Understanding Boko Haram

Boko Haram was founded in 2002 in Maiduguri, the capital of the Nigerian state of Borno. During its early years, Boko Haram lacked the resources and technology to wage a sophisticated terror campaign. However, with help from major transnational terror groups, Boko Haram has become one of the most dangerous terrorist groups on the planet.

Boko Haram gained the global spotlight on April 15th, 2014, when the group abducted 276 schoolgirls from their school in the town of Chibok. Unfortunately, most of the girls who did not escape on the first day would remain in Boko Haram’s hands for years, and many are still unaccounted for.

Researchers now at NSAIL carried out the first comprehensive study of Boko Haram that brings advanced data-driven, machine learning models to both learn models capable of predicting a wide range of attacks carried out by Boko Haram, as well as develop data-driven policies to shape Boko Haram’s behavior and reduce attacks by them.

Understanding Boko Haram’s Behavior

Researchers now at NSAIL developed the first ever predictive model of Boko Haram. Using, at the time, 7 years of data, NSAIL researchers learned temporal probabilistic (TP) rules. A TP-rule has the form “if condition $C$ is true in the environment within which a terror group is operating, then the group will carry out an attack of type $A$ sometime in the next $d$ months.” Our book on Boko Haram presents over 39 such TP-rules covering the following types of attacks: abductions, arson attacks, sexual violence, suicide bombings, targeting of government officials, attacks against security installations, looting, and attempted, but unsuccessful bombings. Some of the key findings about Boko Haram’s attack behavior are given below.

**Shutdown of Boko Haram Locations** seems to be counter-productive in terms of reducing the subsequent occurrence of sexual violence, suicide bombings, arson, and abductions.

**Executions of Boko Haram Personnel by the Government of Nigeria** are negatively linked with incidents of arson, abductions, and targeting of government officials. When such executions do not occur, Boko Haram carries out significant attacks in succeeding months.

**Suspension of Military Aid to the Government of Nigeria** is linked to a reduction in incidents of both arson and attacks on security installations in subsequent months. However, just the opposite occurs as far as looting is concerned – suspension of military aid is followed by periods when Boko Haram goes on looting sprees.

**Reports of Use of Child Soldiers** have a strong positive relationship with virtually every kind of attack carried out by Boko Haram. When such reports are present, there is a positive link to occurrence of sexual violence, suicide bombings, attempted bombings, arson, and abductions. Release of abducted prisoners by Boko Haram is also positively linked to reports of the use of child soldiers.

Protesters carry signs that read “Bring Back Our Girls” to bring attention to the one-year anniversary of the kidnapping of hundreds of Nigerian schoolgirls. Source: [https://www.theguardian.com/world/2015/apr/14/anniversary-boko-haram-kidnapping-chibok-schoolgirls](https://www.theguardian.com/world/2015/apr/14/anniversary-boko-haram-kidnapping-chibok-schoolgirls)

Predicting Boko Haram Attacks

Our team has developed NTEWS, a machine learning framework within which we can generate forecasts about future attacks Boko Haram. The NTEWS forecasting engine uses an ensemble approach to generate such forecasts. NSAIL researchers have put out real forecasts of Boko Haram attacks during the 2019-2021 period. NTEWS will start generating continuing monthly forecasts of Boko Haram attacks, starting September 2022. The assessment of the accuracy of these forecasts suggest that for most types of attacks, we are able to make predictions with over 90% accuracy.
Policies to Reshape Boko Haram's Behavior

The TP-rules that predict Boko Haram behavior play a very valuable role in helping formulate data-driven policies that can help mitigate attacks by Boko Haram. Researchers currently at NSAIL have previously developed algorithms that take a set of TP-rules and automatically generate policies that can help mitigate such attacks. They introduced a new paradigm called action probabilistic logic programs or ap-programs. An ap-program uses a form of reasoning called abduction in order to make predictions. While deduction tries to infer new hypotheses from a given body of knowledge, abduction finds a way to infer possible hypotheses which, when combined with existing knowledge, will imply a given set of desired outcomes. Ap-programs can be used even when there are constraints about what can or cannot be done which is certainly the case with Boko Haram. Researchers now at NSAIL made several important policy recommendations. For instance, NSAIL researchers have discovered that a cocktail of 3 actions to be performed and 2 actions not to be performed will reduce the number of Boko Haram attacks substantially.

Impact of our Work

Prior work on Boko Haram by researchers now at NSAIL have been widely disseminated to relevant stakeholders in the national security community and presented at leading international venues.

Additional Information

Accolades for our work on Boko Haram

"This study enhances situational understanding and helps to discern the intentions and predict the activities of terrorist organizations like Boko Haram. The study shows which courses of action, by the military on the ground or policy decisions in the capital, are related in due time to the stepping up of kidnapping and sexual violence. The study is a great contribution to international crisis-management."

Geert Kuiper, Director of Strategy and Research, Netherlands Ministry of Defense

References


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Northwestern

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