

Herbert Hamers

“CentER and Department of Econometrics
and Operations Research, Tilburg University”

“Game theoretic centrality analysis of terrorist networks”

Abstract

The identification of key players in a terrorist network can lead to prevention of attacks, due to efficient allocation of surveillance means or isolation of key players in order to destabilize the network. We introduce a game theoretic approach to identify key players in terrorist networks. The advantage of this approach is that both the structure of the terrorist network, which usually reflects a communication structure, as well non-network features, which represent individual parameters like financial means or bomb building skills, can be taken into account. The application of our methodology results in rankings of the terrorists in the network. We illustrate our methodology by two case studies: Jemaah Islamiyah’s Bali bombing and Al Qaeda’s 9/11 attack, which has led to new insights in the operational networks responsible for these attacks. The calculation of the Shapley value plays an important role in this methodology. Since both cases can be represented by relatively small networks, the determination of Shapley value is not time consuming. However, in larger networks the Shapley value may not be determined in polynomial time. In literature several attempts have been made to approximate the Shapley value. A short overview on existing literature on approximating the Shapley value is presented. Finally, the first step to a new approach is presented.