JEROME DINAL HERATH

Full Name: Jerome Dinal Herath Muthukumaranage
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EDUCATION

State University of New York at Binghamton, USA *August 2018 - Present*
PhD in Computer Science GPA: 3.93/4.00

University of Colombo, Sri Lanka *January 2013 - January 2017*
Bachelor of Science, Specialization in Computational Physics. GPA: 3.66/4.00
Recipient of Dr. Sarath Gunapala Gold Medal for Computational Physics (2017)

Chartered Institute of Marketing, UK *August 2011 - May 2015*
Professional Postgraduate Diploma in Marketing

St. Joseph's College, Colombo 10, Sri Lanka *August 2011*
Primary Education, GCE Ordinary Levels, GCE Advanced Levels
Assistant Head Prefect (2011-2012)

RESEARCH EXPERIENCE

State University of New York at Binghamton, USA *August 2018 - Present*
Research done in fulfillment of PhD

- Designed an adversarial attack to understand the robustness of Deep Learning based anomaly detection on distributed system logs **[CODASPY'21/Accepted]**
- Built a real-time machine learning model designed for anomaly detection in a streaming multivariate time-series **[BIGDATA'19]**
- Investigated the potential use of Blockchain technology to improve the safety and reproducability of scientific research **[CIC'19]**

State University of New York at Binghamton, USA *August 2017 - August 2018*
Graduate Research Assistant

- Built a Markovian model to understand the use of opportunistic routing in cached wireless networks (applicable for Internet of Things) **[ICC'18, TVT'19]**
- Designed a Deep Learning model for wireless signal strength prediction **[ICC'19, TVT'20]**

University of Colombo, Sri Lanka *January 2016 - January 2017*
Research done in fulfillment of Bachelors Degree

- Simulated the movement of a snake robot using Gazebo, an open source robot simulator and experimented the effect of different robotic designs and movement patterns **[ICIAfS'17, ICCMS'18]**

TEACHING EXPERIENCE

State University of New York at Binghamton, USA *August 2018 - Present*
Graduate Teaching Assistant, Department of Computer Science

- CS 571 : Programming Languages in Spring-2020
- CS 480N/580N : Data Science with Applications in Social Media in Fall-2019
- CS 220 : Introduction to Computer Systems in Spring-2019
- CS 428/528 : Computer Networks in Fall-2018

University of Colombo, Sri Lanka *January 2017 - August 2017*
Assistant Lecturer, Department of Physics

- Teaching experience in Masters of Physics Education Lab
- Teaching Assistant Lecturer for Undergraduate courses in Computational Physics and Physics
- Teaching experience in Undergraduate Lab sessions (Electronics and Computing Lab 2, General Physics Lab 1)

TECHNICAL STRENGTHS

Programming Languages	Python and Matlab, Java, C (highest proficiency first)
Modelling Experience	Markovian Modelling
Machine Learning (ML)	ML for anomaly detection, Deep Learning, Reinforcement Learning
Deep Learning (DL)	Pytorch, Tensorflow
Experience with	Time Series and Graph data

SELECTED RESEARCH PROJECTS

LAM (Log Anomaly Mask) [CODASPY'21/Accepted]

- Log Anomaly Mask (LAM) is an adversarial evasion attack that can be used to evaluate robustness of Deep Learning models used for anomaly detection from distributed system logs.
- Built leveraging Deep Reinforcement Learning, LAM is able to attack models in whitebox, graybox and blackbox scenarios.
- Attacks generated from LAM are imperceptible (∼9.9% difference from original sample) and LAM can attack in an online fashion with low latency (∼0.46 milliseconds).

RAMP (Real-Time Aggregated Matrix Profile) [BIGDATA'19]

- Real-Time Aggregated Matrix Profile (RAMP) is a machine learning model that is capable of identifying anomalies given a stream of multivariate time series data in real time.
- A semi-supervised model that has online training and provides insight into root causes of anomalies.
- Shows superior anomaly detection capability for both direct and adversarial attacks when experimented on scientific workflows running on Amazon EC2 Virtual Machines.

DeepChannel (Deep Learning for wireless signal quality prediction) [ICC'19, TVT'20]

- DeepChannel is an encoder-decoder based sequence-to-sequence deep learning model that is capable of predicting future wireless signal strength variations based on past signal strength data.
- It can be applied to scheduling and improved video streaming over 4G LTE networks and bit rate adaptation for improved performance in WiFi networks.

PUBLICATIONS

1. *"Real-Time Evasion Attacks against Deep Learning-Based Anomaly Detection from Distributed System Logs"*. By **J. Dinal Herath**, Ping Yang, Guanhua Yan. In: Proceedings of The 11th ACM Conference on Data and Application Security and Privacy (CODASPY-2021). **[Accepted]**
2. *"RAMP: Real-Time Anomaly Detection in Scientific Workflows"*. By **J. Dinal Herath**, Changxin Bai, Guanhua Yan, Ping Yang, Shiyong Lu. In: IEEE International Conference on Big Data (Big Data-2019).
3. *"SciBlock: A Blockchain-Based Tamper-Proof Non-Repudiable Storage for Scientific Workflow Provenance"*. By Dinuni Fernando, Siddharth Kulshrestha, **J. Dinal Herath**, Nitin Mahadik, Yanzhe Ma, Changxin Bai, Ping Yang, Guanhua Yan, Shiyong Lu. In: International Conference on Collaboration and Internet Computing (CIC-2019)

4. *"DeepChannel: Wireless Channel Quality Prediction using Deep Learning"*. By Adita Kulkarni, Anand Seetharam, Arti Ramesh, **J. Dinal Herath**. In: IEEE Transactions in Vehicular Technology (TVT-2019).

5. *"A Deep Learning Model for Wireless Channel Quality Prediction"*. By **J. Dinal Herath**, Anand Seetharam, Arti Ramesh. In: IEEE International Conference on Communications (ICC-2019).

6. *"A Markovian Model for Analyzing Opportunistic Request Routing in Wireless Cache Networks"*. By **J. Dinal Herath** and Anand Seetharam. In: IEEE Transactions in Vehicular Technology (TVT-2018).

7. *"Analyzing Opportunistic Request Routing in Wireless Cache Networks"*. By **J. Dinal Herath** and Anand Seetharam. In: IEEE International Conference on Communications (ICC-2018).

8. *"Simulation of Symmetric and Asymmetric movement gaits for Lateral Undulation in Serial Snake Robots"*. By **J. Dinal Herath** and K. Jayananda. In: 2017 International Conference on Computational Modeling Simulation (ICCMS-2017).

9. *"Comparison of Serial and Parallel Snake Robots for Lateral Undulation Motion Using Gazebo"*. By **J. Dinal Herath** and K. Jayananda. In: 2016 IEEE International Conference on Information and Automation for Sustainability (ICIAfS- 2016).

AWARDS

Academic awards and Scholarships

1. Winner of Dr. Sarath Gunapala Gold Medal for Computational Physics, University of Colombo, Sri Lanka (2017).
2. Recipient of MIND (Munasinghe Institute for Development) Scholarship, Sri Lanka (2015-2016).

Travel Grants

1. NSF funded student travel grant to attend IEEE International Conference on Collaboration and Internet Computing (CIC-2019).
2. Student travel grant to attend ACM/IEEE Symposium on Architectures for Networking and Communications (ANCS-2018).
3. NSF funded student travel grant to attend IEEE International Conference on Communications (ICC-2018).