AMUTHEEZAN SIVAGNANAM

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EDUCATION

PhD in Informatics   Aug. 2022 - Present
Pennsylvania State University, University Park, PA, CGPA : **4.00**/4.00
Supervisor: **Dr. Aron Laszka**
Thesis: *Application of Deep Reinforcement Learning to Solve Combinatorial Optimization Problems related to Transportation Domains*

MSc. in Computer Science   Aug. 2019 - Aug. 2022
University of Houston, Houston, TX, GPA : **4.00**/4.00

BSc. (Hons) in Computer Science and Engineering   Jan. 2014 - Jan. 2018
Faculty of Engineering, University of Moratuwa, Sri Lanka, GPA : **3.81**/4.20

SKILLS

Fields : Artificial Intelligence, Machine Learning, Deep Reinforcement Learning, Optimization, Operational Research
Language and Tools : Python, TensorFlow, PyTorch, Git, Docker, CPLEX, Mosek, Google OR-Tools, C, C++, Java

WORK EXPERIENCE

Graduate Research Assistant — Pennsylvania State University   Pennsylvania, USA
Applied Artificial Intelligence Lab   *Aug. 2022 - present*
- Developed a novel **deep reinforcement learning** approach to optimize proactive responder repositioning in emergency management systems that **enhances response efficiency by** $1000\times$ **faster** while **minimizing operational delays**.
- Leveraged a **deep reinforcement learning** approach to tackle the challenge of online vehicle routing with advance booking, enabling **prompt confirmation within seconds**.

Graduate Research Assistant — The University of Houston   Texas, USA
Resilient Networks and Systems Lab   *Sep. 2019 - Aug. 2022*
- Introduced heuristics that **lower the energy costs by $140k annually** for public transit agency operating mixed fleets of buses.
- Implemented a deep reinforcement learning approach that achieved a **20% reduction in operational costs** by enabling online booking for offline Vehicle Routing Problems (VRP).

Software Engineer — LSEG Technology   Colombo, Srilanka
Post Trade Team   *Jan. 2018 - Jul. 2019*
- Introduced unit testing for libraries in the Post-Trade C++ codebase. Implemented and validated database changes for Post-Trade products for the Singapore Stock Exchange using **Behavior Driven Development (BDD)** testing approaches in Java. Contributed to the CI/CD pipeline of the Post-Trade product using Python and Git. **Followed Agile** development practices.

Software Engineering Intern — WSO$_2$ Lanka PVT Ltd.   Colombo, Srilanka
Data Analytics Team   *Jul. 2016 - Dec. 2016*
- Developed an alert generation system to **monitor disease outbreaks** by analyzing descriptive data, triggering email and SMS notifications for widespread incidents. Additionally, implemented a mechanism to assess hospital functionality, such as bed and oxygen cylinder availability, based on admission and discharge messages.

SELECTED PUBLICATIONS

- **Sivagnanam, A.**, Pettet, A., Lee, H., Mukhopadhyay, A., Dubey, A. and Laszka, A. "*Multi-Agent Reinforcement Learning with Hierarchical Coordination for Emergency Responder Stationing*" Accepted to be present in the Proceedings of the 41 st International Conference on Machine Learning, Vienna, Austria. PMLR 235, 2024 (**ICML 2024**). https://proceedings.mlr.press/v235/sivagnanam24a.html
- **Sivagnanam, A.**, Kadir, S.U., Mukhopadhyay, A., Pugliese, P., Dubey, A., Samaranayake, S. and Laszka, A., "*Offline Vehicle Routing Problem with Online Bookings: A Novel Problem Formulation with Applications to Paratransit.*" In proceedings of the 31st International Joint Conference on Artificial Intelligence (**IJCAI 2022**). https://www.ijcai.org/proceedings/2022/0546.pdf
- **Sivagnanam, A.**, Ayman, A., Wilbur, M., Pugliese, P., Dubey, A. and Laszka, A., "*Minimizing Energy Use of Mixed-fleet Public Transit for Fixed-route Service.*" In Proceedings of the 35th AAAI Conference on Artificial Intelligence (**AAAI '21**), February 2-9, 2021, Virtual Event, 7 pages. https://ojs.aaai.org/index.php/AAAI/article/view/17752
- Atefi, S., **Sivagnanam, A.**, Ayman, A., Grossklags, J. and Laszka, A. "*The Benefits of Vulnerability Discovery and Bug Bounty Programs: Case Studies of Chromium and Firefox.*" Published in In Proceeding of The Web Conference 2023 (**WWW 2023**), April 30 - May 4, 2023, Austin, TX, USA, 8 Pages. https://dl.acm.org/doi/abs/10.1145/3543507.3583352