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Yunus Serhat Bicakci, PhD

Researcher

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As a researcher with a PhD, I specialise in leveraging big data, machine learning, deep learning, and computer vision to address complex challenges across various domains. My work is driven by the transformative potential of data science and AI, particularly Large Language Models (LLMs) and Multimodal Large Language Models (MLLMs), to develop innovative solutions. Proficient in Python, R, and SQL, I also have a strong interest in Geographic Information Systems (GIS) for spatial analysis. Currently, I am focused on integrating geospatial and computer vision with LLMs and MLLMs to push the boundaries of AI capabilities.

Skills

Programming Languages	Python (strong), R (good), SQL (good)
Libraries	PyTorch, Tensorflow, Transformers (Vision Transformers), Pandas, GeoPandas, Numpy, Gradio, Streamlit
Tools	Git, Docker, HPC, CUDA, PostgreSQL, QGIS, ArcGIS

Experience

Assistant Professor | **Marmara University**, *Istanbul – Türkiye* 01/2025 — Present
Research Asssociate | **University of Glasgow** *Glasgow – UK* 06/2024 — 12/2024
Affiliate Academic | **University College London (UCL)** *London – UK* 01/2023 — 06/2024
Assistant Professor | **Marmara University**, *Istanbul – Türkiye* 06/2022 — 01/2023

Latest Projects

Multi-Lingual and Multi-Modal Location Information Extraction: Working on the this project in collaboration with The Alan Turing Institute and DSO National Laboratories, focusing on the development of a novel approach for geolocalization using Multimodal Large Language Models (MLLMs) and Retrieval-Augmented Generation (RAG) techniques. Achieved state-of-the-art street-level geolocalization accuracy (1 km) on benchmarks like IM2GPS, IM2GPS3k, and YFCC4k datasets. Designed a hybrid vector database integrating the Extended MP-16 and OSV-5M datasets, supported by open-weight models (e.g., Qwen2-VL-72B). Methodology optimized GPU resources and avoided expensive fine-tuning, showcasing competitive scalability for geospatial applications. 2024

Comparative Assessment of CNN and Transformer U-Nets in MS Lesion Segmentation: Conducted a comprehensive study comparing CNN-based and Transformer-based U-Net architectures for medical image segmentation of Multiple Sclerosis (MS) lesions. Evaluated six U-Net variants (e.g., U-Net, R2U-Net, TransUNet) on ISBI2015 and MSSEG2016 datasets using hybrid loss functions and multi-sequence MRI data. 2024

Interactive Crime Mapping with Big Data: Led the development of a cloud-based interactive crime mapping application. Integrated datasets from the London Metropolitan Police and geo-tagged tweets to produce real-time visualizations of crime patterns. Enabled dynamic user interactions, including datasets uploads and analyzes. 2023

Semantic Segmentation Model for Building Segmentation: Developed a novel deep learning framework, ATTransUNet, combining Attention Gated Networks and TransUNet for precise building segmentation using aerial imagery and LIDAR data. Achieved competitive IoU and BIoU scores (IoU: 0.7551, 0.8555; BIoU: 0.5613, 0.7127) in the MapAI competition. 2023

Education

PhD | **Geographical Information Technologies**, *Istanbul Technical University* 07/2021
MSc | **Management Information Systems**, *Sakarya University* 07/2013
BA | **Business Administration**, *Anadolu University* 06/2011

Certificates

TensorFlow Developer Certificate – Issued by: TensorFlow | Certificate 2022 – 2025
Google Machine Learning Bootcamp Turkey – Study time: 5 months – Google Developers & inzva | Certificate 2022
Deep Learning Specialization – Issued by: DeepLearning.AI | Certificate 2022

Latest Publications

Street-Level Geolocalization Using Multimodal Large Language Models and Retrieval-Augmented Generation Yunus Serhat Bıçakçı, Joseph Shingleton, Anahid Basiri. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing / in review* 2025

CNN and Transformer U-Nets in Multiple Sclerosis Lesion Segmentation: A Comparative Assessment Beytullah Sarıca, Yunus Serhat Bıçakçı, Dursun Zafer Şeker. *Biomedical Signal Processing and Control / in review* 2025

Big Data and Social Media Analytics: Opportunities for Interactive Crime Mapping Yunus Serhat Bıçakçı, Alina Ristea, Kate Bowers. *New Research in Crime Modeling and Mapping Using Geospatial Technologies*, edited by Michael Leitner, Springer Cham (2025), Geotechnologies and the Environment series. eBook ISBN: 978-3-031-81580-5 2025

ATTransUNet: Semantic Segmentation Model for Building Segmentation from Aerial Image and Laser Data. Yunus Serhat Bıçakçı, Beytullah Sarıca. *Nordic Machine Intelligence, 2(3)*. 2023