Karlsruhe Institute of Technology
Institute AIFB
Research Group "Web Science"
M.Sc. Shuzhou Yuan
shuzhou.yuan@kit.edu

Call for Bachelor/Master Thesis:
"Revolutionizing Wake Vortex Detection with AI: A Neural Network Approach"

Background

Wake turbulence, created by aircraft during takeoff (Figure 1, left), can pose a significant safety risk for following aircraft during landing. To maintain stability and avoid destabilization, minimum separation distances between landing aircraft are established (Figure 1, right). To optimize airport capacity and promote environmental sustainability, we aim to develop a deep neural network capable of accurately detecting wake turbulence.

Figure 1: Visualization of the wake turbulence of the DLR research aircraft ATTAS (left); aircraft on final approach maintain a minimum distance from each other to avoid wake turbulence incursions (right).

Join our team in collaboration with DLR (Deutsches Zentrum für Luft- und Raumfahrt) and be at the forefront of wake vortex detection. Building on previous work using convolutional neural networks and state-of-the-art computer vision models like YOLO [1][2], you will have the opportunity to explore innovative approaches using cutting-edge technologies like graph neural networks and transformers. Your work has the potential to be published as state-of-the-art research and will provide valuable hands-on experience in the field of artificial intelligence.

What prerequisites do you need?

- Solid programming skills (e.g. Python).
- Strong foundation in machine learning, deep learning or artifitial intelligence.
- Experience in LiDAR data or graph neural network is a plus.

[1] https://opg.optica.org/directpdfaccess/2c598bbe-4298-468b-b153430b4a180650_471171/oe-30-8-13197.pdf?da=1&id=471171&seq=0&mobile=no
[2] https://elib.dlr.de/144976/1/2262567_Wartha_ENG5041P_Final_Report_20-21.pdf

Please send your requests with a transcript
of records and a short CV to:
Shuzhou Yuan
shuzhou.yuan@kit.edu