SANKET SHAH

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RESEARCH INTERESTS

AI for Social Good · Reinforcement Learning · Sequential Decision Making · Machine Learning · Transportation · Security · Fairness and Explainability

EDUCATION

Birla Institute of Technology and Science, Pilani August 2013 – July 2017
Bachelor of Engineering (Hons.), Computer Science
GPA: 9.02/10

PUBLICATIONS

1. **Sanket Shah**, Meghna Lowalekar, Pradeep Varakantham, "Neural Approximate Dynamic Programming for On-Demand Ride-Pooling", *Proceedings of the AAAI Conference on Artificial Intelligence. Vol 34. 2020.* **(AAAI-20)** [Link]
2. **Sanket Shah**, Arunesh Sinha, Pradeep Varakantham, Andrew Perrault, Milind Tambe, "Solving Online Threat Screening Games using Constrained Action Space Reinforcement Learning", *Proceedings of the AAAI Conference on Artificial Intelligence. Vol 34. 2020.* **(AAAI-20)** [Link]

RESEARCH EXPERIENCE

Singapore Management University November 2018 – Present
Advised by Prof. Pradeep Varakantham *Research Engineer*

Authored two first-author research papers that use Reinforcement Learning (RL) to address Sequential Decision Making problems that underlie societal challenges in Transportation and Security:

· *Ride-pooling* – In [1] above, we combine ideas from Operations Research, RL and past work in ride-pooling to create a learning based approach that performs online matching based on the expected future value rather than the immediate value. We perform experiments on real-world data and show up to a 16% improvement in efficiency over previous state-of-the-art methods.

· *Threat Screening* – In [2], we model Threat Screening Games (TSGs) as a Markov Decision Process (MDP) and show the equivalence between bounding the expected attacker utility in TSGs and enforcing constraints on the 'actions' of the defender in the MDP. We propose a novel way to handle these constraints on actions and empirically show that our MDP-based Deep RL approach significantly outperforms past work in terms of solution quality and scalability.

Microsoft Research India January 2017 – June 2017
Advised by Dr. Colin Scott and Dr. Bill Thies *Research Intern*

· Helped build an Android app that aimed to augment local peer-to-peer file transfer like Bluetooth (a substitute to the internet for media acquisition in low resource communities) by creating a barter economy.

· Helped pilot the application in a village in Bihar, India along with my advisor and local partners from the region.

Microsoft Research India August 2016 – December 2016
Advised by Dr. Sundararajan Sellamanickam *Research Intern*

Investigated the 'explainability' of Recurrent Neural Networks in terms of compositional linguistic structures like 'and' and 'but' for the task of Sentiment Analysis in English.

Philips India Ltd. May 2016 – July 2016
Internal Technology Accelerator *Research Intern*

· Prototyped the conversation engine for a wearable device to assist the elderly.
· Helped design an annotation scheme for patient medical records.

National Centre for Polar and Ocean Research May 2016 – July 2016
Advised by Dr. Sridhar Jawak *Research Intern*

Performed pixel-based supervised and unsupervised learning on hyper-spectral satellite imagery to study the spectral characteristics of supraglacial lakes in the Antarctic.

ACADEMIC ACHIEVEMENTS AND AWARDS

BITS Pilani Merit Scholarship 2013-14
Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship 2012-13

POSITIONS OF RESPONSIBILITY

Editor in Chief, English Press Club 2015-16
In charge of the monthly campus newsletter 'The Fine Print' and the associated website – oversaw the publication of 8 print issues.

Joint Coordinator, English Drama Club 2014-15
Produced and directed three performances during the academic year.

Senior Core Member, Oasis All-India Inter-Collegiate Cultural Fest 2013-17
Responsible for scheduling over 100 events, competitions and performances across more than 10 venues. Also organised travel and logistics for judges and distinguished guests

RELEVANT COURSES

Machine Learning · Artificial Intelligence · Advanced Data Mining · Design and Analysis of Algorithms · Introduction to Probability and Statistics · Math I (Multivariate Calculus) · Math II (Linear Algebra & Complex Analysis) · Parallel Computing

SKILLS

Programming Languages	Python, C++, Java, C, MATLAB
Toolkits	TensorFlow, Keras, Theano, NLTK, SciKit, Android
Languages	English (Native), Hindi (Proficient), Gujarati (Conversational), Sanskrit (Basic), Japanese (Basic)