Javad Sheikh ML Engineer | CV, Remote Sensing, Edge SDKs

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Summary

I am a machine learning engineer with experience designing and deploying computer vision solutions across OCR, remote sensing, and mobile applications. My work includes building an OCR SDK now used in production by a major bank, developing CNN-based segmentation and fusion pipelines for multi-source satellite data, and proposing data augmentation techniques for imbalanced visual datasets. I have worked hands-on with edge-oriented deployment tools (TensorFlow Lite), contributed to high-impact research in real-world image segmentation, and built full CV pipelines from data preprocessing to model training and optimization. I enjoy bridging practical CV challenges with solid ML foundations, especially in low-quality or constrained-image environments.

Employment History

2022 – Now   **Doctoral Researcher,** Department of Computing, University of Turku, Turku, Finland.

- **Developed** full computer vision pipelines for real-world remote sensing tasks, including segmentation and prediction models for sea ice and mineral deposits using multi-source satellite data (SAR + AMSR2).

- **Proposed** SEDA, a similarity-enhanced data augmentation method for addressing highly imbalanced datasets.

- **Co-authored** 7 peer-reviewed publications on sea ice segmentation, vessel prediction, mineral prospectivity, and ML methods for geospatial data.

2018 – 2019   **Mobile Application Developer,** Sibbank, Tehran, Iran.

- **Built and deployed** an OCR SDK for Android used by the Agriculture Bank of Iran; integrated real-time credit card scanning into mobile banking apps.

- **Trained and optimized** CNN models for mobile inference using TensorFlow Lite, focusing on reducing model size and latency for low-end Android devices.

- **Collaborated** with cross-functional teams to ensure robustness and reliability of the scanning experience across devices and lighting conditions.

Education

2023 – Now   **D.Sc. in Information and Communication Technology,** University of Turku, Turku, Finland.
Thesis title: *Advanced semantic segmentation of remote sensing data for Maritime and Mining applications*

2018 – 2021   **M.Sc. in Artificial Intelligence and robotics** Amirkabir University of Technology, Tehran, Iran.
Thesis title: *Anomaly detection on time series using deep neural networks.*

2013 – 2018   **B.Sc. in Biomedical Engineering** Amirkabir University of Technology, Tehran, Iran.
Thesis title: *Design and Implementation of mobile room lighting control equipment for patients with paraplegic patients.*

Technical Skills

- **Programming:** Python, C++, Java, SQL
- **Deep Learning Frameworks:** PyTorch, TensorFlow
- **Computer Vision:** OpenCV, MobileNet, custom CNNs, Unet, DenseNet

Technical Skills (continued)

- **Model Deployment:** TensorFlow Lite, Android SDKs, Docker
- **Data Handling & Tooling:** Pandas, NumPy, Scikit-learn, Git, GitHub, Azure
- **Other:** VS Code, GitLab, basic LaTeX

Selected Publications

2025   **Sheikh, J.**, Farahnakian, F., Zelioli, L., Heikkonen, J., *SEDA: Similarity-enhanced data augmentation for imbalanced learning.*, In: Pattern Recognition, Springer, 2025. DOI: 10.1007/978-3-031-78395-1_3

Proposed a novel augmentation method for improving robustness of visual classifiers under severe class imbalance.

2024   Farahnakian, F., **Sheikh, J.**, Zelioli, L., Nidhi, D., Seppä, I., Ilo, R., Nevalainen, P., Heikkonen, J., *Addressing imbalanced data for machine learning based mineral prospectivity mapping.*, Ore Geology Reviews, 2024. DOI: 10.1016/j.oregeorev.2024.106270

Applied ML to low-sample, noisy geospatial datasets under extreme class imbalance; techniques transferable to constrained computer vision tasks.

2023   **Sheikh, J.**, Farahnakian, F., Heikkonen, J., *Ice-water segmentation using deep convolutional neural network-based fusion approach.*, In: 2023 28th International Conference on Automation and Computing (ICAC). DOI: 10.1109/ICAC57885.2023.10275247

Trained CNN fusion models for multi-source segmentation under low resolution and low contrast conditions.

Sheikh, J., Farahnakian, F., Heikkonen, J., *Sea Ice Concentration Estimation via Fusion of Sentinel-1 and AMSR2 Based on Encoder-Decoder Architecture.*, In: 2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC). DOI: 10.1109/ITSC57777.2023.10422541

Built encoder-decoder models to estimate ice concentration using heterogeneous satellite imagery.

- Full publication list on my Google Scholar.

Teaching Experience

Spring 2024
Spring 2025   **Teaching Assistant for Computer Vision and Sensor Fusion,** Department of Computing, University of Turku, Turku, Finland.

Spring 2015   **Matlab Teaching Assistant,** Department of Biomedical Engineering, Amirkabir University of Technology, Tehran, Iran.

Projects

2021   **Retinopathy Detection Android App**
Developed an Android app for detecting diabetic retinopathy by retraining a DenseNet model. Deployed using TensorFlow Lite for real-time inference on entry-level phones under variable lighting conditions.

2020   **Automatic Weighing Lysimeter System**
Designed and assembled a sensor-based embedded system for soil moisture monitoring. Built the full hardware-software pipeline, including data acquisition, logging, and wireless transmission.

Brain Surgery Bipolar Electrocautery Simulator
Co-developed a haptic surgical simulator with real-time force feedback. Modeled tool-tissue interactions and implemented embedded control for electrosurgical training.

References

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