Raghav Goyal

Contact Information

Phone: +49-15773570775
E-mail: raghavgoyal14@gmail.com, raghav.goyal@twentybn.com
Address: Corinthstr. 40, 10245 Berlin, Germany
Web: https://raghavgoyal14.github.io/

Work Experience

Twenty Billion Neurons, Berlin, Germany - a video understanding startup — Oct 2016 - Present
AI Engineer — (with Roland Memisevic, PhD)

- Research in describing actions in video sequences from real-life crowdsourced datasets, containing fine-grained concepts with an aim to extract *common sense*
- Placed 3^{rd} in Kinetics Video Recognition challenge among 16 teams with best top-5 performance, hosted by DeepMind as a part of ActivityNet workshop at CVPR'17 [summary]
- Placed 3^{rd} in Visual Dialog challenge among 11 teams, hosted as a part of Workshop on Shortcomings in Vision and Language at ECCV'18, outranking Microsoft's submission [rankings]
- Prototyped and benchmarked an open-source binary data format - *GulpIO*, for faster read access to high volume datasets with upto 8x speed-up on magnetic disks [PyPI][blog]

Education

Indian Institute of Technology (IIT) Delhi, New Delhi, India — 2010 - 2015
Integrated M.Tech. in Mathematics & Computing. CGPA: 7.69/10

Grenoble INP, Grenoble, France — 2015 - 2016
Masters by Research in Statistics (in collaboration with Xerox). GPA: 15.24/20

Publications

1. R Goyal, Farzaneh Mahdisoltani, Guillaume Berger, Waseem Gharbieh, Ingo Bax, Roland Memisevic. "*Evaluating visual 'common sense' using fine-grained classification and captioning tasks*". In ICLR Workshop. Vancouver, Canada. May 2018. (pdf)
2. R Goyal, S Kahou, V Michalski, J Materzynska, S Westphal, *, I Bax, R Memisevic. "*The 'something something' video database for learning and evaluating visual common sense*". In ICCV. Venice, Italy. Oct 2017. (pdf) [Acceptance Rate: 28.9%]
3. Raghav Goyal, Marc Dymetman, Eric Gaussier."*Natural Language Generation through character-based RNNs with finite-state prior knowledge*". In Proceedings of 26th International Conference on Computational Linguistics (COLING). Japan. Dec 2016. (pdf|slides) [Acceptance Rate: 32%]

Blog posts

1. "Visual Explanation for video recognition". Understanding what neural networks see when classifying videos. [Link]
2. "Recognizing human actions in videos". How we placed third in the 2017 ActivityNet challenge. [Link]
3. "Modelling audio signal using visual features". On partially reconstructing audio waveform that captures distinct motion patterns occuring in a video such as hits, collision, etc. [Link]

Internships

Recurrent Neural Networks for Natural Language Generation — Spring, 2016
Xerox Research Centre Europe, Meylan, France — (Dr. Marc Dymetman)

- Developed an attention-based sequence-to-sequence model for generating natural language utterance from a given semantic representation of information
- Used a character-level model which unlike the word-level model is able to "copy" information from the input representation without any pre-processing
- Imposed a weak prior in the form of a finite state machine which constrains the generation task to avoid inventing information and generating non-words

Personalized Messaging Engine Summers, 2014
Xerox Research Centre India, Bangalore, India (Dr. Koustuv Dasgupta)

- Developed prioritization module which fires relevant messages for employees based on their feedback & employer's priority
- Used Collective Matrix Factorization to build recommender system which combines multiple information sources such as message attributes and user demography

Patents

1. Goyal, Raghav, and Marc Dymetman."Natural language generation through character-based recurrent neural networks with finite-state prior knowledge." U.S. Patent Application No. US10049106B2. 2018. Granted.
2. Sharma, Avinash, et al. "Methods and systems for transmitting prioritized messages to employees." U.S. Patent Application No. US10089605B2. 2016. Granted.

Projects

Classifying images using Deep Learning Architecture [Thesis|Code] Aug, 2014 - July, 2015
M.Tech. Thesis, Department of Mathematics, IIT Delhi (Dr. B. Chandra)

- Inspected gradient based learning algorithm for maximizing joint likelihood of input data & class labels in Classification Restricted Boltzmann Machine (ClassRBM)
- Formulated an extension of ClassRBM - a Convolutional ClassRBM, to efficiently use spatial properties of images. Subsequently, obtained better accuracy over its one-dimensional counterpart, ClassRBM

Sentiment Mining over Twitter Feeds [Code|Writeup] Fall, 2014
Department of Computer Science & Engineering, IIT Delhi (Dr. Mausam)

- Developed sentiment categorization system trained over 1.6 million tweets of Sent140 dataset to predict positive or negative sentiment
- Implemented and analysed performance of Naive Bayes, SVM & Max Ent models
- Improved precision by using tweet normalization, stop words, lemmatization, negation & part of speech tagging

Trading Forex via Recurrent Reinforcement Learning [Report|Slides] Fall, 2013
Department of Computer Science & Engineering, IIT Delhi (Dr. Parag Singla)

- Implemented algorithmic trading strategy for USD-EUR exchange rate to predict future buy or sell position in a high frequency setup
- Trained feedback neural network using Differential Sharpe Ratio as performance measure
- Compared and established higher cumulative returns over Buy & Hold and Random Monkey strategy

Awards & Honours

- All India Rank 652 in IIT-Joint Entrance Examination 2010 over ∼0.5 mil candidates
- All India Rank 1003 in All India Engineering Entrance Examination 2010 over ∼1 mil candidates
- Awarded Grenoble INP foundation scholarship worth €5000 Fall, 2015
- Teaching assistant for MAL 390: Statistical Methods & Algorithms Spring, 2015
- Awarded MHRD scholarship for securing All India Rank 84 in Graduate Aptitude Test for Engineering (GATE) 2014 2014-15

Relevant Courses

Data Structures, Analysis & Design of Algorithms, Multivariate Statistics, Graph Algorithms, Theory of Automata, Optimization Methods, Data Mining, Software Engineering, Machine Learning, Natural Language Processing

Technical Skills

Languages:	C, C++, Java, Python
Softwares/Tools:	R, MATLAB, LaTeX, TensorFlow, PyTorch