SHIXIANG (SHANE) GU

Jesus College, Jesus Lane, Cambridge, Cambridgeshire, UK, CB5 8BL sg717@cam.ac.uk

RESEARCH INTERESTS

Deep Learning, Robotics and Computer Vision, Natural Language Processing, Reinforcement Learning, Sequential Prediction, Compression, Signal Processing, Bayesian Machine Learning, Information Theory, Artificial Intelligence

ACADEMIC HISTORY

University of Cambridge **2014 – Present**
Computational and Biological Learning Lab, Department of Engineering **Cambridge, UK**
PhD in Machine Learning (jointly supervised at the Max Planck Institute)

- Co-supervised by Zoubin Ghahramani and Richard Turner
- Recipient of Cambridge-Tubingen PhD Fellowship in Machine Learning

Max Planck Institute for Intelligent Systems **2014 – Present**
Department of Empirical Inference **Tubingen, Germany**

- Supervised by Bernhard Schoelkopf

University of Toronto **2009 – 2013**
Bachelor of Applied Science in Engineering Science **Toronto, Canada**
Electrical and Computer Engineering Major, Robotics and Mechatronics Minor

- Achieved CGPA 3.93/4.0, Highest Rank: 1st of 264 students (2010 Winter)
- Recipient of **Award of Excellence 2013**, awarding top 5 graduating students for academic achievements

High School **Vancouver, Canada** **2006 – 2009**
Middle School **Shanghai, China** **2002 – 2006**
Primary School **Tokyo, Japan** **1997 – 2002**

PROFESSIONAL EXPERIENCE

Google Brain, Google Research **06/2015 – 01/2016**
Research Intern **Mountain View, CA, USA**

- Main collaborators: Ilya Sutskever and Sergey Levine
- Derived a new unbiased, back-propagating gradient estimator for discrete stochastic system. Implemented simple integration with automatic differentiation libraries. (additional collaborator: Andriy Mnih at DeepMind)
- Worked on a new hybrid approach for high-dimensional continuous control problem using model-based and model-free reinforcement learning. The approach aims to significantly improve data-efficiency for learning nonlinear neural network policies, and enable application in real world robotics. (additional collaborator: Timothy Lillicrap at DeepMind)

Panasonic Silicon Valley Lab, Panasonic R&D Company of America **06/2013 – 09/2014**
Software Engineer **Cupertino, CA, USA**

Panasonic Silicon Valley Lab (previously Panasonic Speech Tech Lab) leads research in the convergence of user-interfaces, sensing, cloud, and networking technologies to develop next generation of Panasonic products.

- Pursued R&D efforts on investigating the uses of Deep Convolutional Neural Networks on a range of computer vision tasks, including: benchmarking large-scale image recognition on ImageNet; implementing real-time pedestrian detection using distributed GPU servers; and improving object detection through integration with object proposal techniques
- Initiated R&D efforts on Deep Learning at the Panasonic Silicon Valley Lab, in collaboration with Panasonic Cloud Solutions Centre (CSC) in Japan; worked on convolutional neural nets, denoising autoencoders, recurrent neural nets, generative models, distance metric learning, margin maximization

Department of Computer Science, University of Toronto **09/2012 – 04/2013**
Thesis Student **Toronto, Canada**

- Supervisor: Geoffrey Hinton
- Investigated a novel model for evolving artificial neural networks to enable efficient distributed training of deep neural networks (DNN) on large data sets
- Compared the model performance against Google's DistBelief architecture

EyeTap Personal Imaging Lab **01/2012 – 04/2012**
Research Assistant (Volunteer) **Toronto, Canada**

- Supervisor: Steve Mann
- Succeeded in implementing the first quality real-time HDR (High Dynamic Range) video processing on FPGA through extensive Verilog coding and exercised multiple types of image processing techniques
- Co-authored paper, *"A Computational Seeing Aid: Real-time Video Processing For Improved Vision",* accepted by IEEE CCECE (Canadian Conference on Electrical and Computers Engineering) 2012
- Exhibited HDR demo at ACM SIGGRAPH 2012, the world's top conference on computer graphics and interactive technologies

The Next 36, Canada's National Program for Entrepreneurial Leadership Initiative **12/2010 – 08/2011**
Entrepreneur, Co-founder and CTO **Toronto, Canada**

- Selected as one of the top 36 students among all undergraduate students across Canada
- Launched a mobile venture in a team of four during an eight-month period in the area of mobile marketing
- Earned world-class mentorship from the faculty of professors and professionals from Canada and the US, including CEOs, successful entrepreneurs, VCs, and top professors
- Performed the role as the CTO, formulated business strategies, and performed technical execution

University of Toronto Institute for Aerospace Studies **05/2010 – 08/2010**
Research Assistant **Toronto, Canada**

- Supervisor: Craig Steeves
- Worked on a pilot project for a company to manufacture ultra-lightweight aircrafts, modelled and analyzed airfoil stresses based on wing design and pressure distributions using Finite Element software (ABAQUS) and simplified models on MATLAB
- Manufactured samples of carbon fibre composites and tested using a MTS load cell and strain gauges

SKILLS

- Software: Torch/Lua; C/C++, Python; MATLAB; CUDA C; OpenCV; OpenNI and NiTE; NLTK Toolkit; Nuance VoCon Hybrid; Android SDK; ABAQUS; Theano, CUDAMAT, Cuda-Convnet
- Hardware: FPGA, Verilog; embedded systems; high-speed serial I/O; Kinect, PrimeSense
- Languages: native/fluent in Japanese, Mandarin, English

AWARDS/HONOURS

2014 - Cambridge-Tubingen PhD Fellowship in Machine Learning (partially funded by Facebook)
2014 - MAS Admission to MIT Media Lab (courteously declined)
2013 - Award of Excellence 1T3 (awarded to 5 graduating students for academic achievements)
2013 - Alexander Graham Bell Canada Graduate Scholarship-Master ($17,500, courteously declined)
2009/2010/2012 - University of Toronto Scholarship ($8,000)
2009 - Sir Isaac Newton Exam (physics competition), 2nd in Canada
2009 - BC's Brightest Minds (physics competition, $1500), 1st in British Columbia
2009 - CAP High School Physics Prize Exam, 14th in Canada
2009 - Euclid High School Math Exam, 18th in Canada