Maryam Berijanian

CURRICULUM VITAE, January 2024

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Deep Learning, Generative AI, Computer Vision, Natural Language Processing (NLP)

EDUCATION

SEP. 2022-PRESENT

PhD student in Computational Mathematics, Science and Engineering (CMSE)
Michigan State University, East Lansing, Michigan, USA
- Supervisor: Dr. Dirk Colbry
- Research field: Deep learning, Generative AI, Computer Vision, Natural Language Processing (NLP), Multi-modal Vision-Language Models, Generative Adversarial Networks (GAN), Image Segmentation, Digital Image Processing
- **Cumulative GPA: 4.0/4.0**
- Coursework: Computer Vision (taught by prof. Xiaoming Liu), Large Language Models, Generative AI, Parallel Computing, Mathematical Foundations of Data Science, Numerical Linear Algebra, Numerical Methods for Differential Equations

SEP. 2016-OCT. 2018

Master of Science in Systems and Control
Robotics and Mechatronics (RaM) group, Faculty of Electrical Engineering, Mathematics, and Computer Science, **University of Twente, Enschede, the Netherlands**
- Cumulative grade: 7.83/10 (Equivalent GPA: 3.742/4)
- Relevant coursework: Modern robotics, Robotics for medical applications, Digital control engineering, System identification & parameter estimation, Robust control, Mechatronic design of motion systems, Engineering system dynamics, Modeling and simulation, Dynamics & control, Measurement systems for mechatronics
- Thesis: Estimation of hepatic tumors respiratory motion using **machine learning algorithms** and surrogate signals, Mar.-Oct. 2018
Developing a robotic phantom to simulate respiratory motion of human liver, collection of surrogate signals (optical markers, inertial measurement unit (IMU)), image and signal post-processing, measurement of liver tumor displacement by an electromagnetic sensor, employing **machine learning algorithms** to estimate tumor location based on surrogate signals

DEC. 2013-AUG. 2015

Bachelor of Science in Mechanical Engineering (second B.Sc. degree)
Sharif University of Technology, Tehran, Iran
- Cumulative grade including Aerospace Eng.: 18.03/20 (Equivalent GPA: 3.776/4)
- Relevant coursework: Dynamics of machinery, Mechanisms design, Robotics, Measurement and control systems, Fundamentals of electrical engineering II
- Thesis (joint with Aerospace Eng.): Analysis and design of controller for Double-Inverted Pendulum

SEP. 2010-DEC. 2013

Bachelor of Science in Aerospace Engineering (first B.Sc. degree)
Sharif University of Technology, Tehran, Iran
- Relevant coursework: Automatic control, Intro. programming (C++), Dynamics, Fundamentals of electrical engineering I, Precision instruments, Engineering mathematics, Differential equations, Numerical methods

SEP. 2006-AUG. 2010

Pre-university Degree and High School Diploma in Mathematics and Physics
Farzanegan High School, **National Organization for Development of Exceptional Talents** (NODET), Tehran, Iran
- Cumulative grade: 19.48/20

Work Experience

Aug. 2023 Present	**Teaching assistant**, Computational Mathematics, Science and Engineering (CMSE) **Michigan State University**, East Lansing, Michigan, USA Responsible for course: Computational Modeling and **Data Analysis (with Python)**
Aug. 2021- Aug. 2022	**Research assistant**, Institute of **Imaging & Computer Vision** (LfB), Faculty of Electrical Engineering and Information Technology, **RWTH Aachen University, Germany** Development of novel methods for **synthesis and augmentation of digital images based on deep learning** to realistically enrich existing datasets for medical and diagnostic applications
Aug. 2021- Aug. 2022	**Teaching assistant**, Institute of **Imaging & Computer Vision** (LfB), Faculty of Electrical Engineering and Information Technology, **RWTH Aachen University, Germany** Teaching "**Machine Learning Lab Course"**, supervision of students for "Seminar Intelligent Processing and Analysis of Data", correcting examinations of course "Mathematical Methods of Electrical Engineering"
Apr. 2020- Jul. 2021	**Teaching assistant**, Institute for Rail Vehicles and Transport Systems (IFS), Faculty of Mechanical Engineering, **RWTH Aachen University, Germany** Responsible for teaching at exercise sessions and holding examinations of course "Principles of railway vehicle technology"
Jan. 2019- Jul. 2021	**Research assistant**, 3A group (**Automation, Autonomization, and Assistance systems**), Institute for Rail Vehicles and Transport Systems (IFS), Faculty of Mechanical Eng., **RWTH Aachen University, Germany** - Smart infrastructure monitoring via smartphone (detection of rail parts with wear based on acceleration **data analysis**) - Ride comfort evaluation via smartphone sensors - Infrastructure analysis via smartphone (speed estimation and vehicle recognition based on **machine learning and data analysis**, estimation of track geometry)
Oct. 2017- Jan. 2018	Intern, ASML Netherlands B.V., Veldhoven, the Netherlands Research, field of nonlinear control engineering, topic: nonlinear notch filter design for motion stages using hybrid integrator-gain systems (HIGS)
Mar. 2013- Jun. 2013	Teaching Assistant, Aerospace Engineering Department, Sharif University of Technology, Tehran, Iran Responsible for examinations of course "Heat Transfer I"
Mar. 2011	Teaching Assistant, Salam High school, Tehran, Iran Responsible for exercises for students of Mathematics and Physics

Inventions

Jan. 2020	"Fahrzeugtyperkennung aus Schalldruckpegel und Geschwindigkeit" (Detection of train vehicle types based on velocity and sound intensity with **machine learning** methods), Invention No. 239001020 (invention disclosure 1884), RWTH Aachen University, Germany.
Jan. 2020	"Ermittlung der Gleisgeometrie aus Beschleuigungs-, Gyroskop- und Lokalisierungsdaten" (Determination of railway geometry from acceleration, gyroscope, and GPS data), Invention No. 238901020 (invention disclosure 1859), RWTH Aachen University, Germany.

Grants and Funding

Aug. 2021	Applied for and secured funding with total amount of €83,080 for project "Smartphone-based Rail Data Acquisition (SPRaDA)" - Damage Analysis on Track via Smartphones, funded by German Federal Ministry of Transport and Digital Infrastructure (BMDV) as part of mFUND innovation initiative. Institute of Rail Vehicles and Transport Systems, RWTH Aachen University, Germany.

Publications

Jan. 2023	Berijanian, M.; Schaadt, N. S.; Huang, B.; Lotz, J.; Feuerhake, F.; Merhof, D.: "Unsupervised many-to-many stain translation for histological image augmentation to improve classification accuracy". Journal of Pathology Informatics 14, 100195, ISSN 2153-3539.
Nov. 2020	Berijanian, M.; Hampel, F.; Leibner, P.; Schindler, C.: "Accuracy of smartphone accelerometers for evaluation of rail vehicles ride comfort". Eisenbahntechnische Rundschau (ETR) 69, Int. Ed., pp. 29-33.
Jul. 2020	Berijanian, M.: Technical translation of chap. "Schienenverkehrstechnik 4.0 (Rail transport technology 4.0)" of the book "Handbuch Industrie 4.0: Recht, Technik, Gesellschaft (Industry 4.0 handbook: law, technology, society)" from German to English, author: C. Schindler.
Nov. 2019	Stübinger, L.; Hampel, F.; Hempel, T.; Berijanian, M.; Schindler, C.: "Kostengünstige, minimalinvasive und mobile Überwachung des Bahninfrastrukturzustandes mittels Smartphone-Sensorik (Inexpensive, minimally invasive and mobile monitoring of the rail infrastructure condition using smartphone sensors)". 2^{nd} International Railway Symposium Aachen (IRSA), Germany.
Jun. 2019	Berijanian, M.; Naghibi Beidokhti, H.; Sirmaçek, B.; Abayazid, M.: "Toward patient-specific estimation of hepatic tumors respiratory motion: A finite element-based **machine learning** approach". Paper presented at the 33^{rd} International Conference on Computer Assisted Radiology and Surgery (CARS), France.

Honors and Awards

Since 2024:	**Phi Kappa Phi**, oldest and most selective collegiate honor society in USA, Recognized for **multidisciplinary academic excellence**, Michigan State University.
Since 2024:	**Tau Beta Pi**, oldest engineering honor society in USA, Distinguished for **outstanding academic achievements in engineering**, Michigan State University.
2022:	Awarded **Engineering Distinguished Scholar (EDS) fellowship** of amount $62,485 from Michigan State University, awarded only to less than 20 outstanding applicants from across the College of Engineering.
2016 & 2017:	Received **University of Twente Scholarship** of amount €25000, awarded to top 50 students per year.
2015:	Member and scholarship recipient of Iran's **National Elites Foundation**.
2015:	**Ranked 5 out of 70 and 14 out of 120** students of Aerospace and Mechanical Engineering during Bachelor's degree studies, respectively.
2015:	Admission to the Master's Program in Mechanical Engineering at Sharif University of Technology, granted **without requiring the National Graduate Entrance Exam**, as awarded by the Ministry of Science.
2010:	**Ranked 540^{th} among more than half a million** participants in Nationwide University Entrance Examination for B.Sc. degree.
2008:	**Ranked 11^{th} among more than 80** teams participated in student Association for Computing Machinery (ACM) C++ programming contest, Sharif University of Technology.

Peer Review

Jun. 2023 | Reviewed a submission for Journal of Medical Artificial Intelligence, ISSN: 2617-2496

Personal Projects

Apr. 2021-Jul. 2021 | Sentiment analysis of news texts and **NLP using Apache MXNet**
- Text vectorization with embedding layers and pre-trained GloVe word vectors
- Shorten the vectorized texts with a **CNN** and max-over-time pooling
- Concatenate the text vectors and input them to a **fully connected layer**

Languages

Persian:	Native
English:	Advanced, last TOEFL iBT score (year 2021): 111/120
German:	High intermediate, CEFR level B2 certified
Dutch:	Elementary (reading comprehension)
Arabic:	Elementary (reading comprehension)

Computer Skills

Machine/Deep Learning:	PyTorch, Keras, TensorFlow, NLTK, spaCy, OpenCV, Apache MXNet, GluonCV, GluonNLP, Scikit-learn, Scikit-image, Transformers (by Hugging Face)
Programming:	Python, C++, Shell scripting (bash), Dart, Matlab, SQL, Arduino, QuickBASIC
Python Libraries:	NumPy, Pandas, SciPy, Matplotlib, Seaborn
Parallel/High-Performance Computing:	OpenMP, MPI
Mobile App Development:	Flutter and Android Studio
Web App Framework:	Flask
Database:	PostgreSQL
Software Development & Testing:	Code Review, Unit Testing, Maintaining Code
Version Control:	Git and GitHub
IDEs/Code Editors:	Visual Studio Code, PyCharm, Jupyter Notebook
Computer-aided Design:	AutoCAD, Solidworks, Solid Edge
Modeling and Simulation:	Matlab Simulink, 20-sim, Ansys, Fluent and Gambit
Documentation:	Writing Docstrings, Markdown, LaTeX, Microsoft Office
Operating System:	Linux (Ubuntu), MacOS, Windows

Leadership Skills

Mentorship:	Supervised MSc students' projects on deep learning in the Seminar "Intelligent Processing and Analysis of Data", Aug. 2021-22. Provided mentorship to high school students at Salam High School, Mathematics and Physics major, Mar. 2011.
Teaching Assistance:	TA for "Computational Modeling and Data Analysis," responsible for office hours, assisting and grading Python coding assignments, Aug. 2023 - Present. TA for "Principles of Railway Vehicle Technology", engaging in teaching, designing and grading exam questions. Apr. 2020 - Jul. 2021.

Interests and Activities

Volleyball, Tennis, Cycling, Ping-Pong, Zumba
Cooking, Traveling