

Youssef Shoeb

Ph.D. Candidate || Research Engineer

Location: Berlin, Germany (Willing to Relocate)

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ABOUT

- Ph.D. candidate at TU Berlin and Research Engineer at Continental AG with 3 years of experience in computer vision and AI for autonomous driving. Specializing in uncertainty estimation, anomaly detection, and data-centric AI. Actively seeking applied research or engineering roles in the machine learning or computer vision domain.

EXPERIENCE

- **Continental AG** Berlin, Germany
Research Engineer *September 2022 - Present*
 - Part of the Research and Advanced Engineering department, where I work on developing and implementing methods and tools to collect and process data efficiently.
 - Developed methods for uncertainty estimation, out-of-distribution detection, anomaly segmentation, object tracking, and information retrieval for a data curation and active learning use case.
 - Developed automated data quality assessment and silent testing methods to detect model errors and validate perception algorithms.
- **Fraunhofer FKIE** Bonn, Germany
Research Assistant *November 2020 - July 2022*
 - Part of the Interoperability and Testing group, where I worked on setting up simulation environments and using reinforcement learning methods for optimization and evaluation.
 - Implementation and evaluation of different reinforcement learning algorithms for multi-agent environments.
 - Investigated the use of graph neural networks for creating a digital twin of a 5G communication network for a reinforcement learning network optimization framework.

EDUCATION

- **Technical University of Berlin** Berlin, Germany
Doctor of Science in Mathematics *Expected 2025*
 - **Research Focus:**
 - * Doctoral thesis: “Addressing Out-of-Distribution Data in the AI Model Lifecycle for Automated Driving Perception Systems”, emphasis on robust detection, analysis, and mitigation and recovery strategies for out-of-distribution data in automated-driving applications.
 - **Extra Activities:**
 - * Supervised multiple Master’s students, guiding research in out-of-distribution detection, anomaly segmentation, and related topics.
 - * Reviewer for major computer vision and intelligent vehicle conferences; recognized with an *Outstanding Reviewer Award* at BMVC 2024.
- **University of Bonn** Bonn, Germany
Master of Science in Computer Science *2022*
 - **Major:** Intelligent Systems.
 - **GPA:** 1,2/5 (German Scale - A).
 - **Awards:** 3rd place AFCEA Master’s thesis award
- **German University in Cairo** Cairo, Egypt
Bachelor of Science in Computer Science and Engineering *2020*
 - **GPA:** 1,2/5 (German Scale - A with High Honors).

SELECTED PUBLICATIONS

Research Papers

- Nayal, Nazir*, Youssef Shoeb*, and Fatma Güney. “A Likelihood Ratio-Based Approach to Segmenting Unknown Objects.” in *International Journal of Computer Vision (IJCV)*, 2025.
- Youssef Shoeb, Robin Chan, Gesina Schwalbe, Azarm Nowzad, Fatma Güney, and Hanno Gottschalk. “Have We Ever Encountered This Before? Retrieving Out-of-Distribution Road Obstacles from Driving Scenes.” In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2024.
- Youssef Shoeb, Azarm Nowzad, and Hanno Gottschalk. “Adaptive Neural Networks for Intelligent Data-Driven Development.” In *2025 IEEE Intelligent Vehicles Symposium (IV)*, 2025.
- Youssef Shoeb, Azarm Nowzad, and Hanno Gottschalk. “Out-of-Distribution Segmentation in Autonomous Driving: Problems and State of the Art.” In *Proceedings of IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2025.
- Youssef Shoeb, Nazir Nayal, Azarm Nowzad, Fatma Güney, and Hanno Gottschalk. “Segment-Level Road Obstacle Detection Using Visual Foundation Model Priors and Likelihood Ratios.” In *Proceedings of the 20th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications - Volume 2: VISAPP*, 2025.

Patents

- Youssef Shoeb, Gesina Schwalbe, Azarm Nowzad. “Vehicle, Apparatus, Computer Program, and Method for Out-of-Distribution Object Detection”, European Patent Office EP4465250A1 & International Patent WO 2024/235674 A1 (2024).
- Youssef Shoeb, Gesina Schwalbe, Oliver Rümpelein. “Vehicle, Apparatus, Computer Program, and Method for Detecting an Out-of-Distribution Object”, European Patent Office EP4553782A1 (2025).

SKILLS

- **Programming:** Python, C++, CUDA
- **Frameworks & Libraries:** PyTorch, OpenCV, scikit-learn, NumPy, Pandas.
- **Machine Learning:** Supervised/Unsupervised Learning, Active Learning, Anomaly Detection, Uncertainty Estimation, Reinforcement Learning, Information Retrieval.
- **Computer Vision:** Object Detection, Semantic Segmentation, Object Tracking.
- **Tools:** Docker, Git, SLURM

OTHER INFO

- For more information on publications, projects, and internships, please refer to my website [here](#)