

Development of an Intelligence Framework for Spotting Suicide Bombers Using SmartPLS.

Moradeke Grace Adewumi¹, Sunday Rufus Olojuolawe²

¹Department of Computing and Information Science, ²Department of Technical Education

Bamidele Olumilua University of Education, Science and Technology, Ikere Ekiti.

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ABSTRACT

Suicide bombing is an act of terrorizing lives and properties in a community. Despite the advancement in military Munitions to combat terrorist activities, there exists a global rise in terrorism almost daily. Terrorism is an act committed by an unidentified group or individual with the intent to damage or jeopardize a community's safety. Development of an intelligent model for spotting suicide bombers in a crowd is expedient. Document analysis and interview protocol were used to gather facts from the security experts in South Western Nigeria to get the variables that they possibly used to identify terrorists. Their responses were analyzed thematically to form constructs and sub-constructs that were used for the questionnaires for the study. The responses from the questionnaires were used to form the latent variables for the study, which was analyzed using SmartPLS 4. The PLS-SEM algorithm stopped when it reached the stop criterion of $1.0E-7$ (i.e., 0.0000001). The reliability of the model was measured using Cronbach's Alpha and Composite Reliability (CR) when items have factor loading of (≥ 0.7). The convergent validity was measured using The Average Variance Extracted (AVE) at (0.500). The result shows that the only variables that can be used to form an intelligent framework for suicide bombers are training and location.

Keywords: Intelligent, Suicide bomber, SmartPLS, Terrorist.

INTRODUCTION

Suicide bombing has been an agent of destruction in Nigeria today. A terrorist or anyone who conducts a bombing with the intent or expectation of killing both himself and other people is known as a suicide bomber. Suicide bombers engage in a variety of violent crimes, such as ambushes, killings, bombings, kidnappings, open conflicts with law enforcement, and the use of homemade explosive devices. (Kingdom et al., 2015). The insurgence of terrorists in Nigeria began in 2014 and has gained national attention since 2015 with bombing attacks and killings that led to the death of several policemen, soldiers, and civilians. Research has shown that a series of attacks occurred in a crowd, among which are the mosque attack of 12th March 2022 in Kaduna; the Owo massacre of 7th June 2022, and the mosque attack at Gunmi local government, Zamfara State on 24th of September, 2022 to mention a few. The absence of peace or its fragility, as a result of this terrorist act, over 2.3 million population have been rendered homeless while many lives have been lost and many lives injured (Tochukwu *et al.*, 2020). Therefore, the role of spotting suicide bombers is expedient. According to Bloom, (2017) terrorist attacks are masterminded and carried out by loosely knit groups of individuals; they function inside murky networks that are hard to pinpoint and identify, and when they are apprehended, their sponsors shield them from justice. The first step toward hindering these terrorists is to understand how they structure their organizations: where and when they normally strike, whom they target, and different propaganda messages used to create chaos in society. Therefore, the focus of this study will be on the development of a model that can be used to spot suicide bombers in a crowd to promote and maintain lasting peace in society.

Peace implies the promotion of sustainable economic, and social development, equality between women and men, democratic participation, tolerance, the free flow of information, and disarmament. United Nations report (2009) emphasized the imperatives of peace against ending the war. Peace is about putting in place the institutions and trust that will carry people forward into a peaceful future (Touo, 2020).

Problem Statement

The insecurity issues in Nigeria have been worrisome, despite the efforts of the Security services to curtail the menace, the situation continued to be deplorable. The uprising of terrorists has presented genuine security difficulties to Nigerians. Individuals have been prevented from exercising their fundamental human rights in society and have been denied the usual opportunity of contributing to the nation's development because of fear of assault from members of the insurgents. Especially in some areas of Northern Nigeria where terrorists have assumed control through suicide bombers and launching violent assaults on innocent people (Mustapha & Hamid, 2019). The increased wave of crime and general insecurity has resulted in people of average caliber taking extra precautions by spending a huge part of their income on personal security such as erecting high fences that are equipped with barbwire or electric wire, engaging security monitors and dogs, fixing of alarm gadgets in cars, installation of CCTV in homes of residence among others. The less privileged are being attacked almost daily. It seems that the government of Nigeria is incapacitated to forestall the incessant bombing rate. Thus, this study developed a model for spotting suicide bombers in a crowd.

Aim of the study

The main objective of this study is to develop an intelligent gathering framework for spotting suicide bombers in a crowd.

The specific objectives are:

1. To explore the constructs of security intelligence for spotting suicide bombers through document analysis.
2. To explore the constructs and sub-constructs of security intelligence for spotting suicide bombers from the perspective of security personnel in Nigeria.
3. To develop a security intelligence Framework for the constructs identified in (ii) above.

Research questions

1. What are the constructs for security intelligence based on document analysis?
2. From the perspective of security personnel, what are the constructs and sub-constructs of security intelligence?
3. What is the framework for spotting a suicide bomber?

LITERATURE REVIEW

Suicide bombing can be seen as a tactic of terrorism, which was also argued to be a rational behavior by Enders and Sandler (2006). Terrorism is an aggression carried out by individuals or groups of people against human beings.

(Adewumi *et al.*, 2022) identified some variables that can be used to identify suicide bombers while in a crowd; however, she did not develop the model for the variables identified. Binstock and Minukas, (2010) worked on a model that can increase the probability of identifying a suicide bomber at a checkpoint or in a marketplace with an adequate standoff distance. The researcher incorporated sensors with unique detection threshold values. The model was not generalized. Ji *et al.*, (2012) developed a system for security footage that automatically identified human behaviour using convolutional neural networks (CNNs) by forming a deep learning model which operated directly on the raw inputs. Kowalski *et al.* (2015) worked on developing a measurement approach and a set of studies for the detection of concealed objects inside clothing using the infrared and terahertz regions. (Bloom, 2017) believes that many of the people involved in terrorism are not religious zealots and do not routinely practice their faith. Many could be considered religious beginners because they lack religious literacy. (Fox *et al.*, 2017) worked on Mathematical modeling and simulation for the detection of suicide bombers. The aim was to use radar sensors to detect humans wearing a suicide bomb vest with detonation wires. Ahmet & Mustafa,

(2021) believed that over the past 20 years, suicide terrorism has grown in popularity as a tactic used by terrorist groups. They underlined that more study is still necessary despite the rise in empirical studies on suicide terrorism. Ali, *et al.*, (2020) emphasized the effectiveness of border fences in stopping terrorism, smuggling, and illegal immigration. The fuzzy technique of order of preference by similarity to ideal solution (Fuzzy TOPSIS) was employed to determine the effectiveness of the border in stopping terrorism, smuggling, and illegal immigration. This does not stop the individual inspection. Galehan, (2021) investigated the methods used by female bombers to infiltrate targets, the kinds of targets they successfully target, and if the gender of the bomber influences the infiltration strategy and the outcome of the bombing mission. The findings showed that female bombers increased the group's overall usage of females in operational roles by successfully infiltrating soft targets with high casualties using a range of infiltration strategies. Amusan and Oyewole, (2015) investigated that there have been a series of attacks on civilians, and security agencies, destruction of public and private properties and kidnappings in a year for some years now. Thousands of people have been killed through bomb blasts, gun shots, arson and other violent attacks from the terrorists while several students of both elementary and higher institutions have been kidnapped and cannot be found till date. Over 250 high school female students at Chibok Girls High School in Borno state, 180 students at Baptist school kaduna state of Nigeria, just to mention few. (Aliyu, Moorthy, and Idris, 2015; Onapajo and Usman, 2015). Despite the security measures deployed by the Nigerian state and its surrounding countries to respond to insecurity, the sect remains capable of initiating significant attacks.

METHODOLOGY

This study was conducted in the South Western Nigeria which comprises six geo-political states that are most easily accessible to the researchers. The concerned states are Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti State. The study was conducted among the senior serving and retired security personnel in the zones due to their wealth of experience.

The study used the sequential exploratory mixed method because of its ability to provide a superior research result in terms of validity and depth (Blenker *et al.*, 2014; Johnson & Onwuegbuzie, 2013). The results of the qualitative data were further analysed using the quantitative approach for more understanding and generalization of the results obtained.

The population for the study consisted of security experts in southwestern Nigeria. The region was considered for the study because of the time frame available for the completion of the study. The purposive sampling technique was used to arrive at the 7 participants that were determined by saturation. The sample for the quantitative phase consisted of 120 respondents who were purposefully selected from among the security officials in southwestern Nigeria. 100 questionnaires were returned (response rate = 83.33%). Due to missing data, 20 questionnaires were not taken into consideration. The SmartPls 4 was used for the analysis of the quantitative data. The option became important because of the need to generate the relationships between the latent variables and factor loading at 0.7 to arrive at a perfectly fit model.

RESULTS AND FINDINGS

The direct observable responses of the research participants were an interview process that was audio-recorded and handwritten. Seven participants were involved in this stage because the interview stopped when the saturation stage was reached (when there were no new ideas from the respondents).

The analysis was done thematically as shown in Table 1 and with Nvivo 12 software to feature out the variables that were used for the questionnaires. The interview protocol was conducted among the major stakeholders of the security personnel in South Western Nigeria. The quantitative phase involved the collection of statistical data using research questionnaires on the constructs and sub-constructs of suicide bombers from the perspective of security personnel. A closed-ended questionnaire was used to elicit responses from the respondents to determine the constructs and sub-constructs of suicide bombers (Vagias, 2006). The researchers used simple random sampling to select the required sample for the study. To ensure the validity of the instrument, it was pilot-tested at Ikere- Ekiti Area Division Police Station. Table 1 shows the analysis of the interview protocol.

Table1: Thematic Analysis

Questions	RESPONSES	RESPONDENTS	CODES	THEMES
How can you describe a suicide bomber?	A suicide bomber is a person, especially a terrorist, who carries out a bomb attack with the intention or expectation of killing himself as well as others.	RP1, RP2, RP4	Meaning	Description
Do suicide bombers exist?	Yes, they exist in our communities	RP1, RP2, RP7	Existence	Visibility
How can we know a suicide bomber?	by carrying heavy luggage, wearing a backpack, keeping hands in pockets and repeatedly patting upper body, critical observant, intelligent aids, vigilant, silence	RP1, RP2, RP3, RP4, RP5, RP6, RP7	Actions	Altitude
	walking with deliberations, sweating or anxious before detonation, may hold hands on head and shout a phrase, pale face from recently shaved beard on male. Focus and steering, looking for a way to blend, doesn't listen to authority, can be praying by whispering to himself.	RP1, RP3, RP5	Appearance	Emotion
How do they appear?	Loose clothes or out of synchronize with the weather, by putting on a bigger dress than himself, looks suspicious of himself and people.	RP2, RP4, RP6, RP7,	Dressing	Outlook
Where do they normally target?	Social gatherings, churches, mosques and schools.	Pp1, pp3, pp6, pp7,	Location	Target
How do they feel?	No obvious emotion, inappropriate emotional state, eyes focused and vigilant, does not respond to authoritative voice or command or direct salutation from a distance. May appear to be in trance.	RP1, RP2, RP3, RP4, RP5, RP6, RP7	Emotion	Attitude
Which religion do they belong to?	Common among Muslims, the mode of dressing depicts action, the use of hijab, use of alimajeris boys.	RP1, RP3, RP6, RP7	Religion	Dressing
How can they be identified?	It requires intelligent training.	RP1, RP3, RP5	Training	Technology

The summary of the participant's responses is shown in Table 2.

Table 2: Summary of the thematic study

Construct	Respondents						
	Rp1	Rp2	Rp3	Rp4	Rp5	Rp6	Rp7
Emotion	/	/		/		/	

Appearance	/	/	/	/	/	/	/
Religion	/		/			/	/
Actions	/	/	/	/	/	/	/
Training	/		/		/		
Location		/	/	/			/
Posture	/	/		/		/	
Dressing	/		/				/

The above constructs were used to develop the questionnaires that were sent to some selected communities in Ondo State for pilot tests. 20 community leaders were involved. It was ascertained that the variables used for the study are reliable at a composite reliability of 0.7 and covariance alpha of 0.5. The questionnaires were later administered to the six states within the southwestern part of Nigeria. The responses from the respondents were entered into an Excel sheet which was saved as a comma delimiters CSV file that was imported into SmartPLS version 4, which generated indicators that were used to develop the model for the study. This research used SmartPLS-4 software for the partial least square structure Equation Modelling (PLS-4) technique because it is good for predictive validity (Shah and Jan 2021). This is shown in Fig. 1.

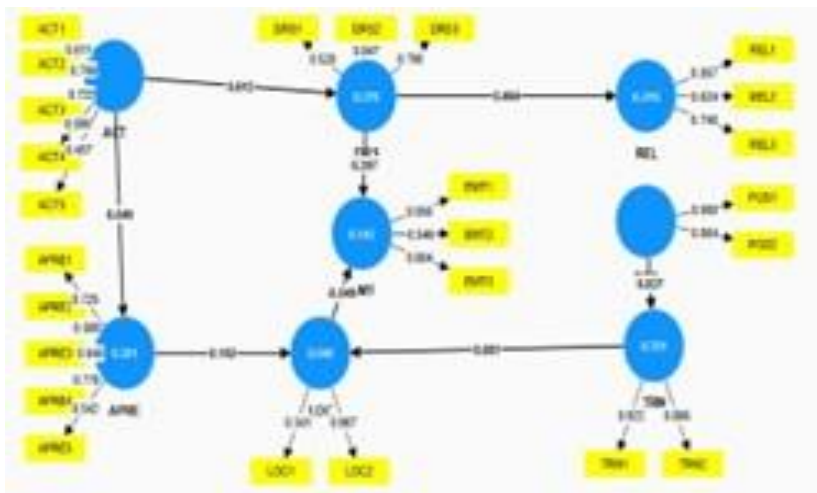


Fig. 1: Model Graphic.

From the list of 8 latent variables that were presented for analysis, ranging from the appearance of the suicide bomber, action displayed, emotional conduct, mode of dressing, posture, religion, location, and training as deduced from the literature and interview protocol, only 15 estimated variables met the threshold of 0.7 out of the total 25 measured constructs. This is shown in Table 3.

Table 3: The constructs and sub-construct of security intelligence

S/N	VARIABLES	LATENT CONSTRUCT CODE	DESCRIPTION	FACTORS LOADING
1	Appearance	APR1		0.725
		APR2		0.680
		APR3		0.684
		APR4		0.778

		APR5	0.542
2	Action	ACT1	0.611
		ACT2	0.722
		ACT3	0.590
		ACT4	0.457
3	Emotion	EMT1	0.880
		EMT2	0.546
		EMT3	0.804
4	Dressing	DRS1	0.528
		DRS2	0.847
		DRS3	0.790
5	POSTURE	POS1	0.900
		POS2	0.864
6	RELIGION	REL1	0.857
		REL2	0.624
		REL3	0.740
7	LOCATION	LOC1	0.341
		LOC2	0.987
8	TRAINING	TRN1	0.922
		TRN2	0.886

DISCUSSION

The study has shown clearly that not all the constructs for analysis are suitable for consideration in the proposed framework for suicide bomber identification. Under appearance, APR1 (carrying heavy luggage) and APR4 (anxiously looking). The factors exhibited a significant relationship of >0.7 . Similarly, ACT2 (wearing black packs) was regarded as significant for inclusion in the model with a high value of 0.722.

Emotion depicts the state of mind. This has two variables for the inclusion with a value of 0.880 and 0.804. In the same vein, dressing has three variables with a significant relationship of 0.847, and 0.790 respectively. Posture in the mosque, church or in any social gathering and the body language exhibited could determine the intent of a suicide bomber. These two variables show a significant relationship and need to be watched out for. The study negates the assumption that the wearing of Hijabs by the Muslim faith worshipers is synonymous with suicide attacks. This assumption was rejected with a model value of 0.624, and consequently, it is not fit for consideration in the final proposed framework. A loading value of 0.987 implies that one should be very watchful while attending social gatherings or functions. Such places are prone to suicide attacks. The security agencies should be more alive in such places and display a high level of professionalism too. Summer, (2010) notes that environment and situations should be viewed as related factors to suicide terrorism. Training is very important in overcoming or at least reducing the menace of suicide bombers. Most importantly, there should be an emphasis

on intelligent gathering. This would help the security agencies to track, diffuse, and arrest the bombers before any harm is perpetrated. This recorded a significant value of 0.922 and 0.886 respectively.

CONCLUSION

The study was based on the need assessment conducted in Nigeria due to the rising rate of insecurity and, more importantly, the spreading of the activities of suicide bombers across the country.

Data were obtained from the primary sources to ensure that the information was not only valid but reliable. The study made it clear that training and intelligence gathering are central to warding off suicide bombers. The same goes for location. We are at liberty to determine where we should be at a particular time, and not all invitation to occasions needs to be honoured.

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