

# Megh Thakkar

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## EDUCATION

2016 - 2020

**BITS Pilani, Pilani Campus, India.**

Bachelor of Engineering in Computer Science. **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.

## PUBLICATIONS

EMNLP '21

**HypMix: Hyperbolic Interpolative Data Augmentation.**

Ramit Sawhney\*, Megh Thakkar\*, Shivam Agarwal, Di Jin, Diyi Yang, Lucie Flek: In Proceedings of the 2021 Conference on Empirical Methods in Natural Language Processing (*Oral presentation*).

SIGIR '21

**Hyperbolic Online Time Stream Modeling.**

Ramit Sawhney\*, Shivam Agarwal\*, Megh Thakkar\*, Arnav Wadhwa, Rajiv Ratn Shah: In Proceedings of the 44th International ACM SIGIR Conference on Research and Development in Information Retrieval.

## EXPERIENCE

Jun '21 - Present

**Neural Voice Cloning and Tabular Question Answering.**

Machine Learning Engineer: [Avaamo](#), Bangalore, India

- Led the work on voice cloning from low resource recordings using state-of-the-art synthesizers and vocoders.
- Currently focusing on semantic parsing and question answering over tabular data.

Dec '20 - Present

**Online Text Stream Modeling and Interpolative Data Augmentation.**

Research Assistant: [Multimodal Digital Media Analysis Lab \(MIDAS\)](#), IIIT Delhi, India

*Advisors:* [Dr. Di Jin](#), [Dr. Rajiv Ratn Shah](#)

- Proposed a time-aware LSTM cell operating in the hyperbolic space for modeling online financial text streams.
- Designed a novel model, dataset and modality agnostic interpolative regularization method using the Riemannian manifold for effective representation of complex latent embeddings.
- Extended the work to an adaptive and intelligent sampling strategy of inputs for efficient interpolations as compared to vanilla mixup (paper to be submitted to ACL '22).
- Currently exploring latent interpolations in the multilingual embedding space for zero-shot cross-lingual transfer.

Sep '20 - Present

**Open Domain Question Answering and Chart-based Text Generation.**

Research Assistant: [NTU-NLP Group](#), Nanyang Technological University (NTU), Singapore

*Advisors:* [Dr. Shafiq Joty](#), [Dr. Enamul Hoque](#)

- Developed a hybrid graph+text encoder model using contrastive learning for open domain question answering.
- Proposed a multi-modal neural network using image encoders fine-tuned with self-supervised learning via redundancy reduction for summarization of chart images (benchmark paper to be submitted to ACL '22).
- Currently working on graph-to-text architectures for large scale pre-training over knowledge-infused representation of charts and its application for downstream tasks such as summarization and question answering.

Aug '19 - Dec '19

**Speech Emotion Detection and Deep Learning API Gateway.**

Research Intern: [Speech and Language Laboratory](#), Nanyang Technological University (NTU), Singapore

*Advisors:* [Dr. Yashvardhan Sharma](#), [Dr. Chng Eng-Siong](#)

- Created a standardized API Gateway to access various deep learning modules such as NER (Name-Entity Recognition), SUD (Sentence Unit Detection), and summarization through a standard interface.
- Built a resource efficient CNN based model for speech based emotion detection and deployed it to production.

May '19 - Jul '19

**Language Model for Query Auto-completion.**

DAAD-WISE Scholar: [Language Technology Group \(LT\)](#), University of Hamburg, Germany

*Advisor:* [Dr. Chris Biemann](#)

- Developed a bi-LSTM based 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 (IIRS), 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](#)

- 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**.

Aug '18 - Dec '18

### Visual Question Answering

*Project supervisor:* [Dr. Dhiraj Sangwan](#)

- Implemented a basic **visual question answering system** for the MS COCO Dataset.
- Used the pretrained **VGG 16** model for image feature extraction and **LSTM** 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 **functional programming**

## SKILLS

**Languages:** Python, C, Java, C++, SQL, Scala

**Libraries and Frameworks:** PyTorch, pytorch-geometric, Keras, scikit-learn, NLTK, networkx, Django, REST

**Publishing:** L<sup>A</sup>T<sub>E</sub>X

## 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.