Raghav Goyal

Contact Information

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Work Experience

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

- Research in describing actions in trimmed, single-activity video sequences from real-life crowd-sourced 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]
- 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%] (Two Minute papers' coverage)
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. [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. A Sharma, A Tripathi, K Dasgupta, N Piratla, R Goyal et al. "Methods and systems for transmitting prioritized messages to employees". US 20160364690 A1. 2016. Published.

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, Theano, Lasagne, Tensorflow, PyTorch