

# Seyed Shayan (Shay) Daneshvar

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## Education

Jan 2023– present MSc, Computer Science, University of Manitoba, GPA: **4.5/4.5**, **Supervisor:** Dr. Shaowei Wang  
**Thesis Title (IP):** RAG-based Vulnerability Generation with Large Language Models  
**Courses:** Data-driven Software Engineering, Deep Learning with CNNs, Advanced Data Mining, Image-based Generative Methods in Machine Learning, Research Methodologies (all grades **4.5/4.5 - A+**).

Sep 2018– Aug 2022 BSc, Computer Engineering, K.N. Toosi University of Technology, GPA: **19.21/20** (US CGPA: **4/4, A+**), Ranked **2nd** in class of **76**  
**Thesis Title:** Reflection Removal of In-vehicle Images (19.5/20) **Supervisor:** Dr. Nasihatkon  
**Selected Courses:** Computer Vision, Natural Language and Speech Processing, Database Design, Advanced Programming, Algorithm Design, Differential Equations, Compiler Design, Microprocessors & AVR Assembly, Discrete Mathematics, Hardware & Software Co-design, Numerical Methods, Software Engineering II, Internet Engineering. (all grades **20/20**)  
Software Engineering I (19.9/20), Linear Algebra (19.9/20), Operating Systems (19.75/20), Theory of Languages & Automata (19.75/20), Engineering Mathematics (19.5/20).

Sep 2014– June 2018 High School Diploma, GPA: 19.39/20, Nemoone Allameh Helli, Ranked **1st**

## Fields of Interests

- Generative AI, Multimodal Large Language Models, Deep Learning, Computer Vision & Image Processing
- Data-driven Software Engineering, Automated Software Engineering, AI4SE, SE4AI, AIOps

## Honors and Awards

Jan 2023– Jan 2025 **University of Manitoba Graduate Fellowship (UMGF)**, C\$28000, University of Manitoba.  
Jan 2023– Jan 2024 **International Graduate Student Entrance Scholarship**, C\$6500, University of Manitoba.  
Aug 2022 Straight MSc. in Artificial Intelligence **Admission Offer**, Sharif University of Technology.  
Sep 2019– July 2020 **Dean's List Inclusion**, Computer Engineering Faculty's Dean, K. N. Toosi University of Technology.  
Sep 2018– July 2022 Full Tuition Fee **Waiver**, from K. N. Toosi University of Technology.  
Aug 2018 Ranked within the **Top 1%** Nationwide University Entrance Exam.

## Work Experience

Sep 2024– Jan 2025 Mitacs Accelerate Intern, **Generative AI for Digital Agriculture**, MacDon Industries Ltd.  
May 2022– Dec 2022 Senior Software Engineer, **Java Backend Developer**, Mahsan Co.  
June 2022– Nov 2022 Instructor, **Spring Cloud, Spring Framework, and Microservices Architecture**, Mahsan Co.  
Nov 2021– May 2022 Software Engineer, **Java & Kotlin Backend Developer**, Tosan Soha  
May 2021– Nov 2021 Software Engineer, **Java Backend Developer**, Pinket  
Jan 2020– May 2021 Instructor, **Java Core & Backend Web Development**, Mapsa HR  
June 2019– Sep 2019 Intern, **Backend Web Development**, Mapsa HR

## Academic Experience

June 2023– (Feb 2025)	Graduate Research Assistant, <b>ML4SE</b> , University of Manitoba, Supervisor: Dr .Shaowei Wang
June 2023– (Dec 2024)	TA, <b>Applied Computational Intelligence</b> , University of Manitoba, Supervisor: Dr .Ahmed Ashraf
Jan 2024– April 2024	Grader, <b>Machine Learning</b> , University of Manitoba, Instructor: Timothy Zapp
May 2023– April 2024	Grader, <b>Software Engineering I</b> , University of Manitoba, Instructor: Robert Guderian
Sep 2023– Dec 2023	Grader/TA, <b>Software Engineering II</b> , University of Manitoba, Instructor: Dr .Shaowei Wang
Sep 2023– Dec 2023	Grader, <b>Project Management</b> , University of Manitoba, Instructor: Dr .Shaowei Wang
July 2021– July 2022	Undergraduate Research Assistant, <b>Computer Vision</b> , KNTU, Supervisor: Dr .Behrooz Nasihatkon
Sep 2021– Feb 2022	Teaching Assistant, <b>Database Design</b> , KNTU, Instructor: Dr .Saeed Farzi
Feb 2021– July 2021	Head Teaching Assistant, <b>Operating Systems</b> , KNTU, Instructor: Dr .Hamed Khanmirza
Feb 2021– July 2021	Head Teaching Assistant, <b>Algorithm Design</b> , KNTU, Instructor: Dr .Ali Ahmadi
Sep 2019– Aug 2020	Head Teaching Assistant, <b>Advanced Programming</b> , KNTU, Instructor: Mehdi Zamanian

## Technical Skills

Languages	Java, Python, C#, Kotlin, C/C++, X86 & AVR Assembly, Javascript & Typescript.
Concepts	OOP, Design Patterns, Architectural Styles and Patterns, AOP, SQL/NewSQL & NoSQL Databases, Concurrency and Parallelism, Event-Driven Programming, TDD/BDD, Web Development, Microservices Architecture, Android Development, Deep Learning, Generative Models, LLMs, Transformers, CNNs, RNN and LSTM, Computer Vision and Image Processing, AI for Software Engineering, Generative AI, Agile Software Development & Project Management (Scrum & Kanban)
ML Frameworks	PyTorch, Tensorflow, Keras, Tensorflow Lite, HuggingFace, OpenCV, TensorBoard.
Web Frameworks	Spring Framework(MVC, Webflux, Cloud, Security, Data, Boot), Angular 2+.
Tools	LaTeX, Git, Gitlab, Docker, Nginx, Kafka, Hibernate, Flyway.
IDEs	Intellij IDEA, Pycharm, Visual Studio, VS Code, Apache NetBeans.
Databases	MySQL, Postgres, YugabyteDB, MS Server, MongoDB, Cassandra, SQLite.
Other Libraries	Hibernate, JUnit, Mockito, , JavaFX & WPF, Maven.
Operating Systems	Windows, Ubuntu Linux.

## Publications

N. Rezaei, **SS. Daneshvar**, B. Nasihatkon, S. Seidi, M. Rezazadeh, "The application of barcode readable assay and linear regression RGB analysis using a customized smartphone app in on-chip electromembrane extraction for simultaneous determination of heavy metal ions," *Microchemical Journal*, Volume 197, 2024. [DOI](#). Related to the **Visual Concentration Estimation** project.

**SS. Daneshvar**, Y. Nong, X. Yang, S. Wang, and H. Cai, "Exploring RAG-based Vulnerability Augmentation with LLMs," [preprint](#), 2024. [Submitted to ICSE 2025].

**SS. Daneshvar** and S. Wang, "GUI Element Detection with SOTA YOLO Deep Learning Models," [preprint](#), 2024.

## Language

Farsi (Native), English (Professional Proficiency - C1), Arabic (A2), French (A1), German (A1)

### TOEFL iBT (English)

Sep 2021– Sep 2023 Total: **100** | Reading: 22 | Listening: 30 | Speaking: 22 | Writing: 26

## Hobbies

Playing Electric Guitar, Weightlifting, Running, Hiking, Playing Tennis, and Reading Psychology

## Selected Projects

### Important Coursework Projects

Feb - Apr 2024

#### Single Image Reflection Removal with MAMBA

Role: Researcher | Image-based Generative Methods in ML | Professor: Dr. Chris Henry  
Replicated the best SOTA Single Image Reflection Removal model (DSRNet), created an image-based version of a SOTA state-space model (Mamba/S6), and replaced attention-based modules of DSRNet with Mamba modules to improve the performance of the model. I also investigated the effect of the Cosine Annealing learning rate schedule and AdamW's weight decay.

Oct - Dec 2023

#### Exploring Vulnerability Augmentation with Mixup-based Representation-level Techniques

Role: Developer & Researcher | Advanced Data Mining | Professor: Dr. Carson K. Leung  
Used various SenMixUp-inspired methods to augment vulnerable code samples, after transforming them into a vector format and before training. I also came up with a vulnerability-preserving heuristic to maintain the vulnerable state of code samples. *(To be published as a short paper...)*

Mar - Apr 2023

#### Brain Tumor Segmentation and Survival Rate Prediction with 3DUNet variants

Role: Developer & Researcher | Deep Learning with CNNs | Professor: Dr. Ahmed Ashraf  
3D Segmentation of Brain Tumors on BraTS2020 dataset. I created, trained, and tested 3 variants of 3D UNet, namely Vanilla 3D UNet, Residual 3D UNet, and 3D UNet with a custom Attention mechanism. I also used the segmentation results to train an FCN to predict survival rates.

Jan - Mar 2023

#### GUI Element Detection using SOTA YOLO models

Role: Researcher | Data-driven Software Engineering | Professor: Dr. Shaowei Wang  
An empirical study on GUI Element Detection with the latest small-sized YOLO models (5, 6, 7, and 8). Specifically, I compared SOTA YOLO models for detecting Android GUI elements and showed that Text Views are often misclassified while Drawers and Switches are easier to detect.

June - July 2021

#### BSc Thesis, Reflection Removal of In-vehicle Images

Role: Developer & Researcher | BSc Thesis | Professor: Dr. Behrooz Nasihatkon  
I built and trained two variations of UNet to remove or decrease the effect of the reflections of in-vehicle images such that the resulting picture would look natural. For the dataset, I used a dataset of real-world streets and road images (CamVid) to synthesize a new dataset with reflections of various objects.

June - July 2021

#### Soccer Player Detection & Classification

Role: Developer | Computer Vision | Professor: Dr. Behrooz Nasihatkon  
Detection & Classification of players & referees from a recorded soccer match & visualization of their location on the soccer field. I used the KNN background subtraction algorithm with basic morphology techniques for the detection task. I labeled over 3K pictures for the classification task and trained a CNN. I also used perspective transform to merge 3 cameras' videos and map coordinates to a flat birds-eye view field.

Oct 2020–Feb 2021

#### Dapixi.ir

Role: Product Owner & Developer | Software Engineering | Professor: Dr. Mehdi Esnaashari  
Dapixi is a free photo sharing website similar to Pinterest. Responsibilities: back-end web development in Java, minor bug fixes in the Angular front-end, and development of the content-based & collaborative filtering photo recommender systems in Python.

Apr – July 2020

#### Database & Web Application Design of a Website

Role: Developer | Database Design | Professor: Dr. Saeed Farzi .  
Database Design & Fullstack web development of a website similar to divar.ir.

### Other Major Projects

July 2021 – July 2022

#### Visual Concentration Estimation

Role: Android & Python Developer, Researcher | Supervisor: Dr. Behrooz Nasihatkon  
Detection of linear and QR barcodes including chemicals with CNNs, concentration estimation using linear and log-linear regressors, and outlier detection with PCA.

June – Sep 2021

#### Chibaladi.com

Role: Developer, Project Manager  
Backend design & development of the Chibaladi website. Chibaladi was a website for assessing developers' knowledge and recommending videos for closing their knowledge gaps.

## Certificates

September 2021	From Shallow to Deep Learning   ISMVIP.
August 2021	Fundamentals of Reinforcement Learning   IEEE KNTU Student Branch.
October 2019	Java Web Developer Certificate   Javacup Association.
Mar 2019 – present	Over 25 other certificates in various fields, mostly in Software Engineering   LinkedIn Learning.

## References

Dr. Shaowei Wang	Assistant Professor, Department of Computer Science, University of Manitoba. MSc supervisor and course instructor, Email: Shaowei.Wang@umanitoba.ca
Dr. Christopher Henry	Associate Professor, Department of Computer Science, University of Manitoba. Course instructor and Mitacs supervisor, Email: Christopher.Henry@umanitoba.ca
Dr. Behrooz Nasihatkon	Assistant Professor, Department of Computer Engineering, K. N. Toosi University of Technology. BSc supervisor and course instructor, Email: nasihatkon@kntu.ac.ir
Dr. Babak Nasersharif	Associate Professor, Department of Computer Engineering, K. N. Toosi University of Technology. BSc thesis examiner and course instructor, Email: bnasersharif@kntu.ac.ir
Dr. Lorenzo Livi	Associate Professor, Department of Computer Science, University of Manitoba. Initial MSc supervisor, Email: Lorenzo.Livi@umanitoba.ca
Dr. Ahmed Ashraf	Associate Professor, Department of Electrical and Computer Engineering, University of Manitoba. Course instructor, Email: Ahmed.Ashraf@umanitoba.ca