Raghav Goyal

Contact Information	Phone: +49-15773570775 E-mail: raghavgoyal14@gmail.com, raghav.goyal@twentybn.com Address: Nostitzstr. 27, 10965 Berlin, Germany Web: https://raghavgoyal14.github.io/

Work Experience

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

- Action recognition in trimmed, single-activity video sequences from real-life crowdsourced datasets, describing fine-grained activities with an aim to extract "common sense"
- Surveying literature, prototyping and deploying best performing architectures containing mix of 3D convolutions, separable convolutions, residual connections, dilation etc.
- Placed 3rd 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]
- 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

Referred Publications

1. <u>Raghav Goyal</u>, Samira E. Kahou, Vincent Michalski, Joanna Materzynska, Susanne Westphal et. al. "*The 'something something' video database for learning and evaluating visual common sense*". In ICCV. Venice, Italy. Oct 2017. (pdf) [Acceptance Rate: 28.9%] (Two Minute papers' coverage)

2. <u>Raghav Goyal</u>, 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. [Medium Link]

2. "Recognizing human actions in videos". How we placed third in the 2017 ActivityNet challenge. [Medium 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. Raghav Goyal, Marc Dymetman."Natural Language Generation through character-based RNNs with finite-state prior knowledge". ID Number.20160644. 2016. Accepted by Xerox TAP.
	2. Avinash Sharma, Abhishek Tripathi, Koustuv Dasgupta, Nischal Piratla, Raghav Goyal et al. "Joint prioritization of messages by combining employer and employee preferences to improve engagement". ID Number.20140996US01. 2014. Accepted by Xerox TAP. Under Review.

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

Portfolio Optimization using Support Vector Machine [Slides] Fall, 2013
Department of Electrical Engineering, IIT Delhi (Dr. Jayadeva)
- Built a supervised approach in which portfolio is rebalanced using SVM and weighted using Universal Porfolio model
- Extracted features based on low, high, open, close & volume to predict buy position
- Achieved higher accuracy over Average Portfolio, SVM, Universal Portfolio in terms of cumulative returns

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, Theano, Lasagne, Tensorflow, PyTorch