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Call for Bachelor/Master Thesis:

A Safe and Transparent AI Assistant for Air Traffic Control

Background

The safety of landing aircrafts is a critical concern, and wake vortex generated by preceding aircraft during landing can pose a significant threat to the succeeding aircrafts. The safety and efficiency of landing aircrafts heavily rely on the judgements of the air traffic controllers. In order to improve the safety, airport capacity, and environmental sustainability, more accurate, efficient, and transparent tools are needed.

In previous studies, many deep neural networks have been applied in order to automatically detect the wake vortex [1], and they have achieved intriguing results. However, the deep neural networks suffer from the problem of lacking transparency, as their decision-making mechanism is not human-interpretable. Therefore, they are not trustworthy enough in safety-critical tasks. For the current thesis, we decide to apply state-of-the-art algorithms in Explainable AI to improve the transparency of deep neural networks and to develop trustworthy assisting tools for the air traffic controllers.

Figure 1: The wake vortex generated by an aircraft during landing (left); aircrafts waiting to land while maintaining a safe distance (right).

Join our team in collaboration with DLR (Deutsches Zentrum für Luft- und Raumfahrt) and get an opportunity to work on a critical safety issue and at the forefront of wake vortex detection. Enhance your skills in cutting-edge technologies such as Graph Neural Networks and Explainable AI and potentially publish your research at a top computer science conference.

Prerequisites

- Good programming skills (e.g., in Python).
- Excellent communication and academic writing skills in English.
- Knowledge in Machine Learning, Deep Learning and Artificial Intelligence.
- Experience with Graph Neural Networks and Explainable AI is a plus.

Please send your questions and application (with a transcript of records and a CV) to:
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[1] https://arc.aiaa.org/doi/abs/10.2514/6.2021-2635