Sandeep **Kumar**

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Education

Indian Institute of Technology Kanpur *Jul. 2015 - Jul. 2019 (exp)*

B.S. in Mathematics and Scientific Computing (8.64/10)

Research Interests

Computer Vision, Natural Language Processing, Artificial Intelligence

Publications

Multimodal Differential Network For Visual Question Generation

Conference paper at **EMNLP 2018** Link for paper

- Developed a method to incorporate exemplars to learn differential embeddings for generating natural questions for a given image
- Obtained Multimodal embeddings by combining image and caption information which allows the model to capture relevant context
- Achieved state-of-the-art results on multiple datasets using Encoder-Decoder architecture

Learning Semantic Sentence Embeddings using Pair-wise Discriminator

Conference Paper at **COLING 2018** Link for paper

- Proposed a novel method for obtaining sentence-level embeddings by solving the paraphrase generation task
- Introduced a sequential pair-wise discriminator to obtain semantic and relevant sentence embeddings
- Obtained state-of-the-art results on the task of paraphrase generation and sentiment analysis

Experience

Interpretable Visual Dialog (Prof. Devi Parikh) *March 2018 - Present*

Research internship at Georgia Institute of Technology (*This work is under review*)

- Analysed Visual Dialog models with the help of GradCAM visualisations
- Imposed additional constraints on the model to do well on multiple tasks

Video Completion with Deep Learning *Dec 2017 - Present*

Research internship at NVIDIA Graphics Bangalore (*This work is under review*)

- Built a convolutional generative adversarial network for this task
- Used multiple discriminators to ensure temporal and spatial consistency of video

Bayesian Techniques For Question Generation (Prof. Vinay P Namboodiri) *Jan 2018 - May 2018*

Undergraduate Research, (*This work is under review*)

- Developed a bayesian architecture to procure embeddings for cues such as place, tag and caption
- Used a bayesian fusion module to obtain joint embeddings for different cues
- Proposed a bayesian moderator module to gauge the importance of different fused embeddings

Mitigating Annotation Costs in legal domain *Oct 2017 - Jan 2018*

Course Project (*This work is under review*)

- Designed a novel algorithm to annotate legal documents in an information retrieval setup
- Got rid of human effort at test time without significantly affecting the performance

Honors & Awards

2015 Among top 5% in JEE Advanced 2015 and top 0.1% in JEE Mains 2015.
2015 Secured 96.4 % in Higher Secondary Examination
2014 Scholar Kishore Vaigyanik Protsahan Yojana (KVPY), National Talent Search Examination (NTSE)
2014 Merit Certificate Indian National Chemistry Olympiad, NSEJS (National Junior Science Olympiad)

Relevant Courses

Machine learning Techniques	Data Structures & Algorithms	Linear Algebra
Applied Stochastic Processes	Probability & Statistics	Time Series Analysis

Technical Skills

Languages: Python, C++, C, Lua, MATLAB, R **Tools** : LaTeX, MELD, GIT **DL Platforms** : Torch