

Analysis of Global Terrorist Activities Based on Social Network

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Abstract. In recent years, global terrorism has accelerated its transformation and has been continuously upgraded. UCINET software is used to construct the network model of “time-area” and “target-method” relationship of international terrorist events. It also analyzes the singular value, summarizes the characteristics and development trends of current terrorist incidents, and proposes corresponding strategies for the fight against terrorism under the new situation. Combined with the impact on China’s anti-terrorism situation, it proposes the next step to effectively combat violent terrorist activities.

Introduction

Since 2001, the United States "911" incident, terrorism has become the global issues that threaten world peace and development, affecting the security of people all over the world [1]. In recent years, terrorism is spreading rapidly across the globe, and through a variety of models and tools, with the danger and increasingly destructive rise, governments have become major issues of importance. Social network analysis is a quantitative analysis method developed by the sociologist according to graph theory, mathematical methods[2]. It systematically describes and analyzes the relationship between social networks by mapping and analysis of internal human communities, groups, organizations and so on. Social Network of Knowledge Management that provides a new perspective, a new vision open, greatly enriched the study of knowledge management [3]. UCINET network analysis integration software mainly includes three parts: NetDraw, Mage and Pajek [4]. NetDraw can analyze both one-dimensional and two-dimensional data, Mage can display and analyze 3D data, and Pajek can be used for large-scale network analysis [5]. Firstly, the relationship matrix is constructed. Then the network analysis tool UCINET is used to construct the event-related terrorist activity network map. Finally, the network characteristics are analyzed by numerical social network.

Analysis of Terrorism Event From 2001 to 2017 Based on Social Networks

Data Sorting

For quantitative analysis of terrorist activity data it has far-reaching significance to study the situation and development trends. University of Maryland and the US Department of Homeland Security Centers of Excellence, the National Federation of terrorism and the response to terrorism research the creation of global terrorism database (GTD) is an open source database, including the 1970-2017 terrorist attacks around the world the information is terrorism currently contains the most complete public database [6]. Which contains the date and location of the incident, the nature and objectives of the weapons used, the number of casualties as well as groups or individuals responsible for information. From 2001 to 2017 about 111855 terrorist incidents occurred, the number of trends can be observed that the occurrence of an event which Figure 1

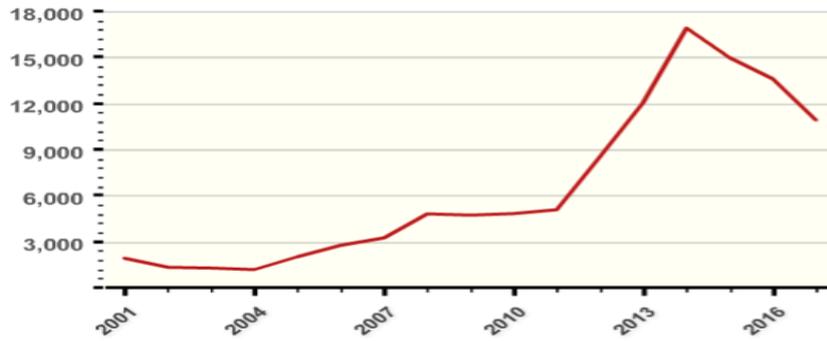


Fig.1 The number of terrorist incidents worldwide trends

Construction and Analysis of Terrorist Activity Network

Because of the reported data, the internal terror relevant actors is not clear, little correlation between the content of a terrorist organization and a clear description of the suspect can not get specific association between the name and organization of terrorist activities staff [7].Therefore, large-scale data base in GTD as a sample, build relevant set to understand the relationship between them.

According to "time - region", "target – attack type" mode 2- established network of relationships, build networks mainly first build correlation matrices, followed by Net Draw UCINET software visualization analysis tools for automatic network construction. Figure 2 and 3 are "time - region", "target – attack type" matrix log.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
North America	15	19	31	15	24	12	35	31	34	62	75	97
Central America and the Caribbean	5	4	0	9	1	1	1	14	5	1	3	4
South America	50	47	144	159	148	106	133	179	281	175	159	172
East Asia	2	0	25	8	1	4	4	14	42	27	8	7
Southeast Asian	272	364	513	562	473	353	585	1186	1074	1063	1077	1020
South Asia	939	980	1744	1946	1978	2135	3799	4607	4988	4570	3639	3430
Central Asia	6	4	36	31	9	9	12	7	9	9	17	7
Western Europe	98	72	163	181	133	93	188	253	214	321	273	110
East Europe	70	62	209	165	260	198	173	165	959	683	134	291
Middle East and North Africa	1179	1385	1535	1361	1463	1662	2411	4544	6919	5954	6115	3780
Sub-saharan Africa	114	301	379	284	331	494	1156	989	2306	1935	2077	1970
Western Australia and Oceania	2	1	8	1	1	0	0	1	9	7	10	12

Fig.2 "time - region"matrix log

	citiz	milit	police	admin	comme	trans	educa	relig	publi
bomb attack	19452	9852	8358	5067	5700	2342	1820	1505	2025
armed attack	9066	6942	7048	3456	1540	420	558	794	105
kidnap	4042	709	718	1255	798	68	255	183	25
facility attack	2306	322	540	973	1485	366	459	476	239
assassinate	1355	537	1027	3146	48	4	54	215	3
unknown	1282	1910	855	242	108	27	27	30	31
unarmed attack	264	46	58	71	48	14	53	20	1
roadblock	109	28	58	50	109	16	23	17	5
hijack	96	21	22	41	60	42	4	0	0

Fig.3 "target – attack type" matrix log

Figure 4, 5 are "time - region" networks, "target – attack type" networks of relationships.

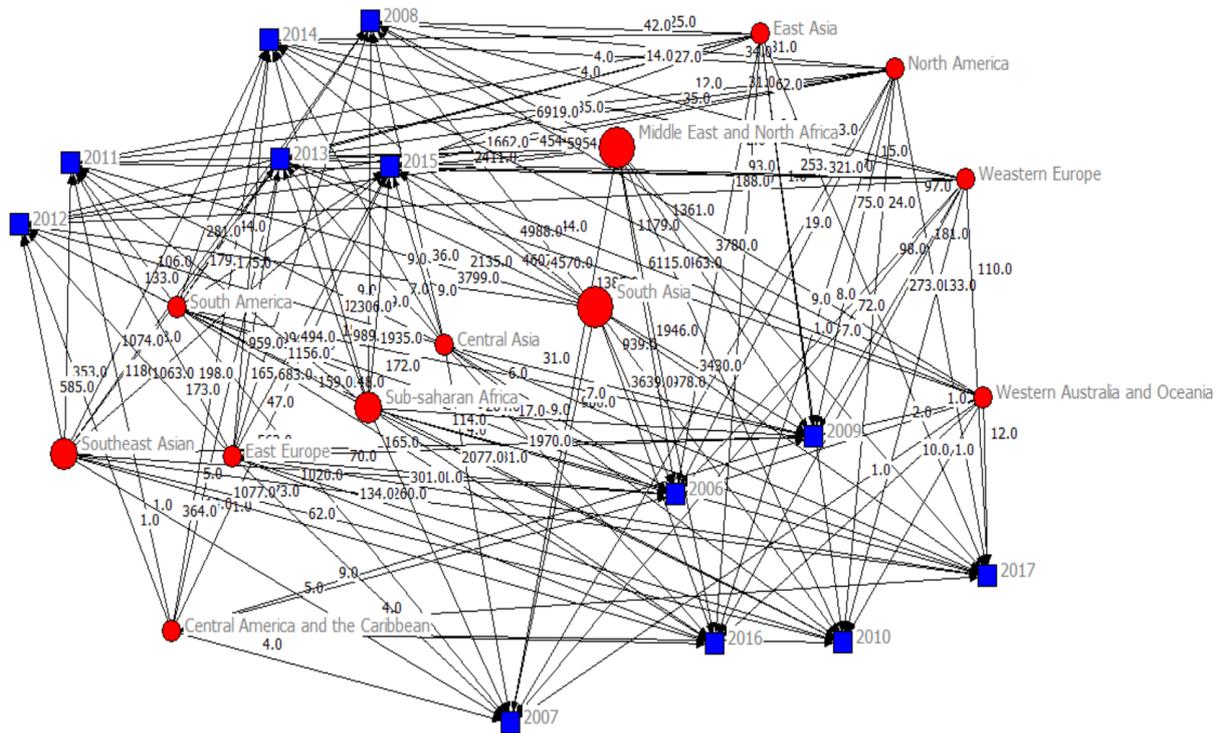


Fig.4. "time - region" networks of relationship

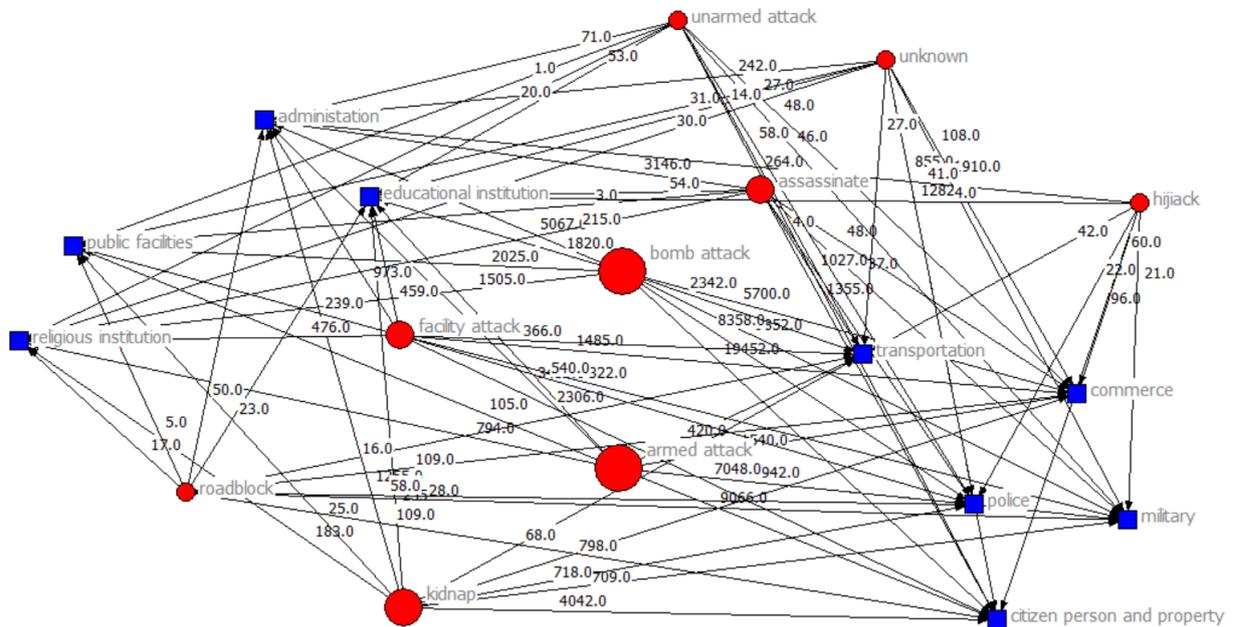


Fig.5. "target – attack type" networks of relationship

Singular value decomposition is a method of network data 2- mold behind Factors. By examining the singular value and its load factor to explain the value of each factor plays a role in the incident, in order to infer the character of the event. The results are shown in Figures 6,7 and 8,9.

SINGULAR VALUES

FACTOR	VALUE	PERCENT	CUM %	RATIO	PRE	CUM PRE
1:	17898.57	79.1	79.1	7.582	0.972	0.972
2:	2360.59	10.4	89.6	2.371	0.022	0.994
3:	995.45	4.4	94.0	1.452	0.004	0.997
4:	685.34	3.0	97.0	1.771	0.002	0.999
5:	386.98	1.7	98.7	2.636	0.001	1.000
6:	146.80	0.6	99.4	1.651	0.000	1.000
7:	88.90	0.4	99.7	3.372	0.000	1.000
8:	26.36	0.1	99.9	1.305	0.000	1.000
9:	20.20	0.1	99.9	3.072	0.000	1.000
10:	6.58	0.0	100.0	1.460	0.000	1.000
11:	4.50	0.0	100.0	19.405	0.000	1.000
12:	0.23	0.0	100.0		0.000	1.000
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	22620.50	100.0				

Fig.6 Singular values of "time - region"

Row Scores

Column Scores

		1	2	3			1	2	3
1	North America	0.008	0.002	-0.041	1	2006	0.085	-0.015	0.271
2	Central America and the Caribbean	0.001	-0.002	0.007	2	2007	0.098	0.038	0.170
3	South America	0.029	-0.040	0.015	3	2008	0.133	-0.173	0.125
4	East Asia	0.003	0.002	0.007	4	2009	0.132	-0.295	0.154
5	Southeast Asian	0.149	-0.096	0.095	5	2010	0.137	-0.269	0.125
6	South Asia	0.613	-0.768	-0.053	6	2011	0.152	-0.249	0.017
7	Central Asia	0.002	-0.007	0.008	7	2012	0.251	-0.550	-0.406
8	Weastern Europe	0.035	-0.039	0.103	8	2013	0.368	-0.329	0.486
9	East Europe	0.065	0.029	-0.040	9	2014	0.499	0.280	-0.014
10	Middle East and North Africa	0.732	0.584	0.333	10	2015	0.439	0.137	0.050
11	Sub-saharan Africa	0.244	0.237	-0.929	11	2016	0.413	0.488	0.039
12	Western Australia and Oceania	0.001	0.002	-0.005	12	2017	0.309	-0.026	-0.661

Fig.7. Time and region scale

SINGULAR VALUES

FACTOR	VALUE	PERCENT	CUM %	RATIO	PRE	CUM PRE
1:	28921.69	75.7	75.7	7.232	0.963	0.963
2:	3999.31	10.5	86.2	1.398	0.023	0.986
3:	2861.68	7.5	93.7	2.706	0.012	0.997
4:	1057.41	2.8	96.5	1.258	0.002	0.999
5:	840.60	2.2	98.7	2.000	0.001	1.000
6:	420.25	1.1	99.8	9.433	0.000	1.000
7:	44.55	0.1	99.9	1.520	0.000	1.000
8:	29.32	0.1	100.0	1.744	0.000	1.000
9:	16.81	0.0	100.0		0.000	1.000
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	38191.62	100.0				

Fig.8. Singular values of "target – attack type"

Row Scores

Column Scores

		1	2	3			1	2	3
1	bomb attack	0.858	-0.387	-0.103	1	citizen person and property	0.760	-0.432	0.000
2	armed attack	0.471	0.779	-0.064	2	military	0.416	0.447	-0.387
3	kidnap	0.142	-0.285	0.273	3	police	0.373	0.571	-0.085
4	facility attack	0.094	-0.280	0.226	4	administration	0.226	0.204	0.913
5	assassinate	0.082	0.213	0.903	5	commerce	0.203	-0.405	-0.038
6	unknown	0.075	0.195	-0.208	6	transportation	0.078	-0.174	-0.059
7	unarmed attack	0.009	-0.019	0.014	7	educational institution	0.066	-0.114	-0.002
8	roadblock	0.005	-0.011	0.009	8	religious institution	0.061	-0.025	0.049
9	hijack	0.004	-0.011	0.008	9	public facilities	0.063	-0.192	-0.056

Fig.9. Target and attack type scale

Singular Value Decomposition obtained, the first singular value accounted for 79.1% and 75.7%, accounting for a large percentage of the total, indicating that they are more important. SVD through further data analysis, it is considered that the first dimension (singular value) reflects the extent of the damage a terrorist incident, and the second reflects the degree of difficulty of the organization of terrorist incidents, and the third reflects the terror spread depth. The combination of these singular values, we can examine different events and factors in the size of the load values of the singular values, as shown in Table 10-2, the bomb attacks in the "destruction factor" load value of 0.858, the load "difficulty factor" value -0.387, supported on a "depth factor" value of -0.103, indicating a large degree of disruption of bombs generally, the lower the degree of difficulty tissue embodiment, the depth of damage is large.

Summary

Based on the theory of social network analysis, this paper studies the global terrorist activities. The multi-relational network model of events was constructed by UCINET, and some network characteristics were analyzed. The experimental results show that the results of visualization and data analysis are consistent with the actual situation.

Terrorist activities, in the outside world to see, killing of the innocent and have great uncertainty, but that does not mean the terrorists in the implementation of any specific terrorist activities. On the contrary, the current terrorist activities are often achieved through careful planning and organizations to deploy, carefully selected target attacks. Therefore, the plan can be targeted effectively to combat terrorism.

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