# Seyed Sajad Mousavi

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## Technical Skills

- **Machine/Deep learning and Computer vision libraries**: TensorFlow, PyTorch, Lasagne/Theano, Caffe, Scikit-learn, Weka, Google Colab, OpenCV.
- **Programming Languages**: Python, R, Java, C++, Matlab
- **Database Technologies**: Oracle, MS Access, MS SQL Server, MySQL, Oracle NoSQL.
- **Parallel programming**: Multiprocessing/multithreading in Python and C, MPI, OpenMP
- **Experience with**: Git, Docker, AWS, HPC
- **Operating Systems**: Linux, Windows.

## Education & Training

- **Harvard University** — Boston, Massachusetts
  *Postdoctoral Researcher in Biomedical Informatics, Harvard Medical School* — *May 2020 – Present*
- **Northern Arizona University** — Flagstaff, AZ
  *PhD in Informatics and Computing* — *May 2020*
- **Northern Arizona University** — Flagstaff, AZ
  *Master of Science in Informatics* — *Dec. 2018*
- **National University of Ireland, Galway** — Galway, Ireland
  *Master of Engineering in Information Technology* — *Aug. 2017*
  - **Thesis**: Researching Advanced Deep Learning Methodologies in Combination with Reinforcement Learning Techniques
- **Iran University of Science and Technology** — Tehran, Iran
  *Master of Science in Artificial Intelligence and Robotics* — *Sep. 2012*
  - **Thesis**: Adjustable Autonomy Using Reinforcement Learning for Multi-Agent Systems
- **University of Zanjan** — Zanjan, Iran
  *Bachelor of Software Engineering* — *Sep. 2010*
  - **Thesis**: Study and Using the MPI Library in Parallel Systems and Supercomputers

## Work and Research Experiences

- **UC San Diego Health, Dept. of Biomedical Informatics** — San Diego, CA, USA.
  *Bioinformatics Programmer II* — *June 2019 - Aug. 2019*
  - **Time series analysis and Machine learning**: Worked on the design and development of machine learning models for early prediction of life-threatening conditions such as Sepsis and Delirium using electronic health record (EHR) data.
  - **Supervisor**: Prof. Shamim Nemati
- **FotoNation** — Galway, Ireland
  *Intern* — *May 2016 - Sep.2016; May 2017 - Aug. 2017*
  - **Machine learning**: Worked in deep learning, reinforcement learning, and computer vision fields to design and develop algorithms for object detection, face detection/recognition.
  - **Supervisor**: Pawel Filipczuk and Gabriel Costache
- **National University of Ireland, Galway** — Galway, Ireland
  *Research and Teaching Assistant* — *Oct. 2015 - Aug. 2017*
  - **Research Assistant**: Research on machine learning and deep learning for traffic light control & playing games in interactive environments.
  - **Teaching Assistant**: Object Oriented Programming: Data Structures and Algorithms; Computing Architecture & Operating Systems; Next Generation Technologies II; Java Programming.

- **Karoon Higher Education Institute** Ahvaz, Iran
  *Faculty Member* *Jan. 2014 - Sep. 2015*
  - **Instructor**: Artificial Intelligence; Data Structures and Algorithms; Database Systems; Expert Systems; C++ Programming.
- **Iran University of Science and Technology** Tehran, Iran
  *Software Developer* *Sep. 2011 - May 2012*
  - **Database Management**: Oracle NoSQL & Neo4j NoSQL implementation on Linux servers with Java programming language.
- **University of Zanjan** Zanjan, Iran
  *Software Developer* *Jan. 2009 - Aug. 2010*
  - **Parallel Programming**: Study and writing parallel programs for multi-processor computers using MPI and TBB libraries.

## Graduate Courses

- Statistical Pattern Recognition
- Machine Learning
- Artificial Neural Networks
- Statistical Image Processing
- Digital Signal Processing
- Multi-agent Systems
- Evolutionary Computing
- Remote Sensing
- Statistical Methods
- Large-scale Data Structures and Organization
- Topics in Cybersecurity
- High Performance Computing
- Research Methods in Informatics and Computing

## Publications

1. Belen, J., **Mousavi, S.**, Shamsoshoara, A., and Afghah, F. (2020). An Uncertainty Estimation Framework for Risk Assessment in Deep Learning-based Atrial Fibrillation Classification. arXiv preprint arXiv:2011.00121.

2. **Mousavi, S.**, Afghah, F., Khadem, F., and Acharya, U. R. (2020). ECG language processing (ELP): a new technique to analyze ecg signals. arXiv preprint arXiv:2006.08841.

3. Shamsoshoara, A., Afghah, F., Razi, A., **Mousavi, S.**, Ashdown, J. and Turk, K., (2020). An Autonomous Spectrum Management Scheme for Unmanned Aerial Vehicle Networks in Disaster Relief Operations. IEEE Access, 8, pp.58064-58079.

4. **Mousavi, S.**, Afghah, F., & Acharya, U. R. (2020). HAN-ECG: An Interpretable Atrial Fibrillation Detection Model Using Hierarchical Attention Networks, Computers in Biology and Medicine, Volume 127, 2020, 104057, ISSN 0010-4825, https://doi.org/10.1016/j.compbiomed.2020.104057.

5. **Mousavi S**, Fotoohinasab A, & Afghah F (2020) Single-modal and multi-modal false arrhythmia alarm reduction using attention-based convolutional and recurrent neural networks. **PLoS ONE Journal** 15(1): e0226990. https://doi.org/10.1371/journal.pone.0226990.

6. **Mousavi, S.**, Afghah, F., & Acharya, U. R. (2019). SleepEEGNet: Automated Sleep Stage Scoring with Sequence to Sequence Deep Learning Approach. **PloS ONE Journal**, doi: 10.1371/journal.pone.0216456.
7. Ghazanfari, B., Afghah, F., Najarian, K., **Mousavi, S.**, Gryak, J., Todd, J., (July 2019). An Unsupervised Feature Learning Approach to Reduce False Alarm Rate in ICUs, 41th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC'19**).

8. **Mousavi, S**., & Afghah, F. (2019). Inter-and intra-patient ECG heartbeat classification for arrhythmia detection: a sequence to sequence deep learning approach. In ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP'19**), pp. 1308-1312.
9. **Mousavi, S.**, Afghah, F., Razi, A., & Acharya, U. R. (2019). ECGNET: Learning where to attend for detection of atrial fibrillation with deep visual attention. In 2019 IEEE EMBS International Conference on Biomedical & Health Informatics (**BHI'19**). IEEE.
10. **Mousavi, S.**, Afghah, F., Ashdown, J. D., & Turck, K. (2019). Use of a quantum genetic algorithm for coalition formation in large-scale UAV networks. **Elsevier Ad Hoc Networks Journal**, 87, 26-36.
11. **Mousavi, S.**, Afghah, F., Ashdown, J. D., & Turck, K. (April 2018). Leader-follower based Coalition Formation in Large-scale UAV Networks, A Quantum Evolutionary Approach, **INFOCOM**, Workshop on Wireless Sensor, Robot, and UAV Networks **(Best Paper Recognition)**.
12. Zaeri-Amirani, M., Afghah, F., **Mousavi, S**. (July 2018). A Feature Selection Method Based on Shapley Value to False Alarm Reduction in ICUs, A Genetic-Algorithm Approach, 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC'18**).
13. **Mousavi, S. S.**, Schukat, M., & Howley, E. (2017). Traffic Light Control Using Deep Policy-Gradient and Value-Function Based Reinforcement Learning. **Journal of IET Intelligent Transport Systems**, DOI: 10.1049/iet-its.2017.0153.
14. **Mousavi, S. S.**, Schukat, M. & Howley, E. (2017). Traffic Light Control Using Deep Reinforcement Learning Agent. NUIG UL 7th Postgraduate Research Day 2017.
15. **Mousavi, S. S.**, Schukat, M., Howley, E., & Mannion, P. (2017). Applying Q($\lambda$)-learning in Deep Reinforcement Learning to Play Atari Games. Adaptive Learning Agents (ALA) Workshop at Sixteenth International Conference on Autonomous Agents and Multiagent Systems (**AAMAS'17**).
16. **Mousavi, S. S.**, Schukat, M. & Howley, E. (2016). Deep Learning Methodologies in Combination with Reinforcement Learning Techniques. NUIG UL 6th Postgraduate Research Day 2016.
17. **Mousavi, S. S.**, Schukat, M., Howley, E., Borji, A., & Mozayani, N. (2016). Learning to predict where to look in interactive environments using deep recurrent q-learning. arXiv preprint arXiv:1612.05753.
18. **Mousavi, S. S.**, Schukat, M., & Howley, E. (2016, September). Deep reinforcement learning: An overview. In Proceedings of SAI Intelligent Systems Conference (pp. 426-440). **Springer**, Cham.
19. Habibalahi, A., Moghari, M. D., Samadian, K., **Mousavi, S. S.**, & Safizadeh, M. S. (2015). Improving pulse eddy current and ultrasonic testing stress measurement accuracy using neural network data fusion. **Journal of IET Science, Measurement & Technology**, 9(4), 514-521.
20. **Mousavi, S. S.**, Ghazanfari, B., Mozayani, N., & Jahed-Motlagh, M. R. (2014). Automatic abstraction controller in reinforcement learning agent via automata. **Elsevier Applied Soft Computing Journal**, 25, 118-128.
21. Moghaddam, A. P., **Mousavi, S. S.** (2012). Learning Decision Tree Using Neural Network for Stability and Flexibility. Iranian Journal of Medical Informatics, IJMI. 1(3), 39-44.

## Reviewer

- **IEEE Transactions on Neural Networks and Learning Systems**
- **Computer Methods and Programs in Biomedicine - Journal - Elsevier**
- **Ad Hoc Networks - Journal - Elsevier**
- **Measurement - Journal - Elsevier**
- **IEEE 88th Vehicular Technology Conference**
- **International Workshop on Wireless sensors and Drones in Internet of Things (Wi-DroIT)**
- **Pacific Symposium of Biocomputing (PSB)**

## Patents and Invention Disclosures

- **F. Afghah, S. Mousavi, "ECG Language Processing (ELP) for Detection and Prediction of Cardiac Events", Patent submitted, Jun. 2020.**
- **F. Afghah, S. Mousavi, "Patient ECG Heartbeat Classification for Arrhythmia and Atrial Fibrillation Detection", Patent Pending, App. No.: 62801881, Jan. 2019.**

## Honors and Awards

- Awarded the Graduate Research Assistantship, the School of Informatics, Computing and Cyber Systems, Northern Arizona University, 2017-2020.
- Awarded the SICCS Travel Grant Program (TGP) grant to attend the IEEE BHI 2019 conference, the School of Informatics, Computing and Cyber Systems, Northern Arizona University, Spring 2019.
- Best Paper Recognition: My paper "Leader-follower based Coalition Formation in Large-scale UAV Networks, A Quantum Evolutionary Approach", Workshop on Wireless Sensor, Robot, and UAV Networks (at INFOCOM 2018).
- Recipient of the College of Engineering & Informatics Postgraduate Scholarship at the National University of Galway, Ireland, Oct. 2015. Total award value: €66,116.
- Ranked 77th among more than 20000 participants in the National University Entrance Exam (MS), Iran, 2010.
- Achieved the highest rank in the National University Entrance Exam among software engineering students, University of Zanjan, Iran, 2010.