Udaya Krishnan Raviraj

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PROFESSIONAL EXPERIENCE

EXL ANALYTICS-PRODUCT DEVELOPMENT
August 2016 – Present | Gurgaon, IN

INFORMATION RETRIEVAL SYSTEM | Deep Learning, Natural Language Processing (NLP)   Nov '17 – Mar '18
To extract categorical information from very large unstructured text documents for a Legal client and reduce human intervention

- Designed and developed a python based framework that takes text documents as input and summarizes required information
- Developed an attention based - deep learning architecture with contextual embedding obtained from language modeling fine-tuned over the domain ontology.
- Leveraged Apache Kafka,distributed computing capability of Apache Spark and Cloudera's Data Science Workbench to efficiently deploy the framework in a live scenario for large scale extraction
- Deployed framework, after comprehensive experiments on real time data, yields encouraging results in comparison to existing methodologies saving 30% of time spent by analyst

MACHINE COMPREHENSION | Deep Learning, Natural Language Understanding(NLU)   Aug '17 – Feb '18
To design an intelligent program that answers the query about a given contextual paragraph written in English

- Developed a python module for modeling interactions between the contextual paragraph and the query using bi-directional attention mechanism
- Implemented a multi-level hierarchical process that uses deep learning architecture to represent the paragraph at different levels of granularity as a fixed size vector
  - The paragraph is passed through an attention mechanism that generates query aware paragraph representations using character-level, word-level and contextual-level embedding
  - The attention is iteratively calculated at each time step and the resulting attended vector is passed through the modeling layer which uses a LSTM network
  - Defined the training loss as the sum of the negative log probabilities of the true start and end indices, averaged over all example which is minimized using Adaptive Gradient optimization
- Evaluated the model on various open-source machine comprehension data sets to ratify the credibility and variation with language across demography

SPEECH PROCESSING SYSTEM | Signal Processing, Acoustic Mining   Aug '16 – Dec '16
To diarize and detect the real time emotion of a speaker in a dialogue using audio signals to aid an agent in a call center environment by providing actionable insights

- Designed an human emotion detection application using python libraries which uses audio signals to identify the active speaker in a dialogue and detect emotion for the talking span throughout the conversation
- Implemented a framework to generate and stream prosodic, spectral and voice quality features from the audio recording of customer-agent interactions
- Explored the distance metric based feature such as Bayesian Information Criterion to identify the acoustic change in segments of speakers and modeled using Hidden Markov model
- Developed an ensemble model based on SVM, Linear Discriminant Analysis (LDA) and Radial Basis Function (RBF) neural classification to recognize 6 different emotions (two- each)
- Leveraged the Speech to text module developed using Dilate-CNN architecture to generate textual transcription of the audio segments to evaluate the script adherence of the agents
- Framework provides a cumulative emotion score at the end of the conversation which serves as a KPI for a satisfied customer

CONTENT-BASED DOCUMENT CLASSIFICATION|Machine Learning, Natural Language Processing   Jan'17 – May'17
To score the relevancy of news articles for KYC worthiness of a customer for a banking client

- Designed an article classification framework using python libraries for news media industry, aiding data analysts classify relevant news commentary
- Identified and engineered hybrid features of domain specific attributes and numerical statistic of the text generated using bag-of-word model
- Developed an ensemble modeling technique over a k-fold CV to obtain the confidence score of relevancy using the predictions of SVM, Multinomial Naïve Bayes classifiers and Logistic regression over the hybrid features
- Implemented a generative statistical model viz., Latent Dirichlet allocation which generates a distribution of various topics attributing to the news article, providing instantaneous acumen for the analyst
- Deployed this Human-in-the-loop framework for a leading banking client to identify KYC worthiness and minimize structural risk, thereby improving the productivity by 10%

E-MAIL CLASSIFICATION APPLICATION | Deep Learning, Natural Language Processing   Aug'18 –present
To identify the intent of an incoming e-mail and route it to the concerned department of a France based business travel client

- Designed an application which takes a stream of e-mails as an input and categorizes them into designated intent in accordance to the subject, body and attachments in the message
- Implemented a machine learning architecture where word representations are averaged into a text representation, which is fed into a linear classifier
- Trained the model asynchronously using stochastic gradient descent and a linearly decaying learning rate minimizing the negative log-likelihood over different intents
- Working on ensemble approaches using Universal Language Model Fine Tuning(ULMFiT) and Bidirectional Encoder Representations from Transformers(BERT) algorithm that could challenge the existing solution in terms of computational complexity and accuracy
- Leveraged MS outlook client, Apache Kafka, pyTorch and MongoDB pipeline to productionize the product in client's environment

AXTRIA.INC
June 2015 – July 2016 | Gurgaon, IN

SOCIAL MEDIA SENTIMENT ANALYSIS   Jan '16 – Feb '16
To predict the effect of social media feeds on Television Rating points(TRP) of TV series for a leading mass media network client
- Developed a classification framework in R which identified subjective sentences from the social media feeds using bootstrapping
- Explored and implemented the K- nearest neighbor algorithm by parametrizing the voronoi tessellation to predict the sentiments of the subjective sentences
- Evaluated the performance of the framework over twitter feeds for the categories of #TV #Drama #Romance #Thriller
- Deployed the module over an existing TRP calculating framework thereby adding a social media interaction dimension to the predictions

RECOMMENDER SYSTEMS: MARKET BASKET ANALYSIS   Sep'16 – Dec'16
To study, identify and improve the customer buying patterns for a retail chain in India

- Developed a toolkit in R to calculate the support, confidence and lift metrics associated with buying patterns of products listed in the data set
- Devised differential analysis methodology to compare results between different stores, customers across demographic groups, between different days of the week, seasons of the year, etc.

TEST-CONTROL ANALYSIS TOOL   Feb'16– May'16
To evaluate the effectiveness of drug marketing campaigns of a pharmaceutical client

- Developed a toolkit with a user interface in R to find the control-test pairs by mapping analysis that includes one-to-one and one-to-many interactions
- Devised a detailed analysis dashboard considering the effects of time-lines of campaign on test and control and factors influencing customer behavior
- Deployed the framework by integrating with Excel providing intuitive dashboards with KPIs to evaluate campaign effectiveness, thereby reducing the need for repetitive coding for every new campaigns

EDUCATION

INDIAN INSTITUTE OF TECHNOLOGY KANPUR
Aerospace Engineering : July 2011 - May 2015 | Kanpur, IN
CGPA: 7.7/10

AP INTERMEDIATE BOARD
June 2009 - April 2011 | Secunderabad, IN
Percentage : 96.9/ 100

AP STATE BOARD
June 2008 - April 2009 | Secunderabad, IN
Percentage : 91.5 / 100

TECHNICAL SKILLSET

PROGRAMMING
Over 20000 lines:
C • Python • R • Matlab
Over 1000 lines:
SAS • SQL • VBA • EXCEL

METHODOLOGIES
Machine Learning (Deep Learning)
Natural Language Processing
Natural Language Understanding
Artificial Intelligence (AI)

PLATFORMS
Data Science
Tensorflow • PyTorch • Apache Kafka •
Apache Spark • MongoDB • Docker

Cloud
AWS(EC2,ECS,Sage-maker,S3) • MS Azure

AWARDS AND POSITIONS OF RESPONSIBILITIES

- 2017 |Invited Speaker: Guest lecturer for the course on Data Mining (DMT3A) ||CSE, Netaji Subhas Institute of Technology
- 2017 |Employee of the Quarter Q3 2017 : Successfully engaging in business development and monetizing product built to solve Extraction of Categorical Information from Unstructured Documents||EXL, Product Development Lab
- 2016 |Mastermind Award : Solving a real-world problem by leveraging Deep Learning algorithm and monetized the product serving client in US ||EXL, Product Development Lab
- 2016 |R Instructor Training the new recruits to build proficiency in R || Axtria.Inc
- 2014 |Chief Translator Assisted pupils with procedures and related queries in the festival || Communication Cell, Techkriti'14
- 2011-2012 |National Cadet Corps B Certificate || 2 UP Composite Technical Regiment
- 2009 |Best All-Rounder Award Outstanding performance in Academics, Extra-Curricular and Leadership||MMHS
- 2008-2009 |School People Leader Student representative of 2000 pupil || Model Mission High School, Hyderabad

SCHOLASTIC ACHIEVEMENTS

- All India Rank 2054 in IIT- JEE in 2011
- All India Rank 200 in AIEEE in 2011
- Andhra Pradesh State Rank 2713 in EAMCET in 2011
- Stood among top 1 percentile of students in Higher Secondary Examinations in 2011