Riashat Islam

Contact Information

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Research Interests

Reinforcement Learning, Predictive Knowledge and General Artificial Intelligence, Deep Learning, Robot-Driven Learning and Robotics, Generative Models, Sequential Prediction, Dialogue Systems, Bayesian Machine Learning and Information Theory, Artificial Intelligence

Education

Jan 2017 - Present
Montreal, Canada

McGill University
PhD in Machine Learning (Computer Science)
School of Computer Science
Reasoning and Learning Lab
Co-Affiliated with Montreal Institute of Learning Algorithms (MILA)
Supervisor : Doina Precup & Co-Supervisor : Joelle Pineau
Supported by McGill Computer Science PhD Fellowship

Sep 2015 - Aug 2016
Cambridge, UK

University of Cambridge
St John's College
MPhil Machine Learning, Speech and Language Technology
Department of Engineering
Thesis : Acitve Learning with Image Data using Uncertainty in Deep Learning
Supervisor : Zoubin Ghahramani and Yarin Gal
Computational and Biological Learning Lab, Machine Learning Group
CGPA : 72%, *Passed with Merit* (Distinction above 75%)

Sep 2011 - Jul 2015
London, UK

University College London
Bachelor of Engineering in Electronic and Electrical Engineering
Major : Machine Learning (Computer Science)
Thesis : Improving Convergence of Deterministic Policy Gradient Methods
Supervisor : John Shawe-Taylor and Guy Lever
UCL Centre for Computational Statistics and Machine Learning
Additional Collaborator : David Silver (Google DeepMind)
CGPA : First Class (81% marks) (US Grade : 3.93/4.00)

Publications

- Yarin Gal, **Riashat Islam**, Zoubin Ghahramani. "Active Learning with Image Data". Bayesian Deep Learning workshop, NIPS 2016

Research Experience

Mar - Sep 2016
Cambridge, UK

University of Cambridge
Masters Thesis Research Student
Active Learning Images using Uncertainty in Bayesian Deep Learning
Supervisor : Zoubin Ghahramani and Yarin Gal
Cambridge Machine Learning Group

Implemented an active learning approach for deep learning. Developed an active learning framework for image data using Bayesian approaches to deep learning, taking specialised models such as Bayesian Convolutional Neural Networks. The approach aims to improve data-efficiency in deep learning tools for image data

Jun - Aug 2015
California, USA

California Institute of Technology
Summer Undergraduate Research Fellowship (SURF)
Project : Improved State Estimation for a Resilient Spacecraft Executive
Supervisor : Richard Murray and Catherine McGhan
Control and Dynamical Systems Lab
Project in collaboration with NASA Jet Propulsion Laboratory (JPL)

Worked on autonomous navigation for a simulated Mars Rover. Implemented real-time mapping, 3D point cloud integration, risk-aware path planning and obstacle avoidance algorithms into an existing RSE software architecture. Implementation of Simultaneous Localisation and Mapping (SLAM) technique into existing architecture and integrated with the Robot Operating System (ROS) toolbox

Sep'15 - Mar'16
London, UK

University College London
Undergraduate Thesis Research Student
Improving Convergence of Deterministic Policy Gradient Algorithms in Reinforcement Learning
Supervisor : John Shawe-Taylor and Guy Lever
UCL Centre for Computational Statistics and Machine Learning
Additional Collaborator : David Silver (Google DeepMind)

Implemented MDP environments for RL algorithms. Implemented policy gradient methods and analysed local optima in policy space in different MDPs. Analysis of convergence to global optima for deterministic policy gradients. Extended deterministic policy gradient methods to Approximate Hessians and Natural gradients for comparison. Analysis of adaptive learning rates for gradient based policy optimisation

Jun - Aug 2014
Maryland, USA

Johns Hopkins University
Summer Research Expedition program (SRE)
Project : Cost-Sensitive Decision Tree of Classifiers for Medical Data
Supervisor : Suchi Saria
Machine Learning Group

Implemented a cost-sensitive decision tree classifier for classification of septic shock. The approach considers feature cost for feature extraction, and subgroups patient population based on type of disease. Approach implemented for subgroup patient identification from large scale ICU medical data

Work Experience

Jan - Apr 2016
Cambridge, UK

Large Vocabulary Continuous Speech Recognition in HTK
Department of Engineering, University of Cambridge
Supervisor : Mark Gales
Cambridge Speech Research Group
Implemented a DNN-HMM based hybrid speech recognition system. Analysed context dependency and parameter sharing in DNN based acoustic modelling

Jan - Apr 2016
Cambridge, UK

Variational Inference and Learning in Deep Latent Variable Models
Department of Engineering, University of Cambridge
Supervisor : Zoubin Ghahramani and Rich Turner
Cambridge Machine Learning Group
Experimentation for a unifying review of efficient inference and leanring algorithms in deep directed generative models. Implementation considers gradient based maximisation of variational lower bound, and demonstrated significance of variance reduction techniques for gradient estimator. Compared approaches for performing inference in directed graphical models

Jan - Apr 2016
Cambridge, UK

Reinforcement Learning for Spoken Dialogue Systems
Department of Engineering, University of Cambridge
Supervisor : Steve Young and Milica Gasic
Cambridge Spoken Dialogue Systems Group
Implemented a reinforcement learning based spoken dialogue system to allow dialogue policy to be optimised to plan and act under uncertainty. Experimentation with belief state tracking to maintain belief distribution and capture possible dialogue paths. Implemented Q-learning and SARSA algorithms to learn a policy to optimise action selection process.

Jan - Apr 2016
Cambridge, UK

Statistical Machine Translation
Department of Engineering, University of Cambridge
Supervisor : Bill Byrne
Cambridge Machine Translation Group
Experimentation with WFSTs for statistical phrase based translation using hierarchical phrases. Implementation based on a hierarchical phrase-based decoder. HiFst decoder used to generate translation lattices and decoding based on a synchronous context-free grammar.

Oct'15 - Apr'16
Cambridge, UK

Machine Learning KAGGLE Competition
Department of Engineering, University of Cambridge
Supervisor : Zoubin Ghahramani and Rich Turner
Cambridge Machine Learning Group
Ranked 1st, 2nd and 5th in Kaggle competition on density modelling, classification and regresssion tasks respectively

Oct - Dec 2015
Cambridge, UK

Speech Recognition using GMM-HMMs in HTK
Department of Engineering, University of Cambridge
Supervisor : Mark Gales
Cambridge Speech Research Group
Analysis of speech recognition systems using GMM-HMM models. Investigation of context dependency and parameter sharing in HMM-GMM acoustic models. Implementation using acoustic and language model rescoring in lattice-based systems.

Jan - Apr 2015
London, UK

Playing Blackjack with Reinforcement Learning
Department of Computer Science, UCL
Supervisor : David Silver (Google DeepMind)
Gatsby Computational Neurosciene Unit and UCL CSML
Implemented a Blackjack MDP framework for testing reinforcement learning algorithms. Derived value iteration, policy iteration, Temporal Difference learning algorithms such as SARSA and Q-Learning for policy and value function optimisation

Industrial Experience

Jun'13 - Mar'14 London, UK	J.P Morgan, Investment Bank *Industrial Placement Intern in Technology Division* Global Technology Infrastructure Global Network Services and Data Centre Networking
Mar - Apr 2013 London, UK	Deutsche Bank, Investment Bank *Spring Week Intern in Technology Division* Global Technology Infrastructure

Teaching Experience

Sep - Dec 2016 Dhaka, Bangladesh	Visiting Lecturer *Independent University Bangladesh (IUB)* Department of Computer Science and Engineering CSE 490 Introduction to Reinforcement Learning
Sep - Dec 2016 Dhaka, Bangladesh	Visiting Lecturer *American International University Bangladesh (AIUB)* Department of Computer Science CSE 4226 Artificial Intelligence and Reinforcement Learning
Sep - Dec 2012 London, UK	Undergraduate Teaching Assistant *University College London* Department of Electronic and Electrical Engineering Mentoring 1st year UCL EEE students for mathematics and object oriented programming courses

Scholarships and Awards

Jan 2017	McGill School of Computer Science PhD Fellowship
Sep 2016	University of Alberta, RLAI Lab MSc and PhD Fellowship *(courteously declined)*
Sep 2016	Columbia University, Computer Science MSc Fellowship *(courteously declined)*
Jul 2016	IBM Research Zurich, Research Internship Fellowship *(courteously declined)*
Jul 2016	Deep Learning Summer School, Montreal, Canada
Oct 2015	Cambridge Commonwealth and International Trust *(Academic Excellence Award)*
Aug 2015	Dean's List of Top Undergraduate Students *(top 5% in UCL EEE Department)*
Jun 2015	Summer Undergraduate Research Fellowship (SURF), *California Institute of Technology*
Jun 2014	Summer Research Expeditions Program (SRE) *Johns Hopkins University*
Aug 2011-15	UCL Barlow Scholarship *(for top International Student at UCL EEE)*
Aug 2012-14	UCL Goldsmid Prize *(Among top 5% performing students in UCL EEE)*

Skills

- Programming Languages : Python; MATLAB; JAVA and Mathematica
- Software : Theano, Keras, Cuda-Convnet, HTK, ROS, OpenCV
- Experience with Deep Neural Networks in Python, Bayesian Approximate Inference methods in MATLAB
- Participation in KAGGLE competitions for classification, regression, density modeling
- Experience of Speech Recognition training and decoding methods with Gaussian Mixture Models and Deep Neural Networks using the Cambridge HTK Toolkit
- Reinforcement Learning algorithms (policy gradient methods, Temporal Difference Learning, Sarsa) as part of undergraduate thesis and for playing BlackJack game
- Robot Operating System (ROS) and Linux OS for robotics control and mapping (TurtleBot, Pioneer 3-DX)
- Implementation of algorithms and data structures in Java
- Hardware Description Language (System Verilog), Microcontrollers and Arduino
- Languages : native/fluent in English, Bengali and Hindi. Studying for French

Seminar Talks and Reading Groups

- Predictive Knowledge and Abstraction in Reinforcement Learning. *MPhil MLSALT Reading Group. University of Cambridge, 2016*
- Active Learning with Bayesian Convolutional Neural Networks using Uncertainty in Deep Learning. *Thesis Talk, University of Cambridge, 2016*
- Preordering for Statistical Machine Translation. *Course Presentation, University of Cambridge, 2016*
- Bayesian Active Learning in Deep Learning. *Seminar at IUB in Bangladesh*
- Improving Convergence of Deterministic Policy Gradients in Reinforcement Learning. *Thesis Presentation, University College London, 2015*
- Improved State Estimation of a Resilient Spacecraft Executive. *SURF Program, Project Presentation, California Institute of Technology, 2015*
- A Unifying Review of Linear Gaussian Models. *MPhil MLSALT Interview Presentation, University of Cambridge, 2015*
- Cost Sensitive Decision Tree Classification for Sepsis Data. *SRE Program, Project Presentation, Johns Hopkins University, 2014*