

MAHZAD KHOSHLESSAN

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SUMMARY:

- +5 years of experience in Python, R, parallel computing and scaling programming models.
- Strong software engineering skills and computer science fundamentals.
- +3 years of experience leading complex, data-driven research projects to completion.
- Experience with computer vision, deep learning frameworks, edge computing and manipulating terabytes of data.
- Experience with time series, supervised/unsupervised methods, Bayesian statistics, statistical inference and building statistical models.

Areas of Expertise: High Performance Computing | Distributed Computing | Applied Computing | Machine Learning | Edge Computing | Predictive Modeling | Data Mining | Data Science | Statistical Analysis

EDUCATION:

Full Stack Deep Learning University of California Berkeley	02/2021 – 04/2021
Introduction to Artificial Intelligence with Python Harvard University	01/2021 – 04/2021
Product Management Bootcamp Product Tech Academy	12/2020 – 01/2021
AI for Business-Bertelsmann Technology Scholarship Program Udacity	12/2020 – 03/2021
Fellowship - Software Engineering Career Accelerator OutCo	09/2020 – 11/2020
M.Sc, Mechanical Engineering (Focus: Applied Math, HPC, Bioinformatics) Arizona State University, Tempe, AZ	08/2014 – 05/2019 GPA: 4.00/4.00
M.Sc., Aerospace Engineering (Focus: HPC, CFD, Aerodynamics) Amirkabir University of Technology, Tehran, Iran	09/2010 – 02/2013 GPA: 4.00/4.00
B.Sc., Aerospace Engineering Amirkabir University of Technology, Tehran, Iran	09/2006 – 06/2010 GPA: 4.00/4.00 (Top 5%)

TECHNICAL SKILLS:

Programming: Python, OOP, R, Mathematica, Fortran
Computer Science Fundamental: Algorithms, Data Structure, Package Dependency Management
Software Engineering & Data Mining: Git, Unix Shell, Docker, Numpy, Scipy, Pandas, Scikit-Learn, Flask, AWS
Databases & Parallelization: MPI, Open-MP, Global Arrays, Dask, Distributed, MapReduce, HDF5
Machine Learning: Hypothesis testing, Bayesian Statistics, General Machine Learning Algorithms
Analytic & Data Visualization: Matplotlib, Seaborn, Bokeh, ggplot
Deep Learning & NLP: Topic Modeling & Sentiment Analysis, DNN, CNN, PyTorch, Mxnet, TensorFlow, Keras
Computer: Linux (Unix), Windows, Latex, InkScape, MS

PROFESSIONAL EXPERIENCE:

MLH Fellowship Production Engineering Track Powered By Facebook	06/2021 – 08/2021
• <i>In this 12 week internship alternative I experience what it's like to work in Production / Site Reliability Engineering and DevOps.</i>	
Product Owner/Project Manager, Omdena Rooftop AI	03/2021 – Present
• <i>Classifying Rooftops Through Neural Networks to Eliminate Energy Waste of Facilities.</i>	
Computer Vision Research Engineer Disaster Management Group, LLC & Omdena-Freelancer	07/2020 – 08/2020

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- Built and fine-tuned a face recognition algorithm using Python, and Mxnet, resulted in 95% accuracy in facial recognition.
- Developed and automated the data flow pipeline system using Python, Mxnet, TensorFlow, Numpy, Pandas resulted in 15% improvement in desired output.

Lead Machine Learning Engineer (Two months voluntary project)

02/2020 - 04/2020

Omdena, World Energy Council (WEC) [Link](#), [Medium Article](#)

- Led team of 10 junior ML engineers to develop NLP models to analyze twitter scraped data and identify global challenges related to the energy transition.
- Measured global sentiment towards energy transition and decarbonisation by training sentiment analysis, topic modeling, and unsupervised algorithms using Python identifying meaningful insights from data.
- Created sophisticated interactive data visualization graphs utilizing Matplotlib and Scatter-text on the model outcomes delivering factors preventing the world from transitioning into clean energy forms.

Center for Biological Physics, Arizona State University

08/2016 - 05/2019

Research Data Engineer: [Link to Project](#)

- Prototyped ideas and approaches to identify and overcome barriers to progress in bio-molecular simulations: I/O and communication in parallel trajectory analysis ($O(100)$ GB to $O(1)$ TB).
- Leveraged modern HPC resources to accelerate analysis and achieved near-ideal scaling up to 384 cores which resulted in an almost 300-fold speed-up compared with serial execution (Python).
- Implemented various techniques to improve data ingestion which resulted in 2 new lab research directions and 4 articles. **Publications:** [Publication1](#), [Publication2](#), [Publication3](#), [Publication4](#).

Research Data Scientist: [Link to Project](#)

- Designed and developed a Bayesian nonparametric model for analyzing super-resolution microscopy data ($O(5)$ TB).
- Developed intricate MCMC algorithms capable of deep-dive statistical analysis enabling counting for high signal to noise ratios and low emitters' density.
- Analyzed and cleaned complex time-series data utilizing Dask, distributed computing & various data science libraries and conveyed what factors lead to slow free energy convergence.
- Developed pipelines for descriptive and explorative analysis of the large scale and noisy data ($O(50)$ TB in size) and optimized Python code utilizing software engineering best practices resulted in 15x speed-up.

PROJECT WORK:

Computer Pointer Controller, Intel Edge AI Scholarship-Udacity Nanodegree Program 12/2019 – 07/2020

Built a gaze detection model to control the mouse pointer of my computer on the edge. [Link](#)

- Built a computer pointer controller app using OpenVINO toolkit, Python, OpenCV to load and run multiple deep learning models simultaneously to estimate the eye gaze and control the computer pointer accordingly.

People Counter, Intel Edge AI Scholarship-Udacity Nanodegree Program 12/2019 – 07/2020

Built a People Counter app, including performing inference on an input video, extracting and analyzing the output data, then sending that data to a server. [Link](#)

- Built people counting model and deployed it on the edge, such that data on 1) the number of people in the frame, 2) time those people spent in frame, and 3) the total number of people counted are sent to a MQTT server.
- Optimized the model for inference with the OpenVINO Toolkit, and extracted useful information from the deployed models.

Smart Queue APP, Intel Edge AI Scholarship-Udacity Nanodegree Program 12/2019 – 07/2020

Built a smart queue app and proposed the most appropriate hardware solution by performing benchmarks on Intel DevCloud. [Link](#)

- Proposed possible hardware solution considering the use case scenario.

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- *Built out an application and tested its performance on the Intel DevCloud using multiple hardware types and identified best performing hardware.*

Counting, Graduate Student, ASU

Spring 2019

Molecular Counting & Single Molecule Localization Microscopy in Living Cells Using Deep-Learning, [Link](#)

- *Implemented an encoder-decoder CNN for analyzing super-resolution microscopy images extending the functionality to challenging high emitter densities and high signal to noise ratios scenarios.*
- *Modernized data processing pipeline by training through data parallelism on GPU led to 600 fold speed-up compared to the serial execution.*

PUBLICATIONS

- **Khoshlessan, M.**, Paraskevatos, I., Fox, G.C., Jha, S., Beckstein, O., Parallel Performance of Molecular Dynamics Trajectory Analysis, Concurrency and Computation: Practice and Experience, 2020, DOI:10.1002/cpe.5789; <https://onlinelibrary.wiley.com/doi/abs/10.1002/cpe.5789>.
- Paraskevatos, I., Luckow, A., **Khoshlessan, M.**, Beckstein, O., Fox, G.C., Jha, S., Task-parallel Analysis of Molecular Dynamics Trajectories, ICPP 2018, August, 2018, Eugene, OR, USA; <https://doi.org/10.1145/3225058.3225128>.
- **Khoshlessan, M.**, Paraskevatos, I., Jha, S., and Beckstein, O., Parallel Analysis in MDAnalysis using the Dask Parallel Computing Library, Proceedings of the 16th Python in Science Conference, pages 64-72, Austin, TX, 2017; DOI 10.25080/shinma-7f4c6e7-00a.
- **Khoshlessan, M.**, and Beckstein, O., Parallel analysis in the MDAnalysis Library: Benchmark of Trajectory File Formats, Technical report, Arizona State University, Tempe AZ. figshare 2017. doi:10.6084/m9.figshare.4695742
- **Khoshlessan, M.**, and Karimian, S.M.H., Detailed Numerical Study on the Aerodynamic Behavior of a NACA 0008 Airfoil Fitted with Gurney Flap in the Regime of Ultra-low Reynolds Number, Journal of Aerospace Technology and Management, 9(2), 2017; DOI: <http://dx.doi.org/10.5028/jatm.v9i2.631>.
- Kannan, K., **Khoshlessan, M.**, Herrmann, M., and Peet, Y., Detailed Numerical Study of Flow and Heat Transfer in Staggered Pin-Fin Arrays Within a Channel, Proceedings of the ASME 2016 TURBO EXPO & Turbomachinery Technical Conference & Exposition IDETC/CIE 2016 June 13-17, 2016, Seoul, COREA; DOI:10.1115/GT2016-57968.
- **Khoshlessan, M.**, Karimian, S.M.H., and Mani, M., Numerical Study of Transient Behavior of a NACA 0008 Airfoil Equipped with a Gurney Flap Using a Control-Volume Based Finite-Element Collocated Scheme (AIAA 2014-1109), 52nd Aerospace Sciences Meeting, 2014, 10.2514/6.2014-1109.
- **Khoshlessan, M.**, Karimian, S.M.H., and Daemi, N., Evaluation of a Control-Volume Based Finite-Element Collocated Scheme for the Solution of External Steady and Unsteady Incompressible Flows at Low Reynolds Numbers, 11th International Conference of Numerical Analysis and Applied Mathematics 2013, AIP Conf. Proc. 1558, 1421-1424 (2013); doi: 10.1063/1.4825783.
- Daemi, N., Karimian, S.M.H., Alisadeghi, H. and **Khoshlessan, M.**, Comparison of Different Schemes for Convection Modeling of Incompressible Flow Equations on Unstructured Grids, 11th International Conference of Numerical Analysis and Applied Mathematics 2013, AIP Conf. Proc. 1558, 1425-1428 (2013); doi: 10.1063/1.4825784.

HONORS & AWARDS:

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Scholarship Winner , the Nordic Probabilistic AI School (ProbAI) 2021	04/2021
Selected Review Committee Member , ML Reproducibility Challenge 2020	02/2021
Technical Interview Practice Fellowship , Interviewing.io	01/2021
Scholarship Winner , AI for Business-Bertelsmann Technology Scholarship Program	12/2020
Nominated & Finalist for Global Ambassador of the Year Award , Women Tech Network	10/2020
WE20 Registration Grant Award , SWE's WE20 Conference	10/2020
AI fellowship + Need-Based & Under-Represented Groups Scholarships , Insight Data Science (3% acceptance rate)	09/2020
Selected Hoppers for vGHC2020 , AnitaB.org's Grace Hopper Celebration	09/2020
Selected Member of the Data Science Track Review Committee , GHC 20	04/2020
Scholarship Winner , Intel Edge AI Scholarship-Phase1&2-Full NanoDegree	12/2019-07/2020
Member of Tau Beta Pi , The engineering honor society, ASU	2014-2019
Member of Exceptional Talents Office , Amirkabir University	2006-2013
National Masters & Doctoral Entrance Exam Exemption , Amirkabir University	2010/2012
Award by HESA for an aircraft design group project , Amirkabir University	2010

ACTIVITIES:

President of the Arizona Biophysical Society Student Chapter Arizona State University	05/2018- 05/2019
Global Ambassador, Influencer, Country Leader WomenTech Network	04/2020- Present

SELECTED GRADUATE LEVEL COURSES:

• Introduction to Artificial Intelligence	• Machine Learning & Statistical Learning
• Statistical modeling and data analysis for the physical and biological sciences	• Applied Linear Algebra
• Deep Learning	• Parallel Processing Methods in Numerical Analysis
• Edge computing & AI at the edge	• Spectral Methods