Elita Lobo

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Education

From Sept 2022 — **Doctor of Philosophy (PhD) in Computer Science, University of Massachusetts Amherst**
Advisor: Dr. Yair Zick
Research topic: Explainable Automated Decision-Making Systems
My research work focuses on novel causal explanation frameworks for machine learning systems that are robust, computationally efficient and have strong privacy guarantees.

Feb 2021 – May 2022 — **Graduate Researcher in the Department of Computer Science, University of New Hampshire**
Advisor: Dr. Marek Petrik
Worked on several research problems in Reinforcement Learning (RL) including data poisoning attacks on policy evaluation algorithms, handling model uncertainty in offline RL, and variance reduction techniques for risk-estimators in RL.

Sept 2018 – Dec 2020 — **Masters in Computer Science, University of Massachusetts Amherst**
Thesis title: *Near-Optimal Soft-Robust Markov Decision Processes.* CGPA: 3.7
Masters Thesis Advisors: Dr. Marek Petrik , Dr. Shlomo Zilberstein

Jul 2012 – Jun 2016 — **Bachelor of Technology (BTech) in Electronics and Communication Engineering, National Institute of Technology Durgapur**
Advisor: Dr. Rajib Kar CGPA: 8.61
Thesis: *Floor Planning using Particle Search Optimization and Greedy Approach*

Publications

Patents
- A Metahyperparameter Tuning Framework for Reinforcement Learning, **Elita Lobo**, Nhan Pham, Dharmashankar Subramanian, Tejaswini Pedapati (Under Review).

Peer Reviewed Conference
- Data Poisoning Attacks on Off-Policy Policy Evaluation Methods, **Elita Lobo**, Harvineet Singh, Cynthia Rudin, Himabindu Lakkaraju, 38th Conference on Uncertainty in Artificial Intelligence, UAI 2022 **(Top 5%)**

Peer Reviewed Symposia
- Matching table metadata with business glossaries using large language models **Elita Lobo**, Oktie Hassanzadeh, Nhan Pham, Nandana Mihindukulasooriya, Dharmashankar Subramanian, Horst Samulowitz, The 18th International Workshop on Ontology Matching, 2023
- Percentile Criterion Optimization in Offline Reinforcement Learning ,**Elita Lobo**, Cyrus Cousins, Marek Petrik, Yair Zick, The 16th European Workshop on Reinforcement Learning, 2023
- Soft-robust Algorithms for Batch Reinforcement Learning, **Elita Lobo**, Mohammad Ghavamzadeh,Marek Petrik, R2AW Workshop, IJCAI 2021
- Behavior Policy Search for Risk Estimators in RL, **Elita Lobo**, Yash Chandak, Dharmashankar Subramanian, Josiah Hanna, Marek Petrik, NeurIPS Safe and Robust Control of Uncertain Systems, Neurips 2021
- Data Poisoning Attacks on Off-Policy Policy Evaluation Methods, **Elita Lobo**, Harvineet Singh, Cynthia Rudin, Himabindu Lakkaraju, ICLR 2022 Workshop on PAIR2Struct

Publications (continued)

Paper in Progress — Axiomatic Aggregations of Abductive Explanations, Vignesh Viswanathan, **Elita Lobo**, Yacine Izza, Gagan Biradar, Yair Zick, Arxiv, 2023

Other Research Projects

May 2023 – August 2023 — **Matching Table Metadata with Business Glossaries Using Large Language Models**
Developed novel methods that leverage large language models (LLMs) and human-feedback to obtain accurate metadata to business glossary matching.
Fine-tuned large language models (LLMs) using RLHF with contrastive loss to to further improve accuracy of metadata to business glossary matching.
Advisor: Dr. Dharmashankar Subramanian, Dr. Nhan Pham, Dr. Oktie Hassanzadeh

Sept 2022 – Current — **Novel algorithm for efficient enumeration of minimal explanations for automated decision-making systems**
Working on a novel Markov Chains based sampling algorithm that with high probability, can enumerate over all minimal causal explanations for decisions made by machine learning systems.
Advisor: Dr. Yair Zick

May 2019 – May 2021 — **Near-Optimal Soft-Robust Markov Decision Process**
Developed soft-robust algorithms for handling model mis-specifications in Batch Reinforcement Learning.
Link: shorturl.at/kptwF
Advisor: Dr. Marek Petrik

Jan 2019 – May 2019 — **Independent Study, Perceptual Robotics Lab,University of Massachusetts Amherst**
Developed a Hierarchical Reinforcement Learning for learning diverse skills in a task setting using Deep Embedded Encoding.
Link: shorturl.at/luEQS
Advisor: Dr. Roderic Grupen

Sep 2018 – Dec 2018 — **Independent Study, Center for Smart and Connected Societies, University of Massachusetts Amherst**
Worked on peak days forecast for peak shaving in energy grid using Deep Learning algorithms
Advisor: Dr. Prashant Shenoy

Employment History

May 23 – Aug 23 — **Research Intern, IBM Research, Yorktown Heights, NY**
Developed novel methods that leverage large language models (LLMs) and Human Feedback for accurate metadata to business glossaries matching problem.
Fine-tuned large language models (LLMs) using RLHF with Contrastive Loss to further improve accuracy of metadata to business glossaries matching.

May 22 – Aug 22 — **Research Intern, IBM Watson, Yorktown Heights, NY**
Developed novel algorithms for efficient hyperparameter tuning in Reinforcement Learning.

Employment History (continued)

May 21 – Aug 21 **Research Intern, IBM Watson, Yorktown Heights, NY**
Integrated existing Off-Policy Policy Evaluation algorithms in Automated Dynamic Optimization Framework.
Developed a novel technique for minimising variance of risk-estimators in Reinforcement Learning using the influence function tool from Robust Statistics.

Nov 20 – Feb 21 **Research Intern, Harvard Business School, MA**
Developed a novel data-poisoning attack framework for analyzing sensitivity of off-policy policy evaluation methods.

Aug 17 – Jul 18 **Software Engineer, Flipkart, Bangalore**
Onboarded Price Drop Event in Accounting platform.
Provided on call support for Inter warehouse good transfer service and inventory valuation service.
Contributed to the development of inventory valuation system.
Developed a Deep Learning based model to detect anomalous payouts made to sellers due to bugs introduced by frequent changes in the accounting system.
Developed an efficient Stock Ledger generator API for capturing a monthly snapshot of large-scale good movements between various warehouses.
Contributed to the development of invoice register API.

Jul 16 – Aug 17 **Software Engineer, Endurance International Group, Bangalore**
Developed webpro orchestration layer API, smart search API for customers and session manager for OrderBox.
Developed a service to detect if a domain is parked using ML.
Developed a fast image-search app (Imagio) that allows users to query for trending images based on keywords and filter them by color and type.
Developed a web app for recommending trending images to small businesses based on textual data in their websites.

Sept 16 – Mar 17 **Research Trainee, Indian Institute of Science, Bangalore**
MSR Codes: Contributed to the integration of minimum storage regenerating code in Ceph. Link :shorturl.at/sFRW9

Sept 2015 – Jan 16 **Part-time Problem Setter, HackerRank**
Developed coding problems for competitive coding contests

May 15 – Aug 15 **Software Engineer Intern, GoIbibo, Bangalore**
Designed a Machine Learning framework to predict time to live of each flights search results to be cached to reduce the no of price invalidations that occur when navigating from search page to booking page.
Developed a Distributed In-Memory Cache wherein the servers in the network communicate using Bus Protocol.

May 2014 – Aug 14 **Software Engineer Intern, Google Summer of Code**
Revamped the User Interface of Gnome-Calculator, implemented the Keyboard Mode and History View in the Gnome-Calculator.

Research Interests

Research Areas Reinforcement Learning, Machine Learning, Optimization

Courses taken

Courses taken

- Reinforcement Learning CS687, Optimizations CS690OP, Probabilistic Graphical Models CS688, Machine Learning CS689, Artificial Intelligence CS683, Algorithms CS611, Information Assurance CS660, Advanced Machine Learning Seminar: Theory of Bandits CS950, Statistical Methods for Research Math835, Principles of Statistical Inference Math856, Data Mining and Predictive Analytics Math838

Miscellaneous Experience

Awards and Achievements

- 2020 *Recipient of UNH CEPS Graduate Fellowship*
- 2019 *Recipient of UMass Robin Popplestone Fellowship in Robotics and Artificial Intelligence*
- 2018 *1st Place in Hackday 10 (Marketplace Category),Flipkart*
- *3rd Place in ML Challenge 3, Flipkart*
- 2017 *2nd Place in ML challenge 2,Flipkart*
- *1st Place in Hackathon,Endurance International Group*
- *98 rank in Google Code Jam to IO for Women,2017*
- 2016 *Rank 372 in Google APAC 2016 Round B*
- 2013 *1st Place in Trickology,Department of MCA, NIT Durgapur*
- 2012 *State rank 9 in All India Engineering Entrance Exam 2012*

Teaching Assistantships

UMass Amherst

- *Operating Systems CS377 (2018 Fall), Reasoning under Uncertainity CS240 (2019 Spring), Numerical Optimization CS590OP (2019 Fall), Convex Optimization CS690OP (2020 Spring)*

Pet Projects:

- *Developed an ensemble model to predict if a particular good in inventory will loose its value within x weeks*
- *Developed an in-house Mask Region-based Convolution Networks model for detecting logo infringement of 5 popular brands - Nike, Adidas, Puma, Reebok, Lott*
- *Developed an ensemble model for classifying user queries into queries for male and female products*

Skills

Programming Languages and Tools

- C/C++, Python, Java, GoLang, Ruby, R, MySQL, Spring Boot, Elastic Search, Pytorch, TensorFlow, Keras, Machine Learning

References

PhD advisor:

- Dr. Yair Zick [yzick@umass.edu]

Masters Thesis advisors:

- Dr. Shlomo Zilberstein [shlomo@cs.umass.edu], Dr. Marek Petrik [mpetrik@cs.unh.edu]

External collaborators:

- Dr. Hima Lakkaraju [hlakkaraju@hbs.edu] , Dr. Oktie Hassanzadeh [hassanzadeh@us.ibm.com], Dr. Nhan Pham [nhp@ibm.com], Dr. Dharmashankar Subramanian [dharmash@us.ibm.com]