Aaditya Prakash (Adi)

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Blog, Github, Scholar, LinkedIn, Twitter

RESEARCH

Current: Model parallelism in CNNs, Defense against robust adversarial attacks

Past : Paraphrase Generation , Applications of Memory Networks in NLP — Advisor: Sadid Hasan
Semantic Image Compression using CNN , Visual Question Answering — Advisor: James Storer
Computational Fact Checking with Retrospection — Advisor: Liuba Shrira

EDUCATION

PhD, Computer Science, Brandeis University. Advisor: Prof. James Storer — Current

MA, Computer Science, Brandeis University — 2013 – 2015
Courses: Algorithms, Distributed Systems, Statistical approaches to NLP — GPA 4.0/4.0
Computational Semantics, Computational Neuroscience, Information Retrieval

BS, Biomedical Engineering, Bharath University, Chennai, India — 2004 – 2008
Courses: Calculus(I, II), Complex Analysis, Numerical Methods, Digital Signal Processing — GPA 9.36/10
Biostatistics, Medical Physics, Medical Imaging Lab, Modeling of Physiological Systems — Rank = 1/71

Reinforcement Learning Summer School, Vector Institute (CIFAR/MILA) — *Aug* – 2018

Completed 24 MOOC courses from Coursera, Udacity, edX, Harvard Business School — 2012 – 2013
Machine Learning (Ng), Game Theory, Algorithms, Neural Networks (Hinton), AI (Abbeel) — Certificates

COMPUTING SKILLS

Languages : Python, C, C++, CUDA, Matlab
Deep Learning : TensorFlow[TF],Keras, PyTorch, Theano, Torch
Research Tools : iPython, SciPy, NumPy, OpenCV, Git, Bash, LaTeX
Big Data Tools : Hadoop, MapReduce, MongoDB, Mahout, Spark
Code Samples : VQA [Keras] , Multi-structure ROI [TF] , Neural Paraphrase Generation [TF]
: Multi-agent GANs [TF] , Pixel Deflection [TF] , Fallacy Detector [Haskell]

EXPERIENCE

- Research Intern, Microsoft Research (AI+R) — Summer 2018
  - Model Compression in CNN
- Research Intern, Qualcomm Research — Summer 2017
  - Explored model parallelism for convolutional neural networks
  - Architecture learning for reduced model complexity
- Deep Learning Developer (contract), Spin Master™, Canada — Oct-Dec 2016
  - Designed CNN models for fine grained classification of various toys
  - Developed Android App for classification/detection in real-time
- Associate Research Scientist (part-time), AI Labs, Philips Research, Cambridge, MA — 2016 – 2017
  - Use of neural networks for detecting adverse drug reaction, WWW 2017
  - Clinical text simplification and paraphrase generation, Clinical-NLP COLING 2016

- Research Intern, AI Labs, Philips Research, Cambridge, MA — Summer 2016
  - Explored applications of LSTM in sequence to sequence learning, COLING 2016
  - Developed efficient representation of memory state for Memory Networks, AAAI 2017

- Big Data Analyst, Brandeis University — Summer 2014
  - Researched various new techniques in data analysis on Hadoop and Spark framework
  - Designed assignments and quizzes for a graduate level course

- Teaching Assistant, Brandeis University — 2013-Current
  - Mobile Application Development
  - Scientific Data Processing in MATLAB
  - Fundamentals of Artificial Intelligence
  - Introduction to Big Data Analysis
  - Theory of Computation
  - Data Structures
  - Introduction to Algorithms
  - Data Compression & Multimedia

- Independent Algorithmic Trading — 2010-2012
  - Statistical Arbitrage trades on co-integrated pairs (INFY/TCS, ICICI/IDFC, MRF/Apollo)
  - Low latency Options strategies (Butterfly spread) on Nifty50
  - Designed, developed and programmed several algorithmic strategies as a contractual work
- Senior Systems Engineer, Infosys Limited — 2009-2013
  - Developed new algorithm to visualize large unstructured datasets
  - Implemented various Machine Learning algorithms on Map-Reduce (Mahout)
  - Analyzed various fault measures in distributed optimization problems
- Independent Tutoring, Bharath University — 2007-2009
  - Courses taught: C, C++, Java, Maths [I, II, III, IV], Computer Architecture
  - Taught more than 50 students in batch sizes ranging from 2 to 15

RECOGNITIONS

- Roberto Padovani (Qualcomm) Scholarship Award. — 2017
- Outstanding Teaching Fellow, Brandeis University. — 2017
- Honorable spotlight award, Visual Question Answering Challenge, CVPR. — 2016
- Best paper award at International Conference on Perspective of Computer Confluence, Pune. — 2012
- Gold Medal (for securing highest rank), Bharath University, Chennai. — 2008

ACTIVITIES

- Reviewer NIPS 2018, COLING 2018, Quantum Information and Computation.
- Undergraduate theses advisor (Image Colorization with Priors and Off-policy Actor-Critic)
- Invited lectures on Deep Learning at Connecticut College and Brandeis University.
- Advisory board member, OneQube.

PUBLICATIONS

→ first author

- Deflecting Adversarial Attacks with Pixel Deflection (Spotlight). CVPR 2018 PDF
  CODE :*Image transformation based defense to adversarial attacks, recovers* 98% *fooled images*
- Robust Discriminative Localization Maps. CVCOPS 2018 PDF
  CODE :*Securing Class Activations Maps against attacks by using geometric mean over all classes.*
- Protecting JPEG Images Against Adversarial Attacks (Oral). IEEE DCC 2018 PDF
  CODE :*Improves ability of JPEG to defend against attacks, recovery improved from* 27% *to* 82%
- DR-BiLSTM: Dependent Reading Bidirectional LSTM for NLI. NAACL 2018 PDF
  Dependent reading using hierarchical soft attention, achieves SOTA on Stanford NLI
- Visual Lecture Summary using Intensity Correlation Coefficient. IMVIP 2017 PDF
  Technique to remove instructor and generates slides from white/chalk board videos
- Condensed Memory Networks for Clinical Diagnostic Inferencing. AAAI 2017 PDF
  CODE :*Classifying the diagnosis of a given medical note; SOTA results.*
- Semantic Perceptual Image Compression using Deep CNNs (Oral). IEEE DCC 2017 PDF
  CODE :*Using custom designed CNNs to add differential quantization to achieve semantic JPEG.*
- Adverse Drug Event Detection in Tweets with Semi-Supervised CNNs. WWW 2017 PDF
  Use of unlabeled data to improve performance of detecting ADE in tweets; SOTA results on PSB 2016.
- Neural Paraphrase Generation with Stacked Residual LSTM. COLING 2016 PDF
  CODE :*First deep learning based paraphrasing model, use of skip connection on LSTM.*
- Highway Networks for Visual Question Answering (honorable award). CVPR (VQA) 2016 PDF
  CODE :*VQA Model with implicit attention; Top-4 in VQA Challenge 1.0*
- Reconstructing Self Organizing Maps as Spider Graphs for Better Visual Interpretation of Large Unstructured Datasets. *Infosys Lab Briefings*, Vol 11. INFY 2013 PDF
  Visualizing large unstructured text for interpretable information.
- Measures of Fault Tolerance in Distributed Simulated Annealing (best paper). PICPC 2012 PDF
  Study of various ways a distributed Simulated Annealing can fail to optimize.