VARSHINI REDDY BOGOLU

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EDUCATION

Masters, Data Science Harvard University	---	Sept 21' - Dec' 22
BE, Computer Science & Engg. National Institute of Engineering	9.7/10 Cumulative GPA (Ranked 1st in a class of 120)	2014 - 2018

RESEARCH EXPERIENCE

Research Fellow StellarDNN Harvard University	Artificial Intelligence, Astronomy	Nov 2020 - Present
Research Assistant Supercomputer Education & Research Center Indian Institute of Science	Graph Theory, Machine Learning, Security	Aug 2018 - March 2019
Research Intern Supercomputer Education & Research Center Indian Institute of Science	Graph theory, Machine learning	Jan 2018 - Jul 2018
R&D Intern Hewlett Packard Enterprise Bangalore	Information Security	Aug 2016 - Mar 2017

RESEARCH PROJECTS

Uncertainty Quantification for feature selection using Multi-Armed Bandits **Sept 2021 - Present**

Feature selection for datasets with large predictors but few data points using multi armed bandits. Applying this approach to healthcare data to quantify the difference in uncertainty with this approach

Scheduling of neural network parameters **Apr 2021 - Present**

Scheduling of learning rate, batch size and other hyperparameters of neural networks for solving differential equations using reinforcement learning

Reduction of cost of information in analysis of variable phenomena **Oct 2020 - Feb 2021**

Applying reinforcement learning to classify and prioritise variable objects in order to take informed decisions regarding allocation of limited spectroscopic resources among other resources.

Smart glasses for the visually impaired **July 2020 - Mar 2021**

Glasses that detect surrounding objects and determine their relative speed and distance. Based on this, it actively navigates the user, thus obviating the need for a walking stick. It describes the surroundings for an enhanced experience.

Intrusion Detection System using Sensor Fusion networks **Nov 2019 - Mar 2020**

To capitalise on the large ubiquitous computing power, multiple IDSs are deployed in the same network. A neural network learns the IDSs weights for preferential attack detection. A connected sensor fusion unit makes an appropriate decision.

Malware Classification as an application of social network analytics & community detection **Jul 2019 - Nov 2019**

Community detection is applied to system call graphs and features are then extracted from the communities using social network properties such as the centrality measures (degree, betweenness, eigenvector, etc.).

Comparison of Machine learning techniques for malware detection & classification **Jan 2019 - Jun 2019**

A comparison of different machine learning techniques for the detection and classification of malware variants of known malware families by correlating the static features from executables and exploiting the bloom filter data structure.

Hybrid Behavioural Features for Churn Prediction in Mobile Telecomm Networks **Aug 2018 - Jan 2019**

Features based on social influence and changes in both - call usage patterns and social groups - are extracted to predict churn by underlining the importance of social ties to better understand the behaviour of customers.

Botnet Prediction
Jan 2018 - Jul 2018

The aim is to predict which system in a network of user systems, could be part of a botnet or a botmaster target using predictive functions and community detection on network traffic between the interconnected systems.

Quantum Machine Learning to mitigate the machine learning adoption barriers
Jun 2017 - Jul 2017

A research survey of quantum machine learning algorithms (theory & implementational) along with their applications to overcome issues like large data processing, training overhead etc. The mathematics governing the quantum annealing, quantum topological algorithms and quantum NN classification is thoroughly studied.

Analysis of Similarity Measures for Collaborative Filtering Recommendation
Dec 2016 - Mar 2017

Implemented a user-based Collaborative Filtering (CF) mechanism to determine which similarity index (such as Manhattan distance, Pearson Correlation, etc) is ideal for data of different forms.

Forensic analysis of security attacks
Sept 2016 - Feb 2017

A comprehensive survey of the types of security attacks, mode of occurrence and efficient methods to analyze them. Also, put forward an efficient and scalable algorithm to prevent a Denial of Service Attack for Hewlett Packard Enterprise.

Security Analysis of AES algorithm
Jan 2016 - Mar 2016

Analysation of the design implementation of the asymmetric encryption algorithm & key security features with its complexity. Also, verified the randomness & entropy to check for the redundancy in the key generation.

OTHER PROJECTS

Geographic topology extrapolation using Generative Adversarial Networks

Generative Adversarial Network is used to find probable topological hot-spots in urban cities for new lakes to be dugout to recharge groundwater & reduce the likelihood of flooding of low-lying areas.

Certification Authority Management System

A software project funded by the Ministry of Electronics and Information Technology, Govt. of India that aids certification authorities in the validation & certification of vendor's cryptographic modules and their underlying cryptographic algorithms. All NIST approved algorithms and modules in FIPS 104-2 are incorporated.

Lane detection and switching in self driving cars

Simulation of cars that can drive autonomously in a diverse set of virtual environments using Convolutional Neural Networks. It is based on lane detection & mapping of steering angle with the surrounding environment.

Electoral Database

Efficient database with interactive UI and automated text summarization that tracks electoral campaigns, polling information, manifestos along with candidate comparison and authentication service with double layer encryption.

Sign Language recognition

A system to enable communication with the deaf and hearing impaired by converting American Sign Language (ASL) into text, by creating a vision-based system to identify and classify fingerspelled letters of the ASL.

Fake news detection using Long Short-Term Memory

A corpus of labelled news articles is used to build an LSTM model that generates new sentences that mimic the style of the writers, thereby enabling detection of fake news. This also renders class imbalance inconsequential necessitated by the dearth of input data in the fake news class.

PUBLICATIONS

- "Malware detection and classification using community detection and social network analysis", Journal of Computer Virology and Hacking Techniques, 1-14, DOI: 10.1007/s11416-021-00387-x
- "Bloom Filter-Based Malware Detection and Classification - A Comparison of Machine Learning Techniques", Journal of Computer Virology and Hacking Techniques (Under Peer Review)
- "Hybrid Behavioural Features for Churn Prediction in Mobile Telecomm Networks with Data Constraints", Proceedings of the Second International Conference on Security and Privacy, ISEA-ISAP 2018, DOI: 10.1007/978-981-13-7561-3
- "Simulation of Lane-switching in Self-Driving Automobiles", International Journal of Scientific Research in Computer Science, Engineering and Information Technology 2018, DOI: 10.32628/CSEIT184634
- "Analysis of Similarity Measures for Collaborative Filtering", Proceedings of the International Symposium on Cloud Computing & Data Analytics 2017

AWARDS

- Runner-up, Best Technical Poster Award - ISEA-ISAP Conference'18
- Best Technical Poster Award for "Simulation of Lane-switching in Self-Driving Automobiles" at the National Conference on Engineering Innovations and Solutions'18
- Best Technical Paper Award for "Analysis of Similarity Measures for Collaborative Filtering" at the Intl. Symposium on Cloud Computing & Data Analytics'17
- Winner, KBITS & NAIN "Most Promising Project" Award & seed funding
- Winner, Grace Hopper India 2016 Award and Scholarship
- Winner, Intel India AI Hackathon 2016
- Winner, The Hindu National Level Debate Competition
- Winner - National Level Lawn Tennis Championship'09

VOLUNTEERING

- Fundraising and Curriculum building - Smile Foundation
- Mentor for freshmen students – a Student Mentorship program
- Teaching English and Basic Computers for Divya Deepa, a school for the underprivileged
- College Ambassador - NPTEL
- Volunteer, UN Volunteers India -Environment
- Volunteer at Sneha Kiran, a haven for children living with cerebral palsy
- Technical consultant - Lake Revivers Association, Bangalore
- Designed & implemented a basic computer training module for rural youth at ANVA foundation

TECHNICAL SKILLS

Languages	Python, C, C++, JavaScript, HTML
DBMS platforms	MongoDB, MySQL, FaunaDB
Others	Linux, Mac OS, Windows, Kali Linux, Ubuntu

TEACHING EXPERIENCE

- Teaching Assistant under Dr. Rahul Dave at Univ.Ai, a startup to teach AI and ML to students from IITs.
- Teaching Assistant - College Remedial Students Enhancement program
- Conducted a 40 day course on Data Structures and Algorithms for CS sophomores and juniors

POSTS

- Secretary of NISB - IEEE Local chapter
- IGF Convenor - Bangalore Sector
- Founder, Head - Student Mentor Program, NIE
- Market Analyst - Unanth Technologies Pvt. Ltd.

MEMBERSHIPS

- Internet Governance Forum (IGF)
- AIESEC - Women in Power
- Sustainability Mafia
- IEEE

AREAS OF INTEREST

- Artificial Intelligence
- Reinforcement Learning
- Data Analysis
- Sustainable Computation
- Graph Theory
- Information Security

LANGUAGES

English • Hindi • Telugu • Kannada • ASL