracy of 56% for 136 labels.
- Built a 4 layer CNN Model on phoneme level data to train and make predictions resulting in 80% accuracy for 46 labels.
- Preprocessed data to deal with issues like variable length phoneme representation for CNN inputs.
- Built an end-to-end ASR using Listen-Attend-Spell Architecture with the CMUSphinx language model.
- **Tools Used – Tensorflow, Pytorch, Python**

Audio Forensic for Maritime Recognition (Carnegie Mellon University – Prof. Rita Singh and Prof. Bhiksha Raj) **Aug'17 – Dec'17**

- Built a system to automatically identify maritime audio signatures like Boat and Helicopter sound which can be used in Hoax Call Identification, solve criminal cases etc.
- Collected audio recordings from Youtube 8M dataset using automatic scripts and parsing video description.
- Used feature representations like Constant-Q. Correlograms, Modulation Spectrograms. Also used a pretrained CNN model to extract proxy features using the fully connected layer of CNN architecture.
- Achieved accuracy of 73% using decision trees and 77% using Adaboost. Also proposed a full end to end architecture which could help in a more detailed analysis of sounds like make/type of helicopter and boat engine.
- **Tools Used – Python, Sklearn, Spark, MATLAB.**

Data Science Intern **Walmart Labs** **June'17 – Aug'17**

- Working on the Walmart Performance Ads team to optimize the current model used by Walmart to display relevant ads.
- Predicting Click through Rate(CTR) of ads using contextual information resulting in increase in the revenue based.
- Feature Engineering, identifying new features & performing experiments to tune parameters of current model.
- Deployed Models into production to run A/B test & validated model performance for comparing the online and offline evaluation results like NLL, P/R & ROC AUC and Click Through Rate.
- **Tools Used – Python, Spark(MLlib), Scala, Hive, Cassandra, Weka**

Fake/Real News Classification (Carnegie Mellon University – Prof. Roni Rosenfeld) **Oct'17 – Dec'17**

- Built a system to classify Fake news from the real Broadcast News Articles(1992-1996) using different statistical techniques.
- Extracted various Statistical, Vectorized, Contextual, Semantic Features.
- Used the KenLM Language model to extract the Tri-gram and 5-gram perplexity resulting in 89% accuracy on the development set and 90% accuracy with all features combined.
- **Tools Used – Python, Sklearn, KenLM.**

Movie Recommendation System using MovieLens Dataset (Carnegie Mellon University) **May'17 - June'17**

- Used the Matric Factorization Technique to recommend movies to users following the Netflix Prize Winner's Strategy on the Movie Lens Dataset consisting of 1 million ratings as training set.
- Implemented the Alternating Least Squares Optimizing Techniques to solve the "RMSE" Objective Function.
- Performed Experimental Analysis to tune hyperparamaters like K, lambdas etc.
- **Tool Used: Spyder, Python (NumPy, matplotlib, SciPy)**

Home Depot Product Search Relevance(Carnegie Mellon University) **May'16 - June'16**

- Used various NLP techniques to perform feature engg on the unstructured dataset - Product Description & Attributes.
- Used ML Algos like RandomForest Regressor and Linear Regression to score each search query with the result.
- **Tool Used: Python (NumPy, matplotlib), Big Data/Distributed Sytems -Spark – Pyspark, MongoDB**

Super Fridge: Automated Grocery List using Object Detection in Refrigerator **Mar'17-Apr'17**

- Built an app on Raspberry Pi to detect objects in a Refrigerator and creating a Grocery List for missing items.
- Built modules for Clarifai API and Pi Camera used for object detection & upload the grocery list to google drive for users.
- **Tools Used: Python, Raspberry Pi & Camera, Calrifai API (Object Detection), Google Drive API**

Musicon: Music playing based on User Activity Recognition: SteelHacks'17 **24hr – Hackathon (Feb'17)**

- Built an Android app which used Google's Accelerator(Motion Sensor) to determine User Activity(Brisk Walk, Jogging, etc.).
- Integrated the User activity recognition module with Spotify API, which played song based on user activity.
- **Tools Used: Android JDK, Java, Google Accelerator (motion sensor) API, Spotify API**

Image classification to classify proteins into subcellular localization patterns (CMU) **Aug'16 - Dec'16**

- Built an Active Learning Framework containing Pool Based Data Access Model, Uncertainty based Querying Strategy and different base learners like SVM, Gaussian NB, KNN and Logistic Regression
- Accuracy score of 0.97 was achieved on dev data using SVM as base learner.
- **Tool Used: Spyder, Python (sklearn, NumPy, matplotlib, SciPy)**

Using Probabilistic Graphical Model to forecast Stock Prices for Time Series data (CMU) **Aug'16 - Nov'16**

- Transformed into stationary TS by using log space to remove unequal variances & difference to handle trend component.
- Checked stationarity using Dickey-Fuller Test (Features daily Stock prices of - Apple, MS, Hecla, NEM Mining, GM, Ford)
- Created precision matrix using transformed features and marginalized Precision Matrix for missing data.
- Conclusively was able to predict with minimal error rate the stock prices for Apple using only 3 days of data for companies.

Professional Experience

Business Operation Associate **ZS Associates Inc.** **Sept'14 – June'16**

- **Master Data Management - Role (Data Steward)**
  - Automated processes like loading client data and QCing client deliverable and performed Ad-hoc analysis.
  - Automation of Processes to reduce response time for file processing by over 80%
  - **Technologies Used – Python, MS Excel, VBA, Informatica Siperian, PL/SQL**
- **Smart Data Quality Management – (Quest '15)** **24hr – Hackathon (Oct'15)**
  - Participated & won in Quest'15 organized by ZS Associates which had 44 participating teams.
  - Designed Prod Arch detailing flow & control of Data pipeline. Implemented "Thomson Tau Method" to detect outliers
  - **Technologies Used – R, MS Excel, VBA and MS Access**

Summer Intern **Softkoash Solutions Pvt. Ltd** **May '12 – July '12**

- Implemented MS NerdDinner project as a POC. Fixed bugs to proprietary ERP Solution used by customers in production.
- **Technologies Used – C#, Microsoft's .NET Framework, HTML, CSS and JavaScript**

Co-curricular Activities

- Won Quest '15 (Hackathon at ZS Associates India)
- 2nd Best Project - PICT's "Impetus & Conceptus'14
- 2nd Prize MITCOE TechFest - 'Network Raptors'
- Best Project in Ops Excellence (ZS Global Office)