Bashir **Kazimi**

Deep Learning · Computer Vision

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Summary

Postdoctoral researcher at Forschungszentrum Jülich (FZJ) with interest and expertise in deep learning and computer vision.

Work Experience

Forschungszentrum Jülich

Aachen, Germany

Researcher

Feb. 2023 - Present

- Research on **deep learning** for **electron microscopy** data.
- Prototyping and implementation of **unsupervised**, **semi-supervised** and **supervised learning** models.
- Applications of **Generative Adversarial Networks (GANs)**, **Autoencoders** and **Diffusion Models**.
- **Denoising**, **super-resolution** and **segmentation** of transmission electron microscopy (TEM) images of nanoparticles.
- Implementations in **PyTorch/Lightning**.
- Data pre and post-processing and visualization with **Scikit-Learn**, **Pandas**, **Scikit-image**, and **Matplotlib**.
- Experiment tracking, monitoring and visualization with **Wandb**.

Helmholtz Center Hereon

Hamburg, Germany

Researcher

Apr. 2021 - Dece. 2022

- Research on segmentation of bone implants using deep learning and synchrotron radiation computed tomography (CT) data.
- Development of **active learning** methods well-suited for tasks with small amounts of annotated data.
- Implementations in Pytorch.
- Data analysis and visualization using **Fiji/ImageJ**.
- Contribution to a **web-service** for the active learning model to help users/domain experts apply segmentation on their data without having to learn or implement deep learning methods.

Leibniz University Hannover

Hannover, Germany

Researcher

Apr. 2017 - Apr. 2021

- Research on detection and description of historical man-made landscape structures.
- Prototyping and implementation of **self supervised learning** models (GANs and Autoencoders) to leverage large volumes of unlabeled data.
- **Transfer learning** with self-supervised pretrained models customized for and finetuned on downstream tasks (classification, semantic and instance segmentation) with **limited annotated data**.
- Worked on digital terrain models from airborne laser scanning data.
- Worked with the **ArcGIS** software and **Python Osgeo/Gdal** library for data processing.
- Used **Tensorflow** and **Keras** libraries for implementing deep learning models.
- **Published** papers and open sourced implementations for classification, semantic segmentation, and instance segmentation of archaeological objects in digital terrain data using deep learning.
- Helped **teach** master level courses: Internet-GIS (2017) and Environmental Data Analysis (2018 & 2020)

University of Melbourne

Melbourne, Australia

Visiting Researcher

Nov. 2017 - Dec. 2017

- Research visit as part of a **scholarship** award by **DAAD**: German Academic Exchange Service.
- Research collaboration between Institute of Cartography and Geoinformatics at Leibniz University Hannover and Department of Infrastructure Engineering at University of Melbourne.
- Worked on and **published** a paper for archaeological object detection in airborne laser scanning data.

Typeform S.L.

Barcelona, Spain

Quality Assurance Intern

Jul. 2016 - Mar. 2017

- Automated and manual software tests for featrues before being shipped for production.

Open University of Catalonia

Barcelona, Spain

Java Developer

Frb. 2016 - Jul. 2016

- Helped improve a website for students to upload programming assignments to be graded automatically.

Education

Leibniz University Hannover *Hannover, Germany*

PH.D. IN GEODESY AND GEOINFORMATICS *Apr. 2017 - Jul. 2021*

- Worked on applications of **deep learning** in **airborne laser scanning** data.
- Multiple **publications** and **projects** on detection of archaeological objects.
- **Dissertation** on *Self Supervised Learning for Detection of Archaeological Monuments in LiDAR Data* superivsed by Prof. Dr.-Ing. habil. Monika Sester

BarcelonaTech (Polytechnic University of Catalonia) *Barcelona, Spain*

M.SC. IN ARTIFICIAL INTELLIGENCE *Sep. 2015 - Apr. 2017*

- Fundamental courses and projects in **Machine Learning**, **Computer Vision**, and **Natural Language Processing**.
- **Master Thesis** in **Neural Machine Translation** supervised by Marta Ruiz Costa-jussà.
- **Publication** at International **Journal** of the Spanish Society for Natural Language Processing.

Middle East Technical University *Ankara, Turkey*

B.SC. IN COMPUTER ENGINEERING *Sep. 2010 - Jun. 2015*

- Got a Turkish Government **Scholarship** for undergraduate studies.
- Was part of a 4-people team that **built a social network** as a graduation project.

Skills

Languages	Persian (Native), Turkish (Advanced), English (Advanced), German (Goethe-B2)
Technical skills	Python, PyTorch/Lightning, Tensorflow/Keras, Pandas, Scikit-Learn, ArcGIS, Osgeo/Gdal, git, docker, SQL, Linux, Matploblib
Machine Learning	Linear/Logistic Regression, Clustering, Convolutional Neural Networks, Classification, Semantic Segmentation, Object Detection, Instance Segmentation, Prototyping, GANs, Autoecnoders, Vision Transformers, Diffusion Models

Awards and Fundings

Helmholtz Imaging Project Funding

DEEP-LEARNING ASSISTED FAST IN SITU 4D ELECTRON MICROSCOPE IMAGING" (FAST-EMI) *2023*

- Prof. Stefan Sandfeld and I, together with our collaborators, Prof. Christoph Kirchlechner and Dr. Subin Lee from Institute for Applied Materials – Mechanics of Materials and Interfaces (IAM-MMI), got the Helmholtz Imaging Project funding of 200K euros for the proposal of our project planned for 3 years.

Help a hematologist out Challenge *Hamburg*

3RD PLACE WINNING SOLUTION *2022*

- I took part in the Help a hematologist out Challenge at Helmholtz Incubator Summer Academy - From Zero to Hero, 2022 and joined the BLAMAD team. The theme of the challenge was to find creative domain adaptation solutions for blood-cell classification which is important for diagnosis of diseaeses such as anemia or leukemia. We used domain adaptation techniques and won the 3rd place among all participating teams.

Publications

[1] B. Kazimi and M. Sester, "Self-supervised learning for semantic segmentation of archaeological monuments in dtms," *Journal of Computer Applications in Archaeology*, vol. 6(1), pp. 155–173, Nov 2023.

[2] B. Kazimi, P. Heuser, F. Schluenzen, H. Cwieka, D. Krüger, B. Zeller-Plumhoff, F. Wieland, J. Hammel, F. Beckmann, and J. Moosmann, "An active learning approach for the interactive and guided segmentation of tomography data," in *SPIE*, vol. 12242, p. 122420F, 2022.

[3] B. Kazimi, *Self Supervised Learning for Detection of Archaeological Monuments in LiDAR Data*. PhD thesis, Leibniz Universität Hannover, 2021.

[4] R. Satari, B. Kazimi, and M. Sester, "Extraction of linear structures from digital terrain models using deep learning," *AGILE: GIScience Series*, vol. 2, p. 11, 2021.

[5] B. Kazimi, K. Malek, F. Thiemann, and M. Sester, "Effectiveness of dtm derivatives for object detection using deep learning," in *International Conference on Cultural Heritage and New Technologies 2019*, 2019.

[6] B. Kazimi, K. Malek, F. Thiemann, and M. Sester, "Semi supervised learning for archaeological object detection in digital terrain models," in *International Conference on Cultural Heritage and New Technologies 2020*, 2020.

[7] B. Kazimi, F. Thiemann, and M. Sester, "Detection of terrain structures in airborne laser scanning data using deep learning," *ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences*, vol. 5, no. 2, 2020.

[8] B. Kazimi, F. Thiemann, and M. Sester, “Semantic segmentation of manmade landscape structures in digital terrain models,” *ISPRS Annals of Photogrammetry, Remote Sensing and Spatial Information Sciences*, vol. IV-2/W7, pp. 87–94, 09 2019.

[9] B. Kazimi, F. Thiemann, and M. Sester, “Object instance segmentation in digital terrain models,” in *Computer Analysis of Images and Patterns* (M. Vento and G. Percannella, eds.), (Cham), pp. 488–495, Springer International Publishing, 2019.

[10] B. Kazimi, F. Thiemann, K. Malek, M. Sester, and K. Khoshelham, “Deep learning for archaeological object detection in airborne laser scanning data,” in *Proceedings of the 2nd Workshop On Computing Techniques For Spatio-Temporal Data in Archaeology And Cultural Heritage co-located with 10th International Conference on Geographical Information Science*, 09 2018.

[11] F. Politz, B. Kazimi, and M. Sester, “Classification of laser scanning data using deep learning,” *38th Scientific Technical Annual Meeting of the German Society for Photogrammetry, Remote Sensing and Geoinformation*, vol. 27, 2018.

[12] B. Kazimi and M. Costa-jussà, “Coverage for character based neural machine translation,” *Procesamiento del Lenguaje Natural*, vol. 59, no. 0, pp. 99–106, 2017.