

Nikhil Verma

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Research Engineer, Developer



Education

Birla Institute of Technology and Science

B.E. (HONS.) ELECTRICAL AND ELECTRONICS ENGINEERING
Cumulative GPA 8.01

Pilani, Rajasthan

Aug 2014 - Jul 2018

Publications

Context Marker Embeddings for Neural Conversational QA

Abhishek Sharma, Danish Contractor, Harshit Kumar, Nikhil Verma and Sachindra Joshi
Under Review at the Annual Conference of the Association for Computational Linguistics, 2020

Experience

IBM Research

STAFF RESEARCH ENGINEER

New Delhi

Jul 2018 - Present

- Developed IRLQA, a framework for training and evaluating models for conversational question answering.
- Developed Passage Attention Flow, an improvement over BiDAF based models for conversational question answering.
- Currently working on improving systems that first ask follow up questions to answer underspecified questions.

Microsoft Research

RESEARCH INTERN

Bangalore

Jan 2018 - Jul 2018

- Worked towards developing novel methods to generate natural language summaries describing source code.
- Conceptualized and implemented a weighted attention mechanism using OpenNMT (PyTorch).
- Our model was able to better focus on rare tokens producing improved NL descriptions for `bash` commands.

IBM Research

RESEARCH INTERN

New Delhi

May - Jul 2017

- Improved techniques for generating answerable questions from a given source text.
- Implemented a novel approach using a syntactic sequence to sequence model to handle the problem of unknown sequences.
- Achieved improvements in automatic evaluation metrics using a much smaller vocabulary.

Neural Networks and Fuzzy Logic

TEACHING ASSISTANT

Pilani, Rajasthan

Aug - Dec 2017

- Introduced Numpy based programming assignments in the most sought after course for Neural Networks on campus.
- Managed the logistics of online assignments with over 180 people attempting the test at the same time.

Bhaskaracharya Institute for Space Applications and Geo-Informatics

SUMMER INTERN

Gandhinagar, Gujarat

May - Jul 2016

- Studied classification techniques for satellite imagery to aid in identifying areas being illegally mined.
- Used techniques like K-means and Random forests and tools like QGIS, GDAL, Numpy and Scikit-Learn.
- Our project was one of the two most highest scoring ones in the final presentation among nine others.

Department of Visual Media

BACKEND DEVELOPER, COORDINATOR

Pilani, Rajasthan

Aug 2014 - May 2016

- Developed the backend for the official websites of all three major college festivals.
- Head of the department of over 40 skilled enthusiasts.
- Our systems managed over 1000 participants over the course of four days.

Skills

Proficient Python, NumPy, PyTorch, and Django; Recurrent Neural Networks, SEQ2SEQ Networks, Attention Mechanisms.

Experienced JavaScript, C/C++, Java, Bash, \LaTeX ; TensorFlow, Keras, Flask, OpenNMT; MySQL, SQLite, MongoDB, and Redis

Projects

IRLQA

PYTORCH, ALLENNLP

December 2018

- Developed IRLQA, a PyTorch based framework for training and evaluating models for conversational question answering.
- Implemented state-of-the-art models on the QuAC task thereby severely reducing the dependency on ALLENLP.
- Developed a PASSAGE ATTENTION FLOW mechanism, a novel improvement over existing BiDAF based models

Bash2NL

PYTORCH, OPENNMT

[Report](#)

April 2018

- Used sequence to sequence networks to describe **bash** commands in natural language.
- Conceptualized and implemented supervised and weighted attention mechanisms in OPENNMT-PY
- Our model is able to focus more on rarely occurring words, thus generating better descriptions.

Automatic Question Generation

PYTORCH, TENSORFLOW

[Report](#)

June 2017

- Used sequence to sequence models for generating answerable questions from a given sentence.
- Experimented with both, the traditional RNN based seq2seq models as well as a fully convolutional model.
- Used a combination of reusable **<unk>** tokens and lemmatization to tackle the problem of unknown sequences.
- Achieved improvements in automatic evaluation metrics using a much smaller vocabulary.

Predicting Code Switch Points

SEQ2SEQ, BILSTM

[Report](#) | [Code](#)

Oct 2017

- Developed a novel method to predict possible code-switch points given a monolingual sentence.
- The model is based on stacked, bidirectional LSTMs containing character-level and word-level embeddings.
- The system only requires word-level language tagged data for training unlike other methods which require extensive preprocessing.

Autonomous Mobile Bots

V-REP, REINFORCEMENT LEARNING

[Report](#) | [Code](#)

Apr 2017

- Trained a three layer deep reinforcement learning network to steer a bot automatically given a path.
- Created OpenAI-Gym style APIs as an interface between V-Rep and Keras to facilitate training.
- Made an actual hardware implementation of the model based on Raspberry Pi.

Image Captioning

CNNS, LSTMS

Oct 2016

- Developed a deep learning model for generating short descriptions of images using CNNS and LSTMs.
- Implemented LSTM in Python using Numpy for CPU and Tensorflow for GPU.

Poll Predictor

CNNS, SENTIMENT ANALYSIS

Apr 2016

- Used CNNS to predict the US presidential elections by performing sentiment analysis on real time twitter feed.
- Implemented CNNS in Python from scratch.

Network Traffic Classifier

MLPS

Apr 2017

- Developed a real time system using neural networks to classify live traffic into Tor, Web, P2P and VPN Traffic.
- Used multi-layer perceptrons with specific transport layer properties as features for the model.

Registration Systems

PYTHON, DJANGO, AWS

[Code](#)

Feb 2016

- Developed the centralised backend for the official websites of all college fests.
- The system is used to manage registration, billing, accomodation and event participation of over 1000 participants during the fests.

Achievements

- 2017 **Finalist** Smart India Hackathon, Organised by the Government of India
- 2016 **Coordinator** BOSM 2016, Annual Sports Festival of BITS Pilani
- 2013 **AIR 2437** JEE Advanced, Entrance Exam for the IITs
- 2013 **Scored 370/450** BITSAT, Entrance Exam for BITS Pilani

[Ahmedabad, Gujarat](#)

[Pilani, Rajasthan](#)

[Lucknow, Uttar Pradesh](#)

[Lucknow, Uttar Pradesh](#)