

DHEERU DUA

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EDUCATION

University of California, Irvine, CA	2017-Present
PhD in Computer Science	
Carnegie Mellon University (CMU), PA	Dec 2015
Masters in Intelligent Information Systems	Core GPA: 3.91/4.00
Relevant Coursework: Language and Statistics, Information Retrieval, Question Answering, Machine Learning for Large Datasets, Algorithms for Natural Language Processing, Structure Predictions.	
Indira Gandhi Institute of Technology, Delhi, India	June 2011
B.E. (Hons.) Computer Science and Engineering	Core GPA: 3.94/4.00
Relevant Coursework: Discrete Mathematics, Algorithms Design & Analysis, Artificial Intelligence, Data Structures	

WORK EXPERIENCE

IBM Research – Statistical Language and Discovery Team	Mar 2016- August 2017
o Used Monte-Carlo tree Search with a hierarchical Sequence-to-Sequence model for abstractive document summarization.	
o Used Policy-gradient and Deep-Q Network based techniques for extractive document summarization.	
o Develop a Blocks like framework in Lua Torch for faster productionizing of deep-learned models	
Microsoft Corporation – Bing Team	July 2011-August 2014
o Knowledge Repository for Bing	
Performed Entity Resolution to build a unified entity graph of sports celebrities from various sources. Wrote a set of workflows which run on a MapReduce system to perform data conflation on millions of entities with Leibniz model.	
o SuperFresh Pipeline for Knowledge Repository	
Developed an infrastructure for point updates in the Knowledge graph to support fast updates of popular events.	
o Information and Content Experiences	
Developed a REST based web-service which provided various utilities like image comparison, orientation detection, and blank background detection (using K-mean clustering), which were used by different clients for regression testing.	

RESEARCH AND ACADEMIC PROJECTS

- o Working on Variation autoencoder based framework for disentangling syntactic and semantic representations from text.
- o Used generative adversarial network based architecture to create perturbations in natural language sentence which can fool a black-box classifier, paper accepted in ICLR 2018
- o Participated in Event Detection and Co-reference task in TAC KBP 2015. Developed an Event Mention Detection system using Conditional Random Fields trained on k-best label sequences in an online-passive aggressive manner.
- o Worked on Relation classification which involved introducing features extracted from Path Ranking Algorithm (NELL) into distantly supervised MultiR algorithm and achieved better results in Relation Classification at aggregate and sentential level from the current state-of-the art technique
- o Working on two components of a Question-Answering System for NTCIR QA Lab Task on World History Questions.
  - Events Knowledge Base – Extraction of event frames from unstructured data and finding temporal sequence amongst them using Markov Logic networks. This is further used for automated event-ontology extraction.
  - Machine Reading – Finding more domain specific documents based on various facets of an entity extracted from FrameNet and Wikipedia to build a domain-specific corpus.
- o Built a Search Engine over a semester with different retrieval and feedback models.
  - Implemented various retrieval mechanisms ranging from Boolean operators, BM25 model to Bayesian Indri Model.
  - Worked on query enrichment using pseudo-documents.
  - Trained a Learning to Rank Model incorporating features from all different retrieval models, pseudo-relevance feedback and other features like PageRank.
- o Developed various language models like n-gram, interpolated n-grams using Expectation-Maximization, back-off models, decision tree based language models, Maximum entropy models.
- o Implemented various probabilistic graphical models
  - Sequence Predictions models - Hidden Markov Models, Conditional Random Fields and Viterbi Decoder
  - Tree Parsing models – Learning Probabilistic Context Free Grammar and the subsequent CKY parser
  - Random Walk with restarts for structure learning in co-reference network.
  - Sequence generation models with LSTMs and Recurrent Neural Networks.
- o Worked on structured predictions involving integer linear constraints imposed by techniques like Dual Decomposition, ADMM.