Aaditya Prakash (Adi)

aprakash@brandeis.edu, iamaaditya.github.io

Blog, Github, Scholar, LinkedIn, Twitter

EDUCATION

- PhD, Computer Science, Brandeis University. Advisor: Prof. James Storer — 2015 – 2019
  Thesis: Robust and Efficient Techniques in Deep Learning with applications in Computer Vision and Language Understanding

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

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

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

EXPERIENCE

- Senior Machine Learning Scientist and Research Lead, PathAI — 2020–Current
  - Investigating new avenues for application of AI in healthcare
  - Exploring various applications of Deep models in Histopathological data

- Machine Learning Scientist, PathAI — 2019 – 2020
  - Efficient models for Cell Detection and Classification
  - Custom custom function to exploit non-IID nature of biological substances.

- Associate Research Scientist, AI Labs, Philips Research, Cambridge, MA — 2016 – 2018
  - Use of neural networks for detecting adverse drug reaction, WWW 2017
  - Neural Network for paraphrase generation, Clinical-NLP COLING 2016
  - Clinical text simplification for supervised & unsupervised models, multiple patent applications

- Research Intern, Microsoft Research (AI+R) — Summer 2018
  - Model Compression in Convolutional Neural Networks
  - Improved training of compact models (MobileNet, SqueezeNet, ShuffleNet)

- 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 — Oct-Dec 2016
  - Designed CNN models for fine grained classification of various toys
  - Developed Android App for classification/detection in real-time

- 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 – 2019

- 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

COMPUTING SKILLS

Languages	:	Python, C, C++, CUDA, Matlab
Deep Learning	:	TensorFlow,Keras, PyTorch, Horovod, PyT Lightning
Research Tools	:	SciPy, NumPy, OpenCV, Git, Bash, LaTeX
Big Data Tools	:	Hadoop, MapReduce, MongoDB, Mahout, Spark
Released Code	:	VQA , Multi-structure ROI , Neural Paraphrase Generation
	:	Multi-agent GANs , Pixel Deflection , Fallacy Detector

RECOGNITIONS

- Best reviewer award for NeurIPS — 2018
- 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 CVPR, NeurIPS, COLING, IEEE SIP, 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.

PUBLICATIONS

→ first author

- RePr: Improved Training of Convolutional Filters (Oral). CVPR 2019
  PDF CODE :*Improved performance of vanilla CNNs without using residual or dense-connections.*

- Compact Representations of Dynamic Video Background Using Motion Sprites. IEEE DCC 2019
  PDF *Technique to store video background motions as time-invariant representation of the optical flow*

- 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. 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.*