Hardik **Meisheri**

RESEARCHER · DEEP LEARNING · REINFORCEMENT LEARNING · NATURAL LANGUAGE PROCESSING

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"Change in perspective is worth 80 IQ points" - Alan Ray

Summary

I am currently working on Reinforcement learning for high dimensionality control application. In past, I have worked in the Intersection of Natural Language and Deep Learning specifically for sentiment analysis. I have also analyzed social media text from a statistical and behavioural perspective. My Research Interest lies in Intersection of Natural Language Processing with Deep Learning and Reinforcement Learning, including modelling behaviour patterns, Multi-agent Reinforcement Learning in a hybrid environment and Artificial General Intelligence:- Meta-Learning, Multi-task and Transfer learning.

Work Experience

Tata Consultancy Services Ltd. Planning and Control Research Area   *Mumbai, Maharashtra*

RESEARCHER   *May. 2018 - Present*

- Supply Chain Optimization using Deep Reinforcement Learning (4 Publications, 3 Patents filed)
  - Proposed architecture which can handle millions of stores and product combinations for computing real time decisions for two echelon SCM
  - Developed modified algorithm of A2C to handle quantified action space
  - Integrated with native and ESL based simulator for wide scale adoption in multiple domain
  - Compared against currently SOTA algorithms and heuristics
- Pommerman- Multi-agent simulation game (1 Publication)
  - Proposed framework for Imitation followed by RL training paradigm with curriculum learning for opponent difficulty
  - Achieved similar performance as learning systems with training time reduced by factor of 10
  - Introduction of safety actions to accelerate better learning strategies
  - Theoretical and model explainablity analysis

Tata Consultancy Services Ltd. Text Mining Research Area   *Gurgaon, Haryana*

RESEARCHER   *Jul. 2016 - May. 2018*

- Sentiment Analysis of use generated noisy texts. (4 Publications)
  - Worked on Emotion intensity challenge (SemEval and WASSA), achieved $2^{nd}, 5^{th}$ rank among the participants across the world
  - Proposed an architecture inspired from Siamese network to handle OOV words and combine syntactic structure of twitter and English language
  - Custom prepossessing pipeline to include emojis and remove popular slangs
  - Developed multi-task learning framework to learn robust representations across the task
  - Validated over sarcasm detection task
- Predicting Stock Market movement based on different categories of news articles. (1 Publication, 1 Tutorial)
  - Introduced LSTM based methods to predict the movement of stocks in positive or negative directions over different time granularity
  - Proposed and extracted PESTEL features from news dataset for inculcating unstructured data with for structured prediction
- Predicting trends and behavioural analysis in social media space such as Twitter and Reddit (2 Publications)
  - Analysed 2 year worth of data (all the posts and comments on reddit) to understand and characterize different user behaviours
  - Observed Bot like behaviours among users, Late bloomers in content/topics and mayfly-buzz characteristics for certain comments.

Dhirubhai Ambani Institute of Information and Communication Technology   *Gandhinagar, Gujarat*

TEACHING ASSISTANT   *Aug. 2014 - May. 2016*

- Designing Lab course structures
- Evaluating the students- Exams, quiz
- Supervising and conducting Labs

Skills

Programming Language, Python, R, Matlab
Deep Learning Frameworks, Tensorflow, Keras
Research Areas, Sentiment Analysis, Deep Learning, Deep Reinforcement Learning, Multi-agent Systems
Research Problems, Sentiment Intensity prediction, Sarcasm Detection, Social Media Analytics, Prediction using structured and unstructured data, RL in sequential optimization problems, RL in POMDP

Publications

CONFERENCES

May 2020	**Using Reinforcement Learning for a Large Variable-Dimensional Inventory Management Problem**, Adaptive and Learning Agents Workshop, AAMAS	*Auckland, New-Zealand*
Dec 2019	**Accelerating Training in Pommerman with Imitation and Reinforcement Learning**, Deep Reinforcement Learning Workshop, NeurIPS	*Vancouver, Canada*
May 2019	**Actor Based Simulation for Closed Loop Control of Supply Chain using Reinforcement Learning**, International Conference on Autonomous Agents and MultiAgent Systems (AAMAS)	*Montreal, Canada*
Dec 2018	**Air pollutant severity prediction using Bi-directional LSTM Network**, Workshop on Complex Methods for Data and Web Mining, Web Intelligence	*Santiago, Chile*
Dec 2018	**Multi-Document Summarization using Distributed Bag-of-Words Model**, Workshop on Text Analysis and Retrieval, Web Intelligence	*Santiago, Chile*
Oct 2018	**Learning representations for sentiment classification using Multi task framework**, Workshop on Computational Approaches to Subjectivity, Sentiment, and Social Media (WASSA), EMNLP	*Brussels, Belgium*
Aug 2018	**Analyzing behavioral trends in community driven discussion platforms like Reddit**, International Conference on Advances in Social Networks Analysis and Mining	*Barcelona, Spain*
Jun 2018	**Learning Robust Representations using Multi-Attention Architecture**, SemEval-2018, NAACL-HLT	*New Orleans, USA*
Nov 2017	**Sentiment extraction from Consumer-generated noisy short texts**, SENTIRE, ICDM	*New Orleans, USA*
Sep 2017	**A Deep Learning Approach to Sentiment Intensity Scoring of English Tweets**, Workshop on Computational Approaches to Subjectivity, Sentiment, and Social Media (WASSA), EMNLP	*Copenhagen, Denmark*
Aug 2017	**Detecting, Quantifying and Assessing Impact of News Events on Indian Stock Indices**, International Conference on Web Intelligence (WI)	*Leipzig, Germany*
Sep 2016	**Multiclass Common Spatial Pattern with Artifacts Removal Methodology for EEG Signals**, International Symposium on Computational and Business Intelligence	*Olten, Switzerland*

BOOK CHAPTERS

Jan 2020	**Characterizing behavioral trends in a community driven discussion platform**, Putting Social Media and Networking Data in Practice for Education, Planning, Prediction and Recommendation	*Springer*

Education

Dhirubhai Ambani Institute of Information and Communication Technology *Gandhinagar, Gujarat*

M.TECH IN MACHINE INTELLIGENCE *Aug. 2014 - May. 2016*
- Mtech Thesis: Brain Computer Interface using Electroencephalogram
- GPA: 8.06/10

Gujarat Technological University *Rajkot, Gujarat*

B.E IN ELECTRONICS AND COMMUNICATION *Jul. 2009 - May. 2013*
- BE Thesis: Smart WheelChair
- GPA: 8.42/10

Presentation

Reinforcement Learning for Real World *Bangalore, Karnataka*

DATAHACK SUMMIT - ANALYTICS VIDHYA *Nov. 2019*
- What you need to think about, in order to use reinforcement learning in real life. Basic concepts of RL and what makes it suitable for sequential decision making. Brief introduction of the application of RL on real-life problems and not gaming environments.
- Walk through over the code of applying RL over simple use case, such as solving the online 3D bin packing problem (solving for where each upcoming parcel should be placed, for maximum packing efficiency). The major focus would be on designing architecture, training paradigm and structuring experiments.

Predictive Analytics using Structured and Unstructured Data *Leipzig, Germany*

INTERNATIONAL CONFERENCE ON WEB INTELLIGENCE (WI) *Aug. 2017*

- This tutorial will be specially targeted towards people who are interested to know how business-critical information extracted from unstructured documents can be merged with information flowing in from structured sources and used within a predictive modeling framework to predict future events or forecast values of critical variables that are business performance indicators.

Honors & Awards

INTERNATIONAL

2016   **Best Paper Award**, Paper titled "Multiclass common spatial pattern with artifacts removal methodology for EEG signals", won best paper award at ISCBI conference.   *Olten, Switzerland*

DOMESTIC

2015   **Among Top 11 innovations in India**, Bharatiya Vighyan Samelan, Govt. of Goa   *Panaji, Goa*

2014   **Among Top 24 projects in India**, Economics Times Now   *India*

Professional Activities

Reviewer

- IEEE access, IEEE International Conference on Multimedia and Expo (ICME)

ACM DAIICT Student Chapter *Gandhinagar, Gujarat*

CHAIR-PERSON *Aug. 2015 - May. 2016*

- Organized Summer Schools and Conferences
- Outreach programs for women in rural areas about basic IT knowledge