

Associate Prof., Dr Babych, B. (University of Leeds, UK, b.babych@leeds.ac.uk)
Associate Prof., Dr Atwell, E. (University of Leeds, UK, e.s.atwell@leeds.ac.uk)

MULTILINGUAL INFORMATION EXTRACTION FRAMEWORK FOR REAL-TIME DETECTION OF TERRORIST PROPAGANDA THREATS IN ON-LINE COMMUNICATION

We describe a framework for intelligent real-time detection and analysis of suspected security threats in electronic communication across different languages. Our approach combines machine translation (MT), information extraction (IE) and text similarity detection technologies that will be applied to a corpus of electronic communication in suspected terrorist networks on social media, websites, comments and blogs used for radicalization and terrorist propaganda. The framework is now being developed by the Translation Studies and Artificial Intelligence groups at the University of Leeds and is part of a Horizon2020 proposal submitted in collaboration with several European law enforcement bodies and leading industrial security companies from 6 EU countries, which combines technologies developed by other partners, such as automated analysis of hand-written messages, photo and video materials, detection of manipulated images, network analysis for graphs describing connections and sharing of messages on social media for suspected terrorist groups.

Traditionally IE in security applications focused on detection of illegal terrorist activity, i.e., real threats of attacks; however, terrorist propaganda and religious fundamentalism, although not strictly illegal in democratic countries, are increasingly used by terrorist networks as a powerful tool for ideological justification of causes for terrorism, for recruitment and radicalization, creation of local cells whose activity is much more difficult to detect. The novelty of our approach is identification and tracing terrorist propaganda and disinformation messages over electronic media in real time, which allows analysts to detect their sources, prioritize significance and scale of the threat and identify appropriate facts, messages and resources for countering these specific propaganda attacks.

Our framework includes a statistical MT system trained on a corpus of Arabic, Ukrainian and Russian translations into English, and an English IE system, which identifies patterns of propaganda messages and calculates their distributional semantic similarity across multiple documents. The IE system searches for templates defined in terms of automated morphological annotation and uses our ontology of ideological and religious concepts which can be used by terrorist groups for radicalization, inciting hatred and violence, recruitment, training, fundraising and justification of terrorist ideology. On-going work in our team concentrates on automatic learning of ontologies from corpora, automated reasoning for ontologies using description logic, pattern and event similarity detection for multidocument IE, modeling language distortion, such as shortening, misspellings, dialectological and alphabetic variations, non-literal statements, such as metaphors and euphemisms.

The system will be developed and tested in partnership with the European law enforcement and security organizations, but will also potentially benefit community-led volunteer anti-terrorist groups, which can be assisted by the system in countering terrorist ideology and propaganda.