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Spotting the Islamist Radical within: Religious Extremists Profiling in the United State

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Abstract

The war on terrorism, radicalism and violent extremism is no longer confined to the battlefield; it has become omnipresent in the recent years with militant, terrorists and insurgent groups actively recruiting new technologies as platform to impel their ideologies worldwide. Nonetheless, one thing remains constant in the fight against radicalism equation, that is, the information about radical individuals, whether personal, demographical, social or economic information. The ability to identify, classify and profile potential radicals based on such information has an appealing trait for security agencies around the world. The Intelligence and Security Informatics research field emphasizes the importance of engaging multidiscipline technologies to provide security-related applications that serve as aiding tools in combating terrorism and other forms of violent extremism. In this paper, the authors focus on radical Islamism and hypothesize that Islamist radicals have identifiable information and behavioral traits that could be utilized to identify their ideological motive uniquely amongst other radicals. Four different supervised machine learning algorithms are applied to validate this hypothesis using the “profiles of individual radicalization in the United States” dataset and their performance is compared and discussed. The evaluation results support the authors’ hypothesis and show that profiling religious extremists can be achieved with high recall and precision using machine learning models.

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Keywords: Radicalization; Terrorism; Islam; USA; Machine Learning; Deep Learning; Naïve Bayes; Gradient Boosting Machine; Distributed Random Forest; PIRUS dataset;

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1. Introduction

Over the past forty-five years (1970-2015), extremism, radicalism, and terrorism ideologies have fulminated evidently as demonstrated by the rapid augmentation in the number of terrorist incidents worldwide and the severity of fatalities associated with each incident as revealed by the Global Terrorism Database (GTD)¹. Unfortunately, the number of terrorist activities that have targeted the Organization for Economic Cooperation and Development (OECD) countries during 2015 was the highest since 2000 and it was the second worst year in terms of death casualties after 2001 as reported by the Global Terrorism Index². In 2015 alone, there was over eleven thousand terrorist incidents worldwide resulting in more than twenty-eight thousands death³. Whereas in 2016, a study by PeaceTech Lab has showed that 1,441 terrorist attacks have occurred around the world with over fourteen thousand fatalities³. Whilst in the first half of 2017 (ending on 31th of May), the number of terrorist attacks have reached 520 attacks, which have resulted in 3,565 fatalities according to the Terrorist Incidents Map⁴.

Since 2014, the threat of “*lone wolves*” terrorist attacks has increased significantly⁶. This was contributed to the shout out by the Islamic State of Iraq and Syria (ISIS/ISIL/Daesh) to their supporters on September 22nd, 2014 to carry on terrorist attacks on the countries that are participating in or are supporting the Global Coalition against Daesh including many OECD countries^{2,6}. As a result, the United States was heavily targeted by ISIS inspired attacks with almost third of all the attacks that have targeted OECD countries from 2014 to mid-2016 were in the United States². A study by the Institute for Economics and Peace (IEP) has showed that religious extremism has dramatically increased since 2000 in addition to embodying the leading ideology behind terrorism in the Middle East and North Africa (MENA) region, Sub-Saharan Africa and South Asia⁷.

Although the terms radicalism, terrorism and violent extremism are widely used, they remain poorly defined and often conflated, as they are exonym by nature^{8,9}. In this context, the following definition of the term **violent extremism** is adopted as “*encouraging, condoning, justifying, or supporting the commission of a violent act to achieve political, ideological, religious, social, or economic goals*”¹⁰. Whilst the term **radicalism** is defined as the “*process of developing extremist ideologies and beliefs*”⁸. On the other hand, **Islamist radicalism** is defined as “*a militant methodology practiced by Sunni Islamist-Salafists who seek the immediate overthrow of incumbent regimes and the non-Muslim geopolitical forces which support them, in order to pave the way for an Islamist society which would be developed through martial power*”⁹.

Exploiting technology such as artificial intelligence, machine learning and data mining in the fight against terrorism, radicalism and violent extremism especially on social media has captured researchers’ attention in the past seventeen years^{11, 12}. Consequently, Intelligence and Security Informatics (ISI) has emerged as a trending interdisciplinary research area where advanced information technologies, systems, algorithms, and databases are studied, designed and developed for international, national, and homeland security-related applications^{11,13,14}. Several universities have collaborated with local and national security agencies by establishing research centers for studying terrorism. For example, the Chicago Project on Security and Threats (CPOST) based at the University of Chicago¹⁵, and the National Consortium for the Study of Terrorism and Responses to Terrorism (START), which is a center of excellence of the U.S. Department of Homeland Security based at the University of Maryland¹⁶.

The Empirical Assessment of Domestic Radicalization (EADR) project is a research study aiming to provide better understanding of radicalization and violent extremism in the United States⁹. As part of the EADR project, the Profiles of Individual Radicalization in the United States (PIRUS) dataset has been constructed¹⁷. The PIRUS dataset is considered the largest known database on individual radicalization in the United States. It contains information about 1,473 individuals embracing Islamist, far right, far left or single-issue radical ideologies and covering sixty-six years (1948-2013) of radicalization data with 147 features divided into six main categories (i.e. personal, demographics, socioeconomic, radical group, radicalization ideology and extremist activities information) and multiple subcategories.

In this study, the authors aim to test their hypothesis that Islamist radicals have identifiable information and behavioral traits that can be utilized to identify their ideological motive uniquely among other radicals. In order to validate this hypothesis, the PIRUS dataset has been employed to build a classification model for Islamist radicals in the USA. The performance of four different supervised machine learning algorithms (i.e. deep learning, distributed random forest, gradient boosting and naïve Bayes) has been evaluated using a cutting-edge big data analysis platform (i.e. H2O). Two main evaluation metrics have been used, which are the generalization error metrics (i.e. accuracy, F1-score, precision and recall) and the model training-time. Moreover, the effect of considering the classification problem

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