Alireza (Ali) Shamsoshoara

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https://github.com/AlirezaShamsoshoara, GitHub Pages
Google Scholar

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Research Area

- Dynamic Spectrum Assignment for UAV networks, Internet of Things (IoT), Wireless and Ad hoc Networks, Software Defined Radio (SDR), Machine Learning, Reinforcement Learning, Deep Learning, Imitation Learning, Apprenticeship Learning

Technical Skills

- **Machine Learning**: Reinforcement Learning, Imitation Learning, Apprenticeship Learning using IRL, Linear regression using SGD, Image Classification and Segmentation using Tensorflow and Keras (GPU and CPU)
- **Wireless skills**: Simulators: NS2 and NS3, Hardware: SDRs: Ettus N210 and B205 mini, Transceivers: Zigbee ZE10S
- **Drone skills**: Working with simulators, hands on experience with DJI drones and Pixhawk 4 flight controller
- **Electrical Skill**: Nvidia Jetson Nano, R Pi, Microcontrollers (ARM: LPC1768, STM32F103 - AVR: ATMEGA 8,16,32)
- **Programming Languages**: Python, C, C++, MATLAB, R
- **Relevant Coursework**: Large-Scale Data structures, Cybersecurity, Statistical Analysis, Pattern Recognition, Voice over IP, Digital Signal Processing, Wireless Networks, Computer Networks, Python Programming
- **Software**: Pycharm, Clion, Atollic, MATLAB, GNS3, Keil μvision, Codevision, Proteus, Altium Designer, MPLAB,
- **Operating Systems**: Linux, Windows

Education

- **Northern Arizona University (NAU)** — Flagstaff, AZ
  Ph.D. in Informatics, GPA: 3.80/4 — Aug. 2017 – present
- **Northern Arizona University (NAU)** — Flagstaff, AZ
  Master of Science in Informatics, GPA: 3.80/4 — Aug. 2017 – May. 2019
- **K. N. Toosi University of Technology (KNTU)** — Tehran, Iran
  Master of Science in Electrical Engineering-Electronics, GPA: 3.83/4 — Sep. 2012 – Jan. 2015
  - **Thesis**: An Algorithm to Improve the Lifetime for Multi-Sink Wireless Ad-hoc Networks
- **Shahid Beheshti University (SBU)** — Tehran, Iran
  Bachelor of Science in Electrical Engineering-Electronics, GPA: 3.75/4 — Sep. 2008 – July. 2012
  - **Thesis**: Multi Functional Mars Rover Robot

Experience

- **WINIP LAB, School of Informatics** — Flagstaff, AZ, USA
  Research and Teaching Assistant — Aug. 2017 - Present
  - **Wireless spectrum management for drones**: Worked on the design and development of spectrum sharing models for Unmanned Aerial Vehicles using machine learning tools such as Reinforcement learning and Imitation Learning.
  - **Teaching**: Microprocessor (MSP430 TI), Fundamental of computer engineering (FPGA and VHDL), Signals and Systems (MATLAB), Introduction to Digital Logic, Introduction to Electronics, Electromagnetics in MATLAB
  - **Supervisor**: Dr. Fatemeh Afghah
- **Next Biometrics** — Seattle, WA, USA
  Engineering Intern: Firmware Engineer — May 2018 - Aug. 2018
  - **Firmware programmer for fingerprint sensors on smart cards**:
    1) Working on firmware for a fingerprint sensor in contact-less credit card demo with K22F NXP
    2) Developing a GUI with AppJar library for a python application
    3) Developing a Database application using C# .Net framework and MySQL to store and read reports
  - **Supervisor**: Mr. Charles Horkin
- **Northern Arizona University** — Flagstaff, AZ, USA
  LAB Instructor: Fundamental of Computer Engineering — Jan 2020 - May. 2020
  - **Lecturer for the Lab**: FPGA design in Verilog HDL
  - **Supervisor**: Dr. Tolga Yalcin

- **Northern Arizona University** Flagstaff, AZ, USA
  LAB Instructor: Fundamental of Electromagnetics Jan 2020 - May. 2020
  - **Lecturer for the Lab**: Electromagnetics in Matlab and DC motors
  - **Supervisor**: Dr. Robert Severinghaus
- **Northern Arizona University** Flagstaff, AZ, USA
  LAB Instructor: Signals and Systems Jan 2020 - May. 2020
  - **Lecturer for the Lab**: Signals and Systems in Matlab
  - **Supervisor**: Dr. Fatemeh Afghah
- **Northern Arizona University** Flagstaff, AZ, USA
  LAB Instructor: Introduction to Electronics Aug 2019 - Dec. 2019
  - **Lecturer for the Lab**: Working on Multisim NI simulator.
- **Northern Arizona University** Flagstaff, AZ, USA
  Teaching Assistant: Microprocessors LAB Jan. 2019 - May 2019
  - **Lecturer for the Lab**: Working on MSP 430 Texas Instrument.
  - **Supervisor**: Dr. Robert Severinghaus
- **Northern Arizona University** Flagstaff, AZ, USA
  Teaching Assistant: Introduction to Digital Logic Jan. 2019 - May 2019
  - **Lecturer for the Lab**:
  - **Supervisor**: Dr. Robert Severinghaus
- **NAK World-Class Telecom Managed Service** Tehran, Iran
  Network Engineer Sep. 2016 - Aug. 2017
  - **Designer for IP network**: Working on CISCO devices: Router2911, Switch3850
- **K. N. Toosi University of Technology** Tehran, Iran
  Research Assistant Jun. 2013 - Jan. 2015
  - **Routing protocols for Wireless Ad-hoc networks**: Working on energy consumption for Ad-hoc networks considering the path planning and routing.

Publications

Conferences

1. Belen, James, Sajad Mousavi, **Alireza Shamsoshoara**, and Fatemeh Afghah. "An Uncertainty Estimation Framework for Risk Assessment in Deep Learning-based Atrial Fibrillation Classification.", Asilomar 2020.
2. Keshavarz, Mahsa, **Shamsoshoara, Alireza**, Afghah Fatemeh, and Ashdown Jonathan, "A Real-time Framework for Trust Monitoring in a Network of Unmanned Aerial Vehicles", IEEE **INFOCOM** 2020 Conference on Computer Communication Workshops (WISARN 2020), January, 2020
3. Haiyu Wu, Huayu Li, **Alireza Shamsoshoara**, Abolfazl Razi, Fatemeh Afghah, Transfer Learning for Wildfire Identification in UAV Imagery. 54th Annual Conference on Information Sciences and Systems (**CISS**), March 18-20, 2020, NJ, USA.
4. **Shamsoshoara, A.**, Khaledi, M., Afghah, F., Razi, A., Ashdown, J. and Turck, K., A Solution for Dynamic Spectrum Management in Mission-Critical UAV Networks. 16th Annual IEEE International Conference on Sensing, Communication, and Networking Workshops (**SECON**), 2019.
5. **Shamsoshoara, A**., Khaledi, M., Afghah, F., Razi, A. and Ashdown, J., Distributed cooperative spectrum sharing in uav networks using multi-agent reinforcement learning. In 2019 16th IEEE Annual Consumer Communications & Networking Conference (**CCNC**) (pp. 1-6), IEEE, January, 2019.
6. Afghah, F., **Shamsoshoara, A.**, Njilla, L. and Kamhoua, C., A reputation-based Stackelberg game model to enhance secrecy rate in spectrum leasing to selfish IoT devices. In IEEE INFOCOM 2018-IEEE Conference on Computer Communications Workshops (**INFOCOM**) (pp. 312-317), IEEE, April, 2018.
7. **Shamsoshoara, A.** and Darmani, Y., Enhanced multi-route ad hoc on-demand distance vector routing. In 2015 23rd Iranian Conference on Electrical Engineering (ICEE) (pp. 578-583), IEEE, 2015.

Journals

1. **Alireza Shamsoshoara**, Fatemeh Afghah, Abolfazl Razi, Liming Zheng, Peter Z. Fulé, and Erik Blasch. "Aerial Imagery Pile burn detection using Deep Learning: the FLAME dataset." Computer Networks (2021): 108001.
2. **Alireza Shamsoshoara**, Fatemeh Afghah, Erik Blasch, Jonathan Ashdown, and Mehdi Bennis. "UAV-Assisted Communication in Remote Disaster Areas using Imitation Learning." IEEE Open Journal of the Communications Society (2021).
3. **Shamsoshoara, A.**, Korenda, A., Afghah, F. and Zeadally, S., A survey on hardware-based security mechanisms for internet of things. **Published** in Elsevier Computer Networks Journal, 2020.
4. **Shamsoshoara, A.**, Afghah, F., Razi, A., Mousavi, S., Ashdown, J. and Turk, K., An Autonomous Spectrum Management Scheme for Unmanned Aerial Vehicle Networks in Disaster Relief Operations. **Published** in Journal of **IEEE Access**, 2020.

Dataset

1. The Flame Dataset: Aerial Imagery Pile Burn Detection Using Drones (UAVs), DOI Link

Book and Book Chapter

1. (Chapter) Afghah, F., **Shamsoshoara, A.**, Njilla, L. and Kamhoua, C., "Cooperative Spectrum Sharing and Trust Management in IoT networks",
   Book title: "Modeling and Design of Secure Internet of Things", Book Editors: Charles Kamhoua, Laurent Njilla, Alexander Kott, Sachin Shetty, **John Wiley**, ISBN: 1119593360, 9781119593362, March, 2020. Amazon Link, Google Book
2. (Book) **Shamsoshoara, A.**, Karimi, R., Overview of Network Simulator NS2 (in Persian), Publisher: Abbasi, ISBN: 978-600-5752-13-7, Feb., 2016

Technical Reports

1. **Shamsoshoara, A.**, Overview of Blakley's Secret Sharing Scheme. arXiv preprint arXiv:1901.02802, 2019.
2. **Shamsoshoara, A.**, Ring oscillator and its application as physical unclonable function (PUF) for password management. arXiv preprint arXiv:1901.06733, 2019.

Highlighted Projects

- Aerial Imagery Pile burn detection using Deep Learning: the FLAME dataset [GitHub] [Article] [YouTube] [Dataset]
- Imitation Learning (Behavioral-Cloning) for UAV-Assisted Communication [GitHub] [Article] [YouTube]
- A solution for Dynamic Spectrum Management in Mission-Critical UAV Networks using Team Q learning as a Multi-Agent Reinforcement Learning [GitHub] [Article]
- An Autonomous Spectrum Management Scheme for Unmanned Aerial Vehicle Networks in Disaster Relief Operations using Multi Independent Agent Reinforcement Learning [GitHub] [Article]

Services

Reviewer

- 21st IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WOWMOM 2020)
- The Multidisciplinary Open Access Journal, IEEE Access, 2020
- International Conference on Cyber-Physical Systems (ICCPS), IEEE, 2020
- Consumer Communications and Networking Conference (CCNC), Conference, IEEE, 2020
- Consumer Communications and Networking Conference (CCNC), Conference, IEEE, 2019
- Journal of Communications and Networks (JCN), IEEE, 2019
- Mission-Oriented Wireless Sensor, UAV and Robot Networking (MiSARN), Workshop, Infocom, IEEE, 2019
- IET Wireless Sensor Systems, Journal, IET, 2018, 2019)
- International Conference on Sensing, Communication and Networking (SECON), Conference, IEEE, 2019
- International Symposium on Personal, Indoor and Mobile Radio Communications, Conference (PIMRC), Symposium, IEEE, 2019
- 90th Vehicular Technology Conference: VTC2019-Fall, IEEE, 2019
- 91th Vehicular Technology Conference: VTC2020-Spring, IEEE, 2020
- Global Communications Conference (GLOBECOM), IEEE, 2019
- International Symposium on Dynamic Spectrum Access Networks (DySPAN), IEEE, 2019

Organizing committee

- Web and Publicity Chair, Conference, INFOCOM Workshop, IEEE MiSARN 2019

Certifications

- Structuring Machine Learning Projects, Credential ID: 67QF4QXZS9PX, Certificate, Sep. 2018
- Algorithmic Toolbox, Credential ID: VAE4GA5M7UAM, Certificate, Aug. 2018
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Credential ID: WBN9CRU6GXPL, Certificate, Jul. 2018
- Neural Networks and Deep Learning, Credential ID: HVV6PN6TFDEX, Certificate, Jun. 2018
- The Raspberry Pi Platform and Python Programming for the Raspberry Pi, University of California, Credential ID: HWFQW2R5FWU9, Certificate, Aug. 2016
- Python Data Structures, Certificate of Completion, Credential ID: R8V6THTLHNZU, Certificate, Jun. 2016
- Machine Learning, Certificate of Completion, Credential ID: MBUTZC8LBAVW, Certificate, Apr. 2016

Honors and Awards

- Awarded the Graduate Research Assistantship, the School of Informatics, Computing and Cyber Systems, Northern Arizona University, 2017-2019.
- Awarded the NSF Grant to attend the Powder Wireless week at University of Utah, $2100, Sep. 2019.
- Awarded the SICCS Travel Grant Program (TGP) to attend the IEEE SECON 2019 conference at Northeastern University, Boston, the School of Informatics, Computing and Cyber Systems, Northern Arizona University, Summer 2019.
- Ranked 3^{rd} among 18 master students in Electrical Engineering department at K. N. Toosi University of Technology and exempted from the PhD qualification exam as an "Exceptional Talented Student", 2014.
- Ranked 3^{rd} among 31 bachelor students in Electrical Engineering department at Shahid Beheshti University and exempted from the qualification exam for the M.Sc. graduate program as an "Exceptional Talented Student", 2012.