Yağız Nalçakan, PhD

Postdoctoral Researcher

Yonsei University, Seoul, Republic of Korea

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Education

Izmir Institute of Technology *Izmir, Turkey*

PhD Computer Science *02.2019 - 08.2023*

- Advisor: Prof. Dr. Yalın Baştanlar
- Thesis: Classification of Maneuvers of Vehicles in Front for Driver Assistance Systems
- GPA: 3.36/4.00

Seoul National University *Seoul, Korea*

Visiting Research Fellow (TUBITAK 2214/a Scholarship) *02.2022 - 09.2022*

Istanbul University-Cerrahpasa *Istanbul, Turkey*

MSc Computer Science *02.2017 - 02.2019*

- Advisor: Asst. Prof. Dr. Tolga Ensari
- Thesis: Diagnosis of Alzheimer's Disease with Deep Learning
- GPA: 3.75/4.00

Universita Degli Studi di Milano *Milano, Italy*

Computer Engineering (Erasmus Scholarship) *09.2013 - 12.2013*

Trakya University *Edirne, Turkey*

BE Computer Engineering *09.2011 - 08.2015*

- Undergrad research advisor: Prof. Dr. Yılmaz Kılıçarslan
- Undergrad Project: Sentiment Analysis with Machine Learning on Social Media Data
- GPA: 3.05/4.00

Work & Research Experience

Yonsei University - College of Computing *Seoul, Republic of Korea*

Postdoctoral Researcher *January 2024 - Present*

- Working on the development of a **multi-spectral camera** module for **3D semantic imaging** capable of **material and object recognition** for **autonomous driving** applications. This project is carried out together with KEIT and KATECH organizations.
- Developing a deep learning-based computer vision software for **perception and planning** to enable seamless autonomous driving in **adverse weather** and **unstructured environments**. This project, supported by IITP and ETRI, focuses on creating robust AI solutions to improve the safety and reliability of autonomous vehicles in challenging conditions.

Izmir Institute of Technology & TTTech Auto Turkey *Izmir, Turkey*

Research Scientist *February 2019 - April 2023*

- Worked in a The Scientific and Technological Research Council of Turkey (TUBITAK) 2244 project called "**Intelligent control system and safety in autonomous vehicles**" co-op with **TTTech Auto** Turkey.
- Developed expertise in video data analysis and deep learning techniques, specifically for the **prediction of vehicle maneuvers**. This included gaining a solid understanding of computer vision concepts, as well as proficiency in programming languages such as Python and libraries such as **OpenCV, PyTorch, TensorFlow, and Keras.**
- Contributed to a collaborative research project with TTTech Auto Turkey, gaining experience in **cross-functional teamwork** and communication with industry partners. This involved working closely with engineers and researchers from different backgrounds, as well as presenting project updates and results to stakeholders.
- Gained a deeper understanding of the practical challenges and opportunities in the field of **autonomous vehicles**, including the development of **intelligent control systems and safety features**. This included exposure to cutting-edge research and development in the field, as well as gaining experience in working with **real-world data** and constraints.

Izmir Institute of Technology *Izmir, Turkey*

Research/Teaching Assistant *February 2020 - December 2023*

- I have worked as a Teaching Assistant for a range of courses including Concepts in Computer Science, Programming Basics with Python, Analysis and Design of Algorithms, Image Understanding, Artificial Intelligence, Introduction to Machine Learning, and Deep Learning.
- Through my work as a Research Assistant, I have experienced an environment that has allowed me to hone my communication and leadership skills. I have interacted with faculty members and students on a daily basis, enabling me to communicate complex ideas effectively and develop my leadership skills by managing my time effectively and working collaboratively with others.
- Working closely with faculty members and students, I have gained practical experience in programming, data analysis, and artificial intelligence, and have kept myself updated with the latest trends and best practices in the field of computer science.

Seoul National University - Future Mobility Technology Center (FMTC) *Seoul, Korea*

Visiting Research Fellow *February 2022 - September 2022*

- Worked as a visiting researcher at Future Mobility Technology Center (FMTC) and Vehicle Dynamics Control Lab (VDCL) with a scholarship called "The Scientific and Technological Research Council of Turkey (TUBITAK) 2214-a International Research Fellowship Programme".
- Conducted research on **Self-supervised Learning on maneuver prediction** in collaboration with the VDCL team and the findings were published in Springer Nature's Signal, Image, and Video Processing Journal.
- Worked closely with M.Sc. students about their thesis work, providing guidance and support in developing their research proposals, conducting literature reviews, designing experiments, analyzing data, and presenting their findings.

ISM Technology - Propars *Istanbul, Turkey*

Backend Developer & ML Researcher *October 2015 - June 2017*

- Developed and maintained the backend of a web application that uses Python and the Django framework, facilitating e-commerce merchant sales across multiple platforms, including Amazon, eBay, Etsy, Hepsiburada.com, and N11.com.
- Employed PostgreSQL for database management, ensuring secure data storage, retrieval, and manipulation for the application's various components.
- Assembled integrations with each e-commerce platform's APIs, to establish product management, payment collection, and maintain consistency across the web application and each individual platform.
- Utilized an **image processing module** for merchants to update their images (i.e. remove background, change lighting, contrast, etc.)
- Developed a "**Customer-based automatic message reply**" algorithm that employs **natural language processing** & machine learning. The algorithm correctly classifies the incoming message with **%91 accuracy** and proposes a response to the user. That increased the customer happiness of each merchant by $\sim$ %**50**.
- Collaborated effectively with other developers and stakeholders, participating in agile development methodology(**Scrum**) to ensure the timely and effective completion of project milestones.
- Remained up-to-date with emerging trends and technologies in the field of e-commerce and web development, proactively identifying and incorporating new tools and methodologies into the web application's backend.
- Demonstrated strong problem-solving skills, regularly troubleshooting technical challenges associated with backend development, database management, and **API integrations**, using advanced programming and analytical techniques to resolve issues quickly and effectively.

DDI Technology and Informatics Solutions *Edirne, Turkey*

R&D Engineer (Student Researcher) *June 2014 - December 2014*

- Contributed to a TUBITAK-funded project called "ABBA automatic document classification system." while pursuing a bachelor's degree.
- Worked on developing an **OCR-based document classification system** that identifies and categorizes different types of documents. Played a key role in testing the system's classification algorithm.
- Collaborated with a team of engineers to refine and improve the accuracy and efficiency of the classification system. Gained valuable experience in working on cutting-edge technology projects and collaborating with cross-functional teams.

Publications

Journals

Nalcakan, Y., & Bastanlar, Y. (2023). Cut-in maneuver detection with self-supervised contrastive video representation learning. Signal, Image and Video Processing, 1-9.

Conference Papers

Nalcakan, Y., & Bastanlar, Y. Lane Change Detection with an Ensemble of Image-based and Video-based Deep Learning Models. In 2023 Innovations in intelligent systems and applications conference (ASYU). IEEE.

Nalcakan, Y., & Bastanlar, Y. (2022). Monocular Vision-based Prediction of Cut-in Maneuvers with LSTM Networks. International Conference on Science, Engineering Management and Information Technology, held March 4, 2022.

Yılmaz, R., **Nalçakan, Y.**, & Haktanır, E. (2022). A novel feature to predict buggy changes in a software system. International Conference on Intelligent and Fuzzy Systems, held August 24-26, 2021.

Aşıroğlu, B., Mete, B. R., Yıldız, E., **Nalçakan, Y.**, Sezen, A., Dağtekin, M., & Ensari, T. (2019, April). Automatic HTML code generation from mock-up images using machine learning techniques. In 2019 Scientific Meeting on Electrical-Electronics & Biomedical Engineering and Computer Science (EBBT) (pp. 1-4). IEEE.

Günay, M., Yildiz, E., **Nalcakan, Y.**, Aşiroĝlu, B., Zencírlí, A., Mete, B. R., & Ensarí, T. (2018, October). Digital Data Forgetting: A Machine Learning Approach. In 2018 2nd International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT) (pp. 1-4). IEEE.

Nalçakan, Y., & Ensari, T. (2018). Decision of neural networks hyperparameters with a population-based algorithm. 4th International Conference In Machine Learning, Optimization, and Data Science, September 13-16, 2018.

Book Chapters

Ensari, T., Günay, M., **Nalçakan, Y.**, & Yildiz, E. (2019). Overview of machine learning approaches for wireless communication. In Next-Generation Wireless Networks Meet Advanced Machine Learning Applications (pp. 123-140). IGI Global.

Awards, Fellowships, & Grants

2022	**International Research Fellowship**, The Scientific and Technological Research Council of Turkey (TUBITAK)	*$ 13,600*
2019 - 2023	**Graduate Research Fellowship**, The Scientific and Technological Research Council of Turkey (TUBITAK)	*₺ 150,000*

Outreach & Professional Development

Peer Review

The British Machine Vision Conference (BMVC)
The IEEE International Conference on Intelligent Transportation Systems (ITSC)
The IEEE Conference on Signal Processing and Communications Applications (SIU)
International Workshop on Assistive Computer Vision and Robotics (ACVR) - Workshop within the European Conference on Computer Vision (ECCV)

Technical Skill Set

Languages: Turkish(Native), English(Advanced), Italian(Intermediate)
Programming Languages: Python, C++
Deep Learning Frameworks: TensorFlow, Keras, PyTorch
ML, CV Libraries: OpenCV, Scikit-Learn, Transformers, Pandas
Tools and Development Environments: SQL, NoSQL, Git, Slurm