Megh Thakkar

Linkedin: https://www.linkedin.com/in/megh-thakkar
Website: megh-thakkar.github.io

Education

2016 - 2020 **BITS Pilani, Pilani Campus, India.**
Bachelor of Engineering in Computer Science Engineering.
CGPA: 9.23/10.
Relevant Courses: Neural Networks and Fuzzy Logic, Information Retrieval, Data Mining, Linear Algebra, Calculus, Probability and Statistics, Linguistics, Object Oriented Programming, Data Structures, Algorithms, Database Systems, Operating Systems, Computer Programming.

Research Experience

Aug '20 - Present **Open Domain Question Answering by Jointly Using Text and Knowledge Base.**
*R*esearch Assistant: NTU-NLP Group, **Nanyang Technological University** (NTU), Singapore
Advisor: Dr. Shafiq Joty

- Working on improving **retriever-reader** models for **open domain question answering**, currently for the Natural Questions Dataset.
- Experimenting with various transformer models (**BERT** and **RoBERTa** for the retriever, **BART** and **T5** for the reader) for knowledge-enhanced answer generation.

Aug '19 - Dec '19 **Speech Emotion Detection and Dialogue Generation.**
Research Intern: **Speech and Language Laboratory** (MICL) , Nanyang Technological University (NTU), Singapore
Advisor: Dr. Chng Eng-Siong

- Created an **API Gateway** to access various existing deep learning modules such as NER (Name-Entity Recognition), SUD (Sentence Unit Detection), and summarization through a standard interface.
- Built a **light weight** production ready **CNN based model** for speech based emotion detection.
- Collaborated on a project aimed at diversifying **dialogue generation** models using a context based **generator-discriminator architecture**.

May '19 - Jul '19 **Language Model for Query Auto-completion.**
Research Intern: **Language Technology Group** (LT) , University of Hamburg, Germany
Advisor: Dr. Chris Biemann

- Developed a bi-LSTM based hybrid **character level language model** infused with word embeddings, such as GloVe, ELMo, and Flair, as well as a combination of FastText and sent2vec.
- Used decoding methods like **beam search** and **top k** sampling along with reranking methods such as **LambdaMART** and tensorflow-ranking.
- Improved the state of the art MRR on the AOL Search Query Log dataset by 2.2%

May '18 - Jul '18 **UAV Flight Planner with Shadow Exclusion.**
Research Intern: **Photogrammetry and Remote Sensing Department** (PRSD) , Indian Institute of Remote Sensing, Dehradun, India
Advisor: Dr. Shefali Agarwal

- Developed a software for automatically **generating the path of a UAV**, with **planimetry** and **altimetry**.
- Calculated terrain regions under a shadow using **ray tracing** and **Bresenham's Line Drawing** algorithm, which were subsequently minimised to increase the UAV's efficiency.

May '18 - Aug '18 **BioJS Webapp Backend.**
Summer Intern: **Google Summer of Code, 2018** (Project Link), India-Australia-United Kingdom

- Led the development of a new website for BioJS, a community-based project compiling JavaScript widgets and **modular components** to visualize and process biological data using web technologies.

Projects

Jan '20 - May '20 — **VQA Models that Read Text**

Project supervisor - *Dr. Yashvardhan Sharma (Associate Professor - CSIS Dept, BITS Pilani)*

- Conducted literature review and studied various methods of **multimodal deep learning**, **multimodal attention** and its applications in downstream tasks such as **TextVQA** and **Visual Commonsense Reasoning**.
- Identified approaches to enhance the baseline model by improving the **OCR module** using simple heuristics.
- A **book chapter** on multi-modal learning and its applications for text reading and visual commonsense reasoning is in submission.

Jan '19 - April '19 — **Toy Compiler**

Course Project - *Compiler Construction*, Instructor - *Dr. Vandana Agarwal*

- Created a mini compiler in C for a given custom language as a part of Compiler Construction course.
- Created front-end and back-end components of a compiler including **lexer**, **parser**, **AST**, **symbol tables**, **type and semantic analyzer** as well as **code generator**.

Aug '18 - Dec '18 — **Visual Question Answering**

Project supervisor - *Dr. Dhiraj Sangwan (Senior Scientist - CEERI, Pilani)*

- Implemented a basic **visual question answering system** for the MS Coco Dataset.
- Used the pretrained **VGG 16** model for image feature extraction and stacked **LSTM layers** for text feature extraction.
- Experimented with combining the multimodal feature vectors using naive **concatenation** and **Hadamard product** approaches for the final classification.

Oct '18 - Dec '18 — **Feedback-based Retrieval System with Sentence Ranking**

Course Project - *Information Retrieval*, Instructor - *Dr. Poonam Goyal*

- Designed and implemented an efficient, configurable, and intelligent retrieval framework for text documents.
- Used NLP methods and concepts such as **stemming**, **tf-idf scores**, **BM25 scores** and **nltk** for text processing.
- Implemented a **click-based feedback system** to improve suggestions to re-rank documents based on current retrieval.

Oct '18 - Nov '18 — **Convolutional Neural Networks in Scala**

Course Project - *Principles of Programming Languages*, Instructor - *Dr. Lavika Goel*

- Developed a two layer deep convolutional neural network in Scala using only **functional programming** concepts.

Skills

Languages: Python, C, Java, C++, SQL, Scala
Libraries and Frameworks: PyTorch, pytorch-geometric, Keras, scikit-learn, NLTK, networkx, Django, REST
Publishing: LaTeX

Achievements

2018 — Awarded the **DAAD-WISE** scholarship to pursue summer research in Germany and the **mitacs Globalink** scholarship to pursue research in Canada.

2016-2018 — Awarded the **Institute Merit Scholarship** given to the top 3 percentile of students across all the departments.

2016 — Secured **All India Rank 105** out of about 1.2 million candidates in the JEE Mains Entrance Examination.

Positions of Responsibility

Council of Students for Academic Activities (CoStAA) - ***Member***

- I was responsible for managing all **the technical aspects** of APOGEE (one of India's largest student-run tech fests), including registrations, accommodation allocation, online payments, and mobile applications, while coordinating with fellow elected members for the overall functioning of the fest, by **leading a team** of more than **40 members**.
- Introduced a **QR based ticketing system** to reduce paper usage, a **mobile wallet** for the ordering from the food stalls and an **event management system** for efficiently conducting over 90 events.

Student Faculty Council (SFC, BITS Pilani) - *Member*

- Core team member of the SFC, a group of department faculties and selected students who conduct meetings and discussions in order to ensure proper structure of the courses and also to provide feedback for different courses.