Sandeep Kumar

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Education

University of North Carolina at Chapel Hill *Aug. 2019 - Present*

MS/PhD in Computer Science

Indian Institute of Technology Kanpur *Jul. 2015 - May 2019*

B.S. in Mathematics and Scientific Computing (8.7/10)

Research Interests

Computer Vision, Natural Language Processing, Machine Learning

Publications

Multimodal Differential Network For Visual Question Generation

EMNLP 2018 PDF

- Developed a method to incorporate exemplars to learn differential embeddings for generating natural questions for an 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 VQA-1.0 and VQG-COCO datasets

Learning Semantic Sentence Embeddings using Pair-wise Discriminator

COLING 2018 PDF

- 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 (Quora dataset) and sentiment analysis (SST dataset)

Deep Bayesian Network For Visual Question Generation

WACV 2020 PDF

- Developed a bayesian architecture to procure embeddings for various image related cues like place, caption and tags
- Used a bayesian fusion and moderator module to obtain joint embeddings for different cues
- Obtained 5% improvement over previous state-of-the-art on the task of question generation on VQG-COCO dataset

Internships

Interpretable Visual Dialog *March 2018 - July 2019*

Research internship with Prof. Devi Parikh

- Analysed Visual Dialog models with the help of GradCAM visualisations
- Adopted a Multi-Task learning setting with Question reconstruction as the auxiliary task for dialog

Video Completion with Deep Learning *Dec 2017 - Jan 2018*

Research internship at NVIDIA Graphics Bangalore

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

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	Theory of Computation
Applied Stochastic Processes	Probability & Statistics	Time Series Analysis