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: 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.