Patterns of Jihadist Terrorism Using Transition Networks: an Exploration on Target Selection

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Research Aim

This work will focus on world’s four most active jihadist groups and employ a hybrid stochastic-network approach to understand:
(a) what are the similarities and differences in terms of target selection patterns among these groups;
(b) if terrorist target selection exhibits memory, and
(c) if we can benefit from network science to improve target prediction.

Data

Data come from the Global Terrorism Database (henceforth GTD). For the purposes of this work we analyzed data regarding attacks of the most active jihadist groups from 1970 to 2016, namely the Taliban, the Islamic State of Iraq and the Levant (ISIL), Al-Shabaab and Boko Haram.

Results

A. Normalized Transition Similarity Coefficients for Target Trails

<table>
<thead>
<tr>
<th>Group</th>
<th>Attack Frequency</th>
<th>First Attack</th>
<th>Last Attack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taliban</td>
<td>5,610</td>
<td>0.71</td>
<td>04/20/1995</td>
</tr>
<tr>
<td>ISIL</td>
<td>3,518</td>
<td>2.6</td>
<td>4/18/2013</td>
</tr>
<tr>
<td>Al-Shabaab</td>
<td>1,697</td>
<td>0.5</td>
<td>11/2/2007</td>
</tr>
<tr>
<td>Boko Haram</td>
<td>1,891</td>
<td>0.69</td>
<td>7/27/2009</td>
</tr>
</tbody>
</table>

Boko Haram and Al-Shabaab are detected as the most similar groups (NTS=1), followed by ISIL and Boko Haram (0.91). Boko Haram and Al-Shabaab are the less active groups (both in absolute values and frequency), but they share a very high amount of transitions, highlighting that they seem to follow almost identical patterns of attack when targets are considered. Furthermore, Boko Haram proves to be also very similar to ISIS, in spite of the high diversity in terms of period of activity, absolute number of attacks and frequency

B. Predicting future target using baseline and network derived Markov Chains

We have built 8 different Markov Models - one for every Jihadist group and for each of the groups we modelled two different Markov Chains one using all targets as Markov states and one using Louvain groups as Markov states.

To calculate the quality for each of the Markov Chains we use the percent of correctly predicted targets divided by the total number of predictions over 10000 iterations. Such process is used for prediction of next 1, 2 and 3. We observe that, on average, using the dynamic network based approach yields better prediction accuracy.

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