

FRANK TAKES Leiden Institute of Advanced Computer Science

Mapping the structure of soccer violence and the corporate elite

It is a favourite of conspiracy theorists: how secret elites hold all the power in the corporate world. Frank Takes has the computer algorithms and data to support or refute those theories. He studies how millions of businesses worldwide are interconnected by mutual board members and shared ownership. He also discovered that even football hooligans have an elite.

By Arnout Jaspers

Big data is not just a matter of collecting huge amounts of data, it is about extracting meaningful knowledge from these data. Frank Takes is interested in network science: studying interactions between objects in the data to better understand the information represented by the data. Apart from efficient algorithms, this requires domain knowledge from data experts. He therefore works closely together with social scientists at the University of Amsterdam.

One example of Takes' work is the corporate board interlock network: it links companies all over the world based on shared board members. By analysing this huge network, Takes can identify elites constituting powerful old boys' networks. Companies are also linked by owning shares in other companies. 'This reveals the global power of particular countries,' says Takes, 'but also the strategic positions of certain countries as offshore financial centres.'

Traditional algorithms, used for decades by social scientists to dissect corporate networks, would take years of computing time because of the sheer size of this data. Takes developed



Computer scientist FRANK TAKES studied and obtained his PhD in computer science in Leiden. He is now a postdoc and lecturer at Leiden University, as well as a researcher at the University of Amsterdam.

algorithms that perform these tasks in minutes: 'We make use of special properties of real world networks: for instance, they are sparse, having relatively few links. Also, they are 'small worlds', which means that on average any node is only a few links away from all other nodes. Our algorithms can mine patterns in real world networks that were so far intractable.'

This work makes it possible to characterise tax havens, but it can also unveil patterns in the activities of soccer hooligans. Takes, who also worked with the Dutch police: 'This allows us, to some extent, to move on from just describing, to actually predicting what these violent groups will do.' Takes works on many other applications, such as improved suggestions for playlists on Spotify. He especially enjoys the multi-disciplinary part of his research: 'I regularly co-author publications in the social sciences. For perhaps twenty percent, I've also become a social scientist.' ❧