Abstract:

Almost half of the world's population is carried by airlines each year, and understanding this mode of transport is important from economic and scientific perspectives.

In recent years, the increasing availability of data has led to complex network and agent interaction models which attempt to gain better understanding of the air transport network and develop forecasts.

In this case study paper, we review existing research on two key approaches, namely: (1) a top-down multi-scale network science approach, and (2) a bottom-up entropy-maximization interaction network approach

Using simple socioeconomic indicators, we were able to construct a very accurate interaction model that can predict traffic volume, and the model can forward estimate the impact of population growth or fuel cost.

Organisation:

In Sect. 2, we give a literature review of bottom-up approaches such as spatial interaction models that have been applied to different transport scenarios.

Focus will be on both pair-wise models such as the gravity law and the radiation model, as well as the Boltzmann-Lotka-Volterra (BLV) competitive interaction model [17].

A small-scale test case of its application to the air transport network will be given.

In Sect. 3, we give a review of top-down network science analysis on the air transport network.

unlocking insights into the global transportation network with tableau.

References:

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3.Verma T, Araujo N, Herrmann H (2014) Revealing the structure of the world airline network. Sci Rep 4:5638

4.Zhou Y, Wang J, Huang G (2019) Efficiency and robustness of weighted air transport networks. Transp Res Part E Logist Transp Rev 122:14–26

Conclusions:

Almost half of the world's population is carried by airlines each year, and understanding this mode of transport is important from economic and scientific perspectives.

In this case study paper, we reviewed both bottom-up (max. entropy agent model) and top-down (network science) approaches to better understand the fundamental science behind air transport networks

In Sect. 2.2, using simple socioeconomic indicators, we were able to construct a very accurate entropy-maximization interaction model that can predict traffic volume for Australia.

Using the population and distance functions, the spatial interaction model can forward estimate the impact of population growth.

See an example