Monisha J

Indian Institute of Technology Madras

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Education

2015-2020 **Dual Degree (B.Tech + M.Tech) in Computer Science and Engineering**
Indian Institute of Technology Madras, Chennai CGPA: 8.66

2015 **XII - Karnataka Board,** *KLE Society's Independent PU College, Bangalore* 97.30 %

2013 **X - ICSE,** *B P Indian Public School, Bangalore* 96.33%

Research Projects

Sep 2019 - May 2020 **Paraphrase Generation with a Bilingual Model and Continuous Embeddings**
Dual Degree Project, *Prof. Yulia Tsvetkov*, Language Technologies Institute, Carnegie Mellon University
- Proposed a novel zero-shot technique for paraphrase generation using the von Mises-Fisher loss on the encoder-decoder framework, realised through the transformer network
- Employed bilingual data to induce zero-shot paraphrasing using artificial tokens and parameter sharing and trained on a combinations of translation and rewriting tasks
- Evaluated the model on the IWSLT'16 data and observed that and vMF loss supports paraphrasing better it produces superior paraphrases as compared to the log-likelihood model

Aug - Dec 2018 **Leveraging Ontological Knowledge for Neural Language Models**
Course: Computational Models of Cognition, *Prof. Sutanu Chakraborti*, Indian Institute of Technology Madras
- Incorporated Weight Initialization in learning word embeddings using the WordNet Ontology for a task in the *Construction* domain, resulting in a faster convergence rate and better representation of domain-specific terms
- Proposed three models that induce hierarchical relations between words in the embeddings using the structure of the ontology, specifically for domain transfer applications
- Presented a publication and poster at the **ACM CODS-COMAD Young Researchers' Symposium 2019**

July - Dec 2018 **Multimodal Dialogue Generation**
Course: Undergraduate Research in Computer Science, *Prof. Mitesh Khapra*, Indian Institute of Technology Madras
- Proposed and implemented a model to prove the hypothesis that integrating domain-relevant features improves the performance of image retrieval in multimodal dialogue systems in the fashion domain, using the MMD dataset
- Proposed and explored the performance of attention and memory-based models with appropriate adaptations for multimodal dialogue, along with domain knowledge integration
- Explored the use of Graph Convolutional Networks for modeling the various components of multimodal dialogue

May - July 2017 **Cognitive Approach to Natural Language Processing**
Summer Internship, ***Prof. Veni Madhavan****,* ***Indian Institute of Science (IISc), Bangalore***
- Worked on a cognitive approach to Natural Language Processing that combines syntactic and semantic approaches
- Developed a cognitive parser which processes textual data into cognitive structure representation
- Created a software incorporating the above algorithm, that would be used as a feature extractor for various NLP tasks

Professional Experience

May - July 2018 **Text to Scene Conversion in Augmented Reality**
Summer Internship, ***Adobe Research Labs, Bangalore***
- Proposed and developed a pipeline for converting natural language descriptions to 3D scenes in Augmented Reality, comprising of NLP and ML components that construct the scene through prediction of object sizes and positions
- Developed a mobile application to showcase the applicability of the system, which demonstrated major performance improvements over previous systems
- A poster on the work was presented at the **ACM User Interface Software and Technology Symposium 2019**
- A patent on the work has been filed at the US PTO (Application No. 16/247,235)

May - July 2019 **Autocorrect Feature in Google Docs**
Summer Internship, ***Google India, Bangalore***
- Developed a new feature comprising of user interface behaviour with corresponding actions for pre-existing autocorrect operations (such as capitalization) to alert the user that an autocorrect has occurred and an interface to undo it
- Worked on the implementation of an improved version of autocorrect that corrects misspellings and grammatical errors
- Developed a feedback and logging mechanism for the autocorrect feature, and proposed success metrics to assess the performance of the same
- Presented a poster on the design, implementation and usability of the feature at an office-wide poster session

Publications and Patents

[Publication and Poster] **Leveraging Ontological Knowledge for Neural Language Models (Paper, Poster)**
Ameet Deshpande, ***Monisha Jegadeesan***
In **ACM CODS-COMAD** Young Researchers' Symposium 2019

[Publication and Poster] **Adversarial Demotion of Gender Bias in Natural Language Generation (Paper, Poster)**
Monisha Jegadeesan
In **ACM CODS-COMAD** Young Researchers' Symposium 2020

[Poster] **ARComposer: Authoring Augmented Reality Experiences through Text**
Sumit Kumar, Paridhi Maheshwari, ***Monisha Jegadeesan****, Amrit Singhal, Kush Kumar Singh, Kundan Krishna*
In ACM User Interface Software and Technology Symposium (**ACM UIST**) 2019

[Filed Patent] **Visualizing Natural Language through 3D Scenes in Augmented Reality**
Sumit Kumar, Paridhi Maheshwari, ***Monisha Jegadeesan****, Amrit Singhal, Kush Kumar Singh, Kundan Krishna*
Filed at the US PTO (Application Number: 16/247,235)

Course Projects

July - Dec 2019 **Graph Neural Networks for Extreme Summarization**
Course: Topics in Deep Learning, *Prof. Mitesh Khapra*, Indian Institute of Technology Madras
- Proposed and implemented multiple graph-based neural models for extreme summarization XSum dataset
- Experimented with neural networks with graph architectures at the sentence-level, document-level, as well as both the levels together
- Obtained better performance than simple recurrent and hierarchical models

March - April 2019 **Risk-Sensitivity in Multi-Armed Bandits**
Course: Multi-Armed Bandits, *Prof. L.A. Prashanth*, Indian Institute of Technology Madras
- Empirical survey of the existing methods for risk-sensitivity in stochastic bandit problems, spanning risk measures like Variance, Value at Risk (VaR) and conditional Value at Risk (cVaR)
- Implemented multiple risk-sensitive algorithms for each measure and performed a qualitative and quantitative analysis
- Introduced novel modifications of the Explore-Then-Commit algorithm for VaR and cVaR measures; both showing performance competent with existing risk-sensitive algorithms

Feb - March 2018 **Summarization and Keyword Extraction using TextRank**
Course: Natural Language Processing, *Prof. Sutanu Chakraborti*, Indian Institute of Technology Madras
- Performed a detailed analysis of the existing TextRank algorithm, a page-rank based algorithm for text summarization and keyword extraction and incorporated novel improvements on it

Oct - Nov 2018 **Risk-Sensitive Reinforcement Learning**
Course: Reinforcement Learning, *Prof. L.A. Prashanth*, Indian Institute of Technology Madras
- Empirically analyzed the existing methods for risk-sensitive RL, spanning various risk measures like variance bounds and probability of risk bounds, and incorporating them in algorithms like Q-learning and SARSA
- Introduced a new risk measure and corresponding algorithm that maximizes distance from error states in a Gridworld

Dec 2016 **Scaling Graph Algorithms**
Winter Project, *Prof. Rupesh Nasre*, Indian Institute of Technology Madras
- Implemented algorithms for maximum network flow (Edmonds-Karp algorithm) in a graph and finding a maximum matching in a bipartite graph (Hopcraft-Karp algorithm)
- Optimized the running time for real data graphs such that the algorithm ran efficiently on graphs with up to 10,000 vertices and 1 lakh edges

Skills

Languages C, C++, C#, Java, Python, HTML, CSS, Javascript

Tools Unity, ARCore, Android Studio, Stanford CoreNLP, git, Bootstrap, jQuery, AngularJS

Libraries NLTK, django, scipy, pandas, sklearn, gensim, keras, tensorflow, pytorch

Courses

[Statistical Learning] Topics in Deep Learning, Deep Learning, Machine Learning, Natural Language Processing, Reinforcement Learning, Multi-Armed Bandits, Probabilistic Graphical Models, Computational Models of Cognition

[Curriculum] Computer Networks, Database Systems, Operating Systems, Data Structures and Algorithms, Object-Oriented Programming

[Mathematics] Probability-Statistics-Stochastic Processes, Discrete Mathematics, Graph Theory

Scholastic Achievements

- First runner-up in the **AWS Deep Learning Hackathon** held during Shaastra 2018, IIT Madras:
  Developed a prototype for recognition and translation of English text on signboards and posters into vernacular languages
- **State Rank 17** in Karnataka Common Entrance Test for Engineering, 2015, out of approximately 1.2 lakh students
- Topped respective academic institutions in both **Class X and Class XII** board exams

Positions of Responsibility

Jan - May 2020 **Teaching Assistant,** *Course: Natural Language Processing,* IIT Madras
- Designed and evaluated assignments and exams
- Gave lectures to a class of 75 students
- Mentored 30 students on individual research projects

June 2019 **Organizer, Management Team,** *Tech Intern Connect,* Google, Bangalore
- Member of the managing committee that organized the event, hosting technology interns from all over the city

June - Dec 2016 **Technical Operations Coordinator,** *Shaastra 2017,* Indian Institute of Technology Madras
- Developed the front-end components of major websites and portals for the technical fest of IIT Madras

Extra Curricular Activities

Sports Part of NSO (Sports at IIT Madras) Basketball during the first year of engineering (2015-16)

Cultural Trained in the classical dance form of Bharatanatyam for six years