

# Implementing Haar Cascade Classifiers for Automated Rapid Detection of Light Aircrafts at Local Airports

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## ABSTRACT

Over 97% of the U.S. airports are not equipped with control towers, which limits their ability to keep records of flight operations. This problem can be alleviated with implementation of an automated video-based air traffic surveillance system capable of detecting light aircraft operations, which comprise the vast majority of operations at non-towered airports. To this end, we propose a rapid automatic light-aircraft detection method based on Haar cascade classifiers. The video data are collected from three public-use Utah airports and used for detecting both arrival and departure operations of light aircraft. The proposed model is compared with two state-of-the-art deep neural networks – SSD and YOLO – which typically achieve high accuracy at the cost of decreased speed. The Haar cascade provides competitive accuracy at a much-reduced processing time, which makes the proposed method suitable for real-time applications.