Seyed Shayan (Shay) Daneshvar

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Education

Jan 2023– April 2025 — MSc, Computer Science, University of Manitoba, GPA: **4.5**/4.5, **Supervisor**: Dr. Shaowei Wang
Thesis Title: Exploring Representation-level Augmentation and RAG-based Vulnerability Augmentation with LLMs for Vulnerability Detection
Courses: Advanced Data Mining, Deep Learning with CNNs, Data-driven Software Engineering Research Methodologies, Image-based Generative Methods in Machine Learning (all **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

Feb 2025	**Faculty of Graduate Studies Research Completion Award**, C$5000, University of Manitoba.
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

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

Technical Skills

Languages	Java, Python, C#, Kotlin, C/C++, X86 & AVR Assembly, Javascript & Typescript.
Concepts	OOP, GoF Design Patterns, Architectural Styles and Patterns, AOP, Prompt Engineering, RAG, 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

Citations: 9 - H-Index: 2

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. **[Q1, IF: 5.4]**

SS. Daneshvar, Y. Nong, X. Yang, S. Wang, and H. Cai, "VulScribeR: Exploring RAG-based Vulnerability Augmentation with LLMs," preprint, 2024. **[Under Revision for TOSEM - Q1, IF: 7.0]**.

SS. Daneshvar, D. Tan, S. Wang, and C. Leung, "A Study on Mixup-inspired Augmentation Methods for Sofware Vulnerability Detection," preprint, 2025. **[Accepted at EASE 2025, CORE A]**.

SS. Daneshvar and S. Wang, "GUI Element Detection with SOTA YOLO Deep Learning Models," preprint, 2024.

Language

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

Mar 2025– Mar 2027	**CELPIP-General (English)**, Total: **11** | Reading: 11 | Listening: 11 | Speaking: 11 | Writing: 11
Sep 2021– Sep 2023	**TOEFL iBT (English)**, Total: **100** | Reading: 22 | Listening: 30 | Speaking: 22 | Writing: 26

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 developed a vulnerability-preserving heuristic to maintain the vulnerable state of code samples.

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 Vanila 3D UNet, Residual 3D UNet, and 3D UNet with a custom Attenion 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 (with UNets)**

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.

Hobbies

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

References

Dr. Shaowei Wang	Associate Professor, Department of Computer Science, University of Manitoba. MSc supervisor and course instructor, Email: Shaowei.Wang@umanitoba.ca
Dr. Behrooz Nasihatkon	Assistant Professor, Department of Computer Engineering, K. N. Toosi University of Technology. BSc supervisor, co-author, and course instructor, Email: nasihatkon@kntu.ac.ir
Dr. Christopher Henry	Associate Professor, Department of Computer Science, University of Manitoba. Course instructor and Mitacs supervisor, Email: Christopher.Henry@umanitoba.ca
Dr. Carson Leung	Full Professor, Department of Computer Science, University of Manitoba. Course instructor, co-author, and MSc thesis examiner, Email: Carson.Leung@umanitoba.ca
Dr. Shayan A. Tabrizi	Tech Lead, Software Architect and Manager, Mahsan Co., Tehran. Supervisor and former colleague, Email: ShayanTabrizi@gmail.com
Dr. Ahmed Ashraf	Associate Professor, Department of Electrical and Computer Engineering, University of Manitoba. Course instructor and TA supervisor, Email: Ahmed.Ashraf@umanitoba.ca
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. Shaiful Chowdury	Assistant Professor, Department of Computer Science, University of Manitoba. MSc thesis examiner, Email: Shaiful.Chowdury@umanitoba.ca