Safety Line: big data applied to air transport

Risk estimation in air transport using machine learning

PROBLEM DESCRIPTION

The data from airplane's flight recorders (black boxes) are stored by companies, but they remain unused, except when an incident occurs. Our idea is to detect risky situations from these data, even for an eventless flight.

CHALLENGES AND GOALS

Develop an algorithm to detection of risky flights and to find variables which could be related to these risks. Propose a ready-to use implementation. H2020 SOCIETAL CHALLENGES: A changing world inclusive, innovative and reflective societies PRODUCTIVE SECTOR: Logistics and Transport MATHEMATICAL AND COMPUTATIONAL METHODS

The aim of this work was to use machine learning techniques on flight data. The objective was to use a bottom-up strategy, starting from the question of finding flights which were potentially dangerous, even though no accident occured.

A first analysis indicates that data are highly dependent. Random forests were successfully applied to select relevant data from the events under consideration. This method was afterwards extended to multivariate functionnal data, allowing for the use of more general criteria.



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Results and Benefits

The method proved to be efficient in several relevant use-

cases. A software was developped, using this algorithm:

FlightScanner. This software is now available as a product

of the company.

The presented work was Baptiste Gregorutti PhD, supervised by G. Biau, B. Michel, and P. Saint-Pierre. Since then, B. Gregorutti has been hired as a researcher in data science then as a research manager.

New product allowing for efficient data analysis of flight data

Use of up-todate **machine learning** algorithms in a risk management software

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