Shaswot Shresthamali

CONTACT INFORMATION

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EDUCATION

Ph.D., Information Science and Technology, **March 2021**
The University of Tokyo, Japan

Dissertation Advisor: Prof. Hiroshi Nakamura

Dissertation Title: *Reinforcement Learning-Based Optimization in Energy Harvesting Wireless Sensor Nodes*

Master of Information Science and Technology, **March 2018**
The University of Tokyo, Japan

Dissertation Advisors: Prof. Hiroshi Nakamura, Prof. Masaaki Kondo

Dissertation Title: *Adaptive Power Management of Solar Energy Harvesting Sensor Node by Reinforcement Learning*

B.E., Electronics and Communication Engineering, **October 2012**
Tribhuvan University, Nepal

Final Year Project Advisor: Prof. Dinesh Kumar Sharma

Final Year Project: *Digital Audio Processor*

EMPLOYMENT

Project Assistant Professor, **April 2023–Present**
Kondo Laboratory,
Department of Information and Computer Science,
Keio University,
Japan

Researcher, **April 2021–March 2023**
Kondo Laboratory,
Department of Information and Computer Science,
Keio University,
Japan

Research Fellow, **April 2018–March 2021**
Japan Society for the Promotion of Science (JSPS),
Tokyo, Japan

Engineer, **February 2018–August 2018**
Ridge-i, Tokyo, Japan

Assistant Professor, **November 2012–October 2014**
Sagarmatha Engineering College,
Tribhuvan University, Nepal

Research Interests

Reinforcement Learning (RL), Deep RL, Off-policy RL, Distributed RL, Quantum Computation, Deep Learning Accelerators.

I am currently researching on novel techniques and architectures to accelerate Deep Neural Networks (DNN). I am also researching on integration of High Performance Computing (HPC) systems with Quantum Computers (QC) as a member in the QC-HPC Group of the SQAI project.

My doctoral research deals with RL-based methods for energy scheduling in energy-harvesting wireless sensor nodes. The focus is on applied RL and its relation to **neural network function approximation**, **off-policy learning** and **distributed learning**.

Honors and Awards

Young Researcher Award, Information Processing Society of Japan (IPSJ) **2022**

DC1 Fellowship, JSPS **2018–2021**

Grants-in-Aid for Scientific Research, JSPS **2018–2021**

Young Researcher Award, Information Processing Society of Japan (IPSJ) **2016**

Japanese Government MEXT Scholarship, **2015-2018**

College Fellowship, Pulchowk Campus, Tribhuvan University **2008–2012**

Teaching Experience

Assistant Professor, Sagarmatha Engineering College, Tribhuvan University

Digital Signal Processing	**Winter 2013**
Advanced Electronics	**Winter 2012, 2013**
Instrumentation II	**Winter 2013**
Embedded Systems	**Winter 2013**
Electronic Devices and Circuits	**Winter 2013**
Electric Circuit Theory	**Summer 2013**
Basic Electronics Engineering	**Summer 2013**

Mentoring/ Supervision

Graduate Students

Yikai Mao (Doctoral student)	**April 2022–Present**
Thet Htar Su (Doctoral student)	**April 2023–Present**
Davide Laureti (Master student)	**November 2023–Present**
Jules Feron (Master student)	**November 2023–Present**
Maelle Gabens (Master student)	**November 2023–Present**
Sugimoto Hirotada (Bachelor student)	**November 2022–Present**
Lorenzo Sonnino (Master student)	**November 2021–October 2023**

Interns

Chander Shekhar	**July 2019**

Professional Activities, Outreach, and Service

Invited Speaker

Annual Nepal AI School (NAAMI) **December 20, 2021**
"Learning to Learn Linear Algebra"

Nepal Engineers Association Japan (NEAJ) **November 27, 2021**
"Sharing Professional Experience and Academic Research Work"

Nepal-Japan Educational Dialogue **November 26, 2021**
Webinar: "Higher Education Opportunities in Japan"

The University of Tokyo Alumni Association Nepal (UTAAN) **April 17, 2021**
Annual Benkyokai

Program Committee

5th Sustainable Computing Systems Workshop (SUSCW 22) **November 2022**

4th Sustainable Computing Systems Workshop (SUSCW 21) **November 2021**

Publicity Chair

Workshop on Challenges in Artificial Intelligence and Machine Learning for Internet of Things (AIChallengeIoT 2020) **November 2020**

The University of Tokyo Nepali Society **2015–2021**
President (2017–2018)

Seminar Organizer

A Seminar on FPGA Technology and its role in Electronics Engineering in Nepal
Sagarmatha Engineering College, Nepal **July 2013**

Refereed Publications

1. Sonnino, L., **Shresthamali, S.**, He, Y., Kondo, M., (2024)
DAISM: Digital Approximate In-SRAM Multiplier-based Accelerator for DNN Training and Inference, (to be published)
2024 Design, Automation and Test in Europe Conference (DATE 2024)
2. **Shresthamali, S.**, Kondo, M., (2023)
Enhancing Deep Reinforcement Learning with Compressed Sensing-based State Estimation, (to be published)
2023 IEEE 16th International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC)
3. **Shresthamali, S.**, He, Y., Kondo, M., (2022)
FAWS: Fault-Aware Weight Scheduler for DNN Computations in Heterogeneous and Faulty Hardware,
2022 IEEE International Conference on Parallel and Distributed Processing with Applications, Big Data and Cloud Computing, Sustainable Computing and Communications, Social Computing and Networking (ISPA/BDCloud/SocialCom/SustainCom)
4. **Shresthamali, S.**, Kondo, M., Nakamura, H., (2022)
Multi-Objective Resource Scheduling for IoT Systems using Reinforcement Learning,
Journal of Low Power Electronics and Applications 12.4 (2022): 53.
5. **Shresthamali, S.**, Kondo, M., Nakamura, H., (2021)
Multi-objective Reinforcement Learning for Energy Harvesting Wireless Sensor Nodes,
2021 IEEE 14th International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC) (pp. 98-105).
6. **Shresthamali, S.**, Kondo, M., Nakamura, H., (2019)
Power Management of Wireless Sensor Nodes with Coordinated Distributed Reinforcement

Learning,
2019 IEEE 37th International Conference on Computer Design (ICCD) (pp. 638-647).

7. **Shresthamali, S.**, Kondo, M., Nakamura, H., (2017)
Adaptive power management in solar energy harvesting sensor node using reinforcement learning,
ACM Transactions on Embedded Computing Systems (TECS), Vol. 16, Issue 5s, pp 1-21, September, 2017.
8. Chhetri, S., R., Poudel, B., Ghimire, S., **Shresthamali, S.**, Sharma, D., K., (2015)
Implementation of Audio Effect Generator in FPGA,
Nepal Journal of Science and Technology 2014, Vol. 15, Issue 1, pp. 89-98, December, 2014.
9. **Shresthamali, S.**, (2014)
Parallel Processing Using FPGAs,
KEC Journal of Science and Engineering (KJSE), Vol. 2, Issue 1, pp 79-82, November, 2014.

Unrefereed Publications

1. **Shresthamali, S.**, Kondo, M., (2022)
Enhancing Deep Reinforcement Learning with Compressed Sensing-based State Estimation,
Summer Workshop on Parallel/Distributed/Cooperative Processing (SWoPP 2023)
2. 杉本　寛直, シュレスタマリ サソット, 近藤 正章 (2023)
局所グラフ情報を用いた強化学習による*AGV*の経路スケジューリング手法の検討 *(A study of reinforcement learning-based AGV route scheduling using local graph information)*,
第244回システム・アーキテクチャ研究発表会（ETNET2023）,
3. **Shresthamali, S.**, He, Y., Kondo, M., (2022)
Fault-aware Hardware Scheduling of Computations in Deep Neural Networks ,
Summer Workshop on Parallel/Distributed/Cooperative Processing (SWoPP 2022)
4. ソニー ロレンツォ, シュレスタマリ サソット, 和 遠, 近藤 正章 (2022)
*DNN*推論高速化のための*SRAM*ベース近似デジタル乗算器の提案,
2022年並列／分散／協調処理に関するサマー・ワークショップ (SWoPP2022),
5. シュレスタマリ サソット, 近藤 正章 , 中村 宏 (2017)
適応的電力制御を行う環境発電駆動センサノードの強化学習戦略の比較評価,
研究報告システム・アーキテクチャ（ARC）, Vol. 2017-ARC-227, No. 28, pp. 1-8, July, 2017.
6. シュレスタマリ サソット, 近藤 正章 , 中村 宏 (2017)
強化学習を用いた環境発電駆動センサノードの適応的電力制御手法の検討,
研究報告システム・アーキテクチャ（ARC）, Vol. 2017-ARC-225, No. 26, pp. 1-6, March, 2017.

Presentations

1. **Enhancing Deep Reinforcement Learning with Compressed Sensing-based State Estimation**,
2023 IEEE 16th International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC 2023), December 2023.
2. **Enhancing Deep Reinforcement Learning with Compressed Sensing-based State Estimation** ,
Summer Workshop on Parallel/Distributed/Cooperative Processing (SWoPP 2023), August 2023
3. **FAWS: Fault-Aware Weight Scheduler for DNN Computations in Heterogeneous and Faulty Hardware** ,
2022 IEEE International Conference on Parallel and Distributed Processing with Applications (ISPA 2022), December 2022
4. **Fault-aware Hardware Scheduling of Computations in Deep Neural Networks** ,
Summer Workshop on Parallel/Distributed/Cooperative Processing (SWoPP 2022), July 2022

5. **Multi-objective Reinforcement Learning for Energy Harvesting Wireless Sensor Nodes**,
   2021 IEEE 14th International Symposium on Embedded Multicore/Many-core Systems-on-Chip (MCSoC 2021), December 2021
6. **Reinforcement Learning for Energy Harvesting Wireless Sensor Nodes**,
   Keynote Speech at 4th Sustainable Computing Systems Workshop (SUSCW 21), December 2021
7. **Power Management of Wireless Sensor Nodes with Coordinated Distributed Reinforcement Learning**,
   2019 IEEE 37th International Conference on Computer Design (ICCD 2019), November 2019
8. **Adaptive power management in solar energy harvesting sensor node using reinforcement learning**,
   2017 International Conference on Embedded Software (EMSOFT), October 2017
9. **Adaptive Power Management of Energy Harvesting Sensor Nodes using Reinforcement Learning: A comparison of Q-Learning and SARSA Algorithms**,
   Summer Workshop on Parallel/Distributed/Cooperative Processing (SWoPP 2017), July 2017
10. **Reinforcement Learning For Power Management In Energy Harvesting Sensor Nodes** (Poster),
    54th Design Automation Conference (DAC 2017), June 2017
11. **Adaptive Power Management For Energy Harvesting Sensor Nodes**,
    217th IPSJ (ETNET 2017), March 2017
12. **FPGA: A Brief Introduction**,
    Seminar on FPGA Technology And Its Role In Electronics Engineering In Nepal, Sagarmatha Engineering College, July 2013
13. **An Introduction to Parallel Processing Using FPGAs**,
    LOCUS, Pulchowk Campus, June 2013