



Bachelor Thesis

14.09.2022

Feasibility of Airport Runway Surface Quality Evaluation using Open Satellite Imagery

Background

In commercial airports, runways are the rectangular paved zones dedicated for aircraft takeoff and landing operations. To ensure the latter efficiency and safety, airports are obligated to improve and report their runway contamination levels. Although this information is currently restricted to pilots and regulatory authorities, its transfer to the aeronautical research community can enrich open access databases useful for the development of AI-based applications, facilitate high-fidelity case-sensitive takeoff and landing simulations at specific airports, or enable independent third-party evaluation of airport services and quality management.

To overcome the outlined operational information confidentiality, this thesis will utilize Satellite Imagery Analytics to measure quality and frequency of rubber removal procedures in a few selected airports. For this purpose, a set of high-resolution images extractable from Google Earth Pro, or similar web mapping system, will be collected, cleansed, and analyzed. For image processing analysis, MATLAB algorithms are available, but should be further extended. The outcome of this thesis will define the feasibility of runway quality assessment using open source data and highlight basic limitations or potentials of integrating space-based surface scanning technologies in the air transport system.

Tasks

- Become acquainted with takeoff and landing operations and runway quality requirements.
- Familiarize with airport categories to formalize sample airports selection criteria.
- Collection and processing of satellite images of the selected runways touchdown zones.
- Development of comparative analysis model for runways rubber removal quality and frequency.
- Definition of potentials and limitations of the approach in addition to suggestions for further improvements.
- Discussion, documentation, and presentation of results.

Requirements

- Studies in aeronautical engineering, traffic engineering, automation, operations research, knowledge of basic image processing and data analytics is a plus.
- Good programming skills (MATLAB, Python, etc.).
- Professional written and spoken English or German.
- Structured, collaborative, goal-oriented mindset.

Begin, Duration and Place

Immediately (Sept. 2022), for about 3 months in Home Office & ILT

Contact & Application (CV, short cover letter)

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