Portable Machine Intelligent Gust Front Detection Algorithm
Technology #12756

Applications

This technology has applications in systems designed to provide wind shear warning to aircraft, particularly in terminal airspace during final approach or initial climb out.

Problem Addressed

Wind shear, a phenomenon where wind speed and direction changes drastically over a short distance, is a danger faced typically by aircraft close to the ground. Wind shear has caused fatal accidents in the past involving commercial airliners, and detecting wind shear and its impact on the flight is important because the low altitude of the aircraft makes recovery difficult.

Technology

The algorithm described by this technology works with sensor base data and a multidimensional image processing approach to detect gust fronts in the airport terminal area. The core technology of MIGFA is the use of knowledge-based image processing to examine the data for specific physical traits (signatures) relating to gust fronts: velocity convergence, thin lines representing frontal leading edges, and frontal motion, which are the three primary classes of signatures associated with convergent and wind shear hazards. The algorithm uses template based pattern recognition and pixel intensity to generate a set of interest images, a weighted combination of which are used to detect evidence of wind shear. The algorithm is also capable of predicting wind shear 10 to 20 minutes ahead. (Please see technical brief no. 12755 for additional information).

Advantages

- Works with different sources of Doppler data
- Uses adaptable software methodology

Categories For This Invention:

Software (Copyright)
Other (Software)

Intellectual Property:

Copyright Software

Inventors:
Publications:

MIGFA: The Machine Intelligent Gust Front Algorithm for NEXRAD
Amer. Meteor. So
2005

External Links:

Lincoln Laboratory
http://www.ll.mit.edu/

Image Gallery: