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Foreword by R. James Woolsey

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Foreword

Aaron Mannes and V. S. Subrahmanian have produced a fascinating framework for a disciplined analysis of terrorist groups.

Using as their case the Pakistani-backed Lashkar-e-Taiba ("LeT"), the perpetrator of the dramatic attack on Mumbai in November 2008, the authors examine in detail the group's ideology, history, and all pertinent facts available, from their relations with other Islamist groups to their propensity for attacks on holidays.

The authors' objective is to derive from the data what they term "temporal probabilistic" rules to determine what actions to thwart LeT's campaign will likely have the most success and indeed which of our actions may effectively counter LeT attacks of one type yet actually weaken us against others.

The authors' care and precision are exemplary and yield a rich beginning to the potential utilization of such probabilistic modeling as a broadly used tool for combatting many types of terrorism.

April 17, 2012 R. James Woolsey

Preface

Computation is being used in almost every discipline today—most of the sciences and engineering view computation as an indispensable tool in their efforts to understand one or more phenomena.

This book presents the first in-depth and comprehensive study of a real-world terrorist group using the same kind of "big data" analytic methodologies that have enabled companies like Google and Amazon to model the behaviors of customers and users of their Web services.

We chose Lashkar-e-Taiba as the subject for this rigorous computational analysis in early 2007. Although LeT has been around for over 20 years, outside of terrorism and South Asia specialists, LeT was only taken seriously in the west after the November 26, 2008 attacks in Mumbai.

We chose to conduct this study with a mix of computational science, social science, and public policy researchers, so that methodologies from these diverse disciplines would jointly inform our understanding of Lashkar-e-Taiba's behavior and enable us to shape policies towards them.

We thank many people for their assistance with this work. First, we thank Stephen Tankel—the author of the first (excellent) book on LeT—for reading previous drafts and providing detailed comments. His insights and comments were invaluable. Second, we thank Animesh Roul also for going through the manuscript in detail, providing numerous corrections and references that we had overlooked.

On the technology side, we thank several people who worked on versions of the technology that were eventually used in this book. TP-rules were invented by V. S. Subrahmanian, together with his former Ph.D. student, Alex Dekhtyar. Algorithms to learn TP-rules automatically from data were developed by V. S. Subrahmanian and his former student, Jason Ernst. They form the technical backbone of much of this book. The use of mixed integer linear programming for generating policies was based on work by V. S. Subrahmanian with his then Ph.D. student Raymond Ng, Anil Nerode at Cornell, and Colin Bell at Iowa. We thank Damon Earp for setting up the database system through which our data were collected and stored. Dan LaRocque and LTG (Ret.) Charley Otstott also helped build systems to explore LeT's network. Roy Lindelauf at the Netherlands

National Defense Academy (NLDA) has also been a valuable sounding board for terrorism-related studies.

All of the research work done on this book was done when the authors were at the University of Maryland. We are grateful to UMIACS for their technical support of our work. We are also very grateful to sponsors who funded some of the antecedents of the technologies used in this study. The Air Force Office of Scientific Research initiated funding of our work on computational models of terrorism via grants FA95500610405 and FA95500510298. A policy analytics framework, as well as the TP-rules used in this work (beyond the original TP-rule framework from the 1990s), were studied through generous funding from the US Army Research Office under grant W911NF0910206. In particular, we would like to thank Dr. John Tangney at ONR who got our work in this field started, Dr. Terry Lyons at AFOSR (now sadly deceased) for his strong support of our research, as well as Dr. Purush Iyer at ARO for encouraging us to conduct both theoretical and applied research in this emerging field. Last, but not least, we thank Barbara Lewis and Jennifer Newlin for helping typeset the book in the correct format.

College Park, April 2012

Contents

Acronyms

APT	Annotated Probabilistic Temporal
ASIO	Australian Security Intelligence Organization
BBC	British Broadcasting Corporation
BSF	Border Security Force
CARA	Cultural Adversarial Reasoning Architecture
CIA	Central Intelligence Agency
CII	Council of Islamic Ideology
CRPF	Central Reserve Police Force
DPC	Defense of Pakistan Council
DST	Direction de la Surveillance du Territoire
FARC	Fuerzas Armadas Revolucionaries de Colombia
FDLR	Forces Democratiques des Liberation du Rwanda
FIF	Falah-i-Insaniyat Foundation
FTO	Foreign Terrorist Organization
HM	Hizb-ul-Mujihideen
IED	Improvised Explosive Device
IKK	Idara Khidmat-e-Khalq
IM	Indian Mujihideen
J&K	Jammu and Kashmir
JeM	Jaish-e-Mohammed
JKLF	Jammu & Kashmir Liberation Front
JuD	Jamaat ud-Dawa
KGB	Soviet Committee for State Security
KN	Khairun Naas
IMF	International Monetary Fund
ISI	Inter Services Intelligence
LeT	Lashkar-e-Taiba
LoC	Line of Control
MDI	Markaz al-Dawa Irshad
MEMRI	Middle East Media Research Institute
MJAH	Markazi Jamiat Ahl Hadith

NCTC	National Counterterrorism Center
OGW	Over Ground Workers
PCA	Policy Computation Algorithm
POK	Pakistan Occupied Kashmir
PTI	Press Trust of India
SATP	South Asian Terrorism Portal
SDGT	Specially Designated Global Terrorist
SIMI	Student Islamic Movement of India
SOMA	Stochastic Opponent Modeling Agent
TIM	Tanzim-Islahul-Muslimeen
TP	Temporal Probabilistic
USA	United States of America
VoIP	Voice over Internet Protocol
WITS	Worldwide Incident Tracking System

Chapter 1
Introduction

Abstract This chapter contains a brief introduction to Lashkar-e-Taiba. It describes their geographic locations and also summarizes statistics about violent terror acts carried out by LeT, briefly describes the behavioral rules about LeT derived in this book, and summarizes suggested policy options generated automatically from the LeT data set.

For three full days starting on November 26, 2008, the eyes of the world were on Mumbai as ten gunmen held the city under siege. The sites varied dramatically in scope—from a crowded train station used daily by hundreds of thousands of commuters from every segment of Indian society, to a pair of exclusive hotels frequented by the wealthiest Indians and foreign visitors, to a little known Jewish center on a narrow street (Fair 2009; John 2011). Through a carefully calculated and meticulously planned operation, the terrorists were able to hold Indian police and counter-terror forces at bay for over 72 hours, while simultaneously commanding continuous coverage from the world's press. Later investigations revealed that the terrorists involved used sophisticated new technologies including Global Positioning System (GPS) and voice over IP (VoIP) technologies to execute their attack and communicate with their handlers back in Pakistan (Government of India 2008).[1]

Who were these terrorists? Which group did they belong to and how did this group get its power? How were they recruited? Where did they get the training required to hold off a nuclear power's armed forces several days? Who provided them with the political, financial, and military support needed to execute such a well-coordinated and devastating attack? In the shadowy world of inter-national terrorism, answers to such questions are not always apparent. In this case, however, Indian police captured one of the terrorists, Ajmal Kasab, alive. After

[1] This report was released by the Government of India to the Government of Pakistan. Page 2 of the report de-scribes the retrieval of GPS instruments and a Thuraya satellite phone. Page 12 of the same report describes the use of VoIP technology by the terrorists.

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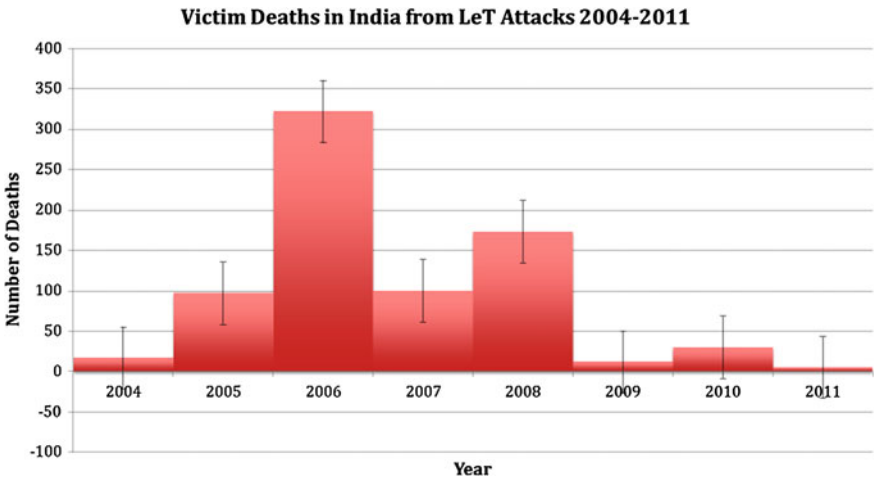

Fig. 1.1 Total number of people killed in India by LeT or its Indian allies based on data from the National Counterterrorism Center's Worldwide Incident Tracking System (WITS) database. There is some question about LeT's responsibility for the attacks in India that have been attributed to it, particularly the 2006 Mumbai train bombings that killed over 200 people. The WITS website discusses its criteria for identifying the perpetrators of terror attacks here: http://www.nctc.gov/witsbanner/wits_subpage_criteria.html

extensive interrogation, it emerged that the group behind the attacks was Lashkar-e-Taiba (LeT for short), the "Army of the Pure (or Pious)[2]" (Government of India 2008, p. 2 point 9). Subsequent testimony in a Chicago courtroom by David Headley, a US citizen of Pakistani origin, who conducted operational surveillance of the locations targeted in the Mumbai assault, confirms not only the involvement of Lashkar-e-Taiba in the Mumbai attacks, but also the fact that Pakistan's Inter Services Intelligence (ISI) agency may have been involved (Rotella 2011, also *US Government vs. Tahawwur Rana* transcripts).

Well-known to specialists on terrorism and south Asian affairs, LeT has been responsible for many terrorist attacks in India, Kashmir, Pakistan, and Afghanistan. In addition, LeT operative Faheem Lodhi was arrested and convicted (in 2006) of planning sophisticated attacks on Australia's power grid (Brenner 2011; The Age 2006) demonstrating a potential global threat.

Figure 1.1 shows that hundreds of people have been killed in attacks attributed to LeT and its allies over the past 15 years based on data from the US National Counterterrorism Center Worldwide Incident Tracking System (WITS) database.

The red bars show the number of people killed during a given year—the black error lines overlaid on the red bars show margins of error. For instance, according to Fig. 1.1, we believe about 325 people (shown by the red bar) were killed in

[2] It has also been asserted that the name Lashkar-e-Taiba should be read as "Army of Madinah" (John 2011).

India by LeT in 2006, but the true number (shown by the black error line) may be anywhere between 280 and 370. Uncertainty arises in the numbers shown because it is not always clear whether LeT was responsible for a given attack.

Long used as a proxy by Pakistan's military in its ongoing confrontation with India in Kashmir (Tellis 2010), LeT had established a proven ability to carry out attacks across the Indian sub-continent—primarily in India, Kashmir, and (as the conflict in Kashmir has calmed) with increasing reports of LeT involvement in Afghanistan (Rubin 2010). LeT has also been able to mount spectacular attacks including the November 26, 2008 Mumbai attacks that left 166 innocent people dead[3] (plus an additional 9 terrorists), and a December 2000 attack on soldiers at the Delhi historic site Red Fort. The Indian government also held LeT responsible for the July 2006 Mumbai train bombings that left approximately 211 people dead; however there is some dispute about LeT's role in the attack.[4]

The ability of LeT to hold a major city in terror for several days and exacerbate tensions between a pair of frequently sparring nuclear powers places an accurate understanding of this group as a major priority for those concerned with international security affairs (Krepon 2010). Beyond its formidable paramilitary capacity, LeT runs social service networks and businesses in Pakistan ensuring a steady stream of new recruits and increasing the number of adherents to its radical jihadist ideology, potentially contributing to Pakistan's radicalization (Abbas 2005). Finally, LeT is showing the potential for carrying out international attacks, making it a possible threat to the Western interests it excoriates rhetorically (Tankel 2011a). LeT's growing power indicates that gathering and analyzing information about LeT needs to be done sooner, rather than later.

Who are the LeT? Who founded them and why? What are their principal goals? What are their principal grievances and what actions have they taken to address them? Who are their principal supporters? What is their modus operandi? Who do they target—and under what conditions? More importantly, what might LeT do in the future and how can the various affected parties act in order to minimize the damage they cause not only to innocent civilians, but also to peace and stability in South Asia?

This book is an attempt to answer some of these questions definitively on the basis of a principled analysis of data, and to provide suggestions that may help national security policy makers and military leaders define a strategy to combat LeT's growing influence and capabilities.

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[3] In all casualty figures quoted in this book, the number of terrorists killed is not included. Thus, when the number of casualties for the November 26, 2008 Mumbai attack is listed as 166, it does not include the terrorists who were killed during the attack.

[4] The other major suspect in the attack was Indian Mujahideen (Gupta 2011), an Indian Muslim terrorist group that receives support from LeT (this relationship is discussed below). Because of the frequent ambiguity in identifying the perpetrator of a terrorist attack, this book will use the term LeT-backed attacks to include attacks that are believed to have been carried out either directly by LeT or by its proxies and close allies.

Unlike many books in the realm of public policy, the recommendations made in this book are through a mix of two very different analytical techniques—traditional qualitative policy analysis and a detailed, mathematical and computational analysis of systematically gathered and carefully curated data about LeT's behavior since its inception in the mid-1980s.[5] The computational analysis, though certainly not infallible, provides confidence that behavioral cues have not been missed and that the space of possible policies that may be used to influence their behavior has been thoroughly investigated. The computational analysis is based on the CARA (Cultural Adversarial Reasoning Architecture) platform (Subrahmanian et al. 2007; Subrahmanian 2007) which brought "big data" mining and analytics techniques to the analysis of terrorism data for the first time. Nonetheless, readers should keep in mind that computational methods are also not guaranteed to be exhaustive or even fully correct as they are only as "good" as the data they use. Yet, computational approaches enabled the mathematical analysis of over 770 variables relating to LeT with data on a monthly basis stretching back to January 1990—something that any human might find very challenging to do.

This book is organized as follows. The remainder of this chapter will first provide a broad overview of LeT's activities containing summary statistics about their behavior. This chapter also summarizes the study's findings about LeT's organizational behavior and policies that might be used to counter their growing influence.

Chapter 2 describes the creation of LeT, its ideology and organization, the ecosystem of governmental, religious, criminal, and terrorist organizations that support LeT, and an overview of its major theaters of operations—Pakistan, Jammu & Kashmir,[6] the rest of the India sub-continent, and the international arena. *This book principally focuses on LeT's operations in India and Pakistan (including the portions of Kashmir controlled by each country).* Reliable data on LeT operations in other geographies (particularly Afghanistan where LeT have expanded operations since the mid-2000s) is limited and hard to analyze.

Chapter 3 discusses the principal technical device used in this book—temporal probabilistic rules (or TP-rules for short). TP-rules are stochastic rules of the form

[5] The precise date on which LeT was founded is not 100 % clear (Tankel 2011b, p. 3) traces the roots of LeT back to 1984 when Zaki-ur-Rehman Lakhvi, one of the principal suspected masterminds behind the 2008 Mumbai attacks, founded an Ahl-e-Hadith group in Afghanistan to fight the Soviets. Tankel goes on to report that Hafez Saeed (the current LeT chief) and Zafar Iqbal, created Jamaat-ud-Dawa (JuD), an Ahl Hadith missionary group in 1985. Tankel describes the subsequent creation of Markaz-ud-Dawa al Irshad (MDI) in 1986 by 17 founders including those above. The new organization folded in Zaki-ur-Rehman's group and Saeed's organization. LeT itself was officially launched in 1990, though there appear to be conflicting reports about the exact date (John 2011, p. 1) states that LeT was created precisely on February 22, 1990.

[6] Throughout this book, the term Jammu & Kashmir is used to refer to Indian administered Kashmir. This expression is used for convenience, the issue of Kashmir's ultimate legal status is a complex one and is not the topic addressed in this book.

> If the environment in which LeT operates satisfies some condition C during a given month, then there is a probability of P % that LeT will take action A at intensity level i, t months later.

Thus, TP-rules allow an analyst to look at the situation today and predict what LeT might do 1, 2, 3 or more months (i.e., *t* can be 1, 2, 3, or more) later. Individual TP-rules cannot be singled out conveniently and used piecemeal to make such predictions—rather, the entire set of rules must be used in conjunction as many TP-rules are related to other TP-rules.

Chapters 4, 5, 6, 7, 8 and 9 describe specific kinds of attacks carried out by LeT. Chapter 4 examines the conditions (and hence identifies TP-rules) associated with attacks on civilians (largely Hindu) by LeT. Chapter 5 describes TP-rules describing the conditions under which LeT launches attacks against public sites, tourist sites, and transportation networks (such as the July 2006 Mumbai train bombings). Chapter 6 describes TP-rules about attacks carried out by LeT against professional security forces such as the Indian Army. Chapter 7 describes TP-rules pertaining to attacks by LeT against security installations and infrastructure such as Army bases. Chapter 8 provides a description of TP-rules pertaining to other types of attacks: specifically attacks carried out on holidays, attacks against government sites, and attempted (but unsuccessful attacks). Chapter 9 examines TP-rules derived about armed clashes involving LeT—armed clashes are violent encounters between LeT and government security forces in which LeT did not possess the initiative.

Chapter 10 briefly describes the mathematical and computational "policy analytics" techniques used to generate policies from the TP-rules described in Chaps. 4, 5, 6, 7, 8 and 9. In particular, Chap. 10 proves a critical theorem showing that it is impossible (at least theoretically) to fully eliminate all of LeT's violent actions. But it does provide the theoretical framework under which most of the types of attacks carried out by LeT can be reduced. Chapter 11 uses the mathematical and computational model defined in Chap. 10 to suggest policies that might be useful in mitigating most of LeT's violent behavior. *These policies are not sufficient to guarantee "good" behavior from LeT*—rather, it would appear that these policies would significantly mitigate risk of violence from LeT, though it is unlikely that they will eliminate all such bad behavior.

Finally, this book includes a set of Appendices.

- Appendix A describes the data methodology used in this research including information on the type of data collected, the data sources consulted, and the types of curation performed.
- Appendix B shows a summary of all terrorist attacks attributed to LeT by the US National Counterterrorism Center's Worldwide Incident Tracking System.
- Appendix C shows all the TP-rules discussed in this paper.
- Appendix D shows all the eight policies derived by the Policy Computation Algorithm—four of which are discussed in detail in Chap. 10 (the other four are very similar and only differ on minor points).

- Appendix E summarizes reports of any kind of internal strife or intra-organizational dissension within LeT. Though LeT experienced only one major split, reports of internal dissension have occurred more often.
- Appendix F summarizes reports documenting LeT's relationship with the Pakistani military.
- Appendix G summarizes reports documenting LeT's relationship with the press.
- Appendix H summarizes information derived from open sources on LeT's locations including training camps.

All the data used in this study was gathered from *open sources*—primarily news sources, but also reports, academic papers, and books.

1.1 How to Read this Book

With the exception of Chaps. 3 and 10, all chapters of this book should be accessible to all readers. A qualitative social scientist, law enforcement or intelligence official, or a policy expert, may want to skip Chaps. 3 and 10 unless they are specifically interested in the details of the "data mining" used to generate the rules about LeT behavior. Nonetheless, Chaps. 3 and 10 should be somewhat accessible to the layperson as it is presented at a high level without gory mathematical technical details.

In addition, all chapters describing TP-rules (Chaps. 4, 5, 6, 7, 8 and 9) contain a summary figure. While this figure is not a substitute for the detailed presentation contained within these chapters, it does provide a birdseye view of some relationships between variables describing the environment in which LeT operates, and the actions it takes. A reader can quickly peruse this figure to get a general idea of the relationship between LeT's violent acts and the possible triggers.

1.2 LeT's Camp Locations

This section briefly describes the locations of LeT's major training camps and offices. LeT's main camp is in Muridke, just outside the city of Lahore, in the Pakistani state of Punjab. More details on training camps are listed in Appendix H.

Figure 1.2 shows locations of known LeT training camps using data collected from open sources. Not every camp is plotted on the map—if there are multiple facilities somewhere, just a single blue icon denotes the existence of camps at that location.

Figure 1.2 is obviously incomplete and is restricted to training camps and major offices that carry out LeT activities. It does not include the locations of LeT's dozens of district offices or the thousands of locations that host "charity boxes" for collecting funds for LeT activities (Rana 2006). Figures 1.3 and 1.4 break these

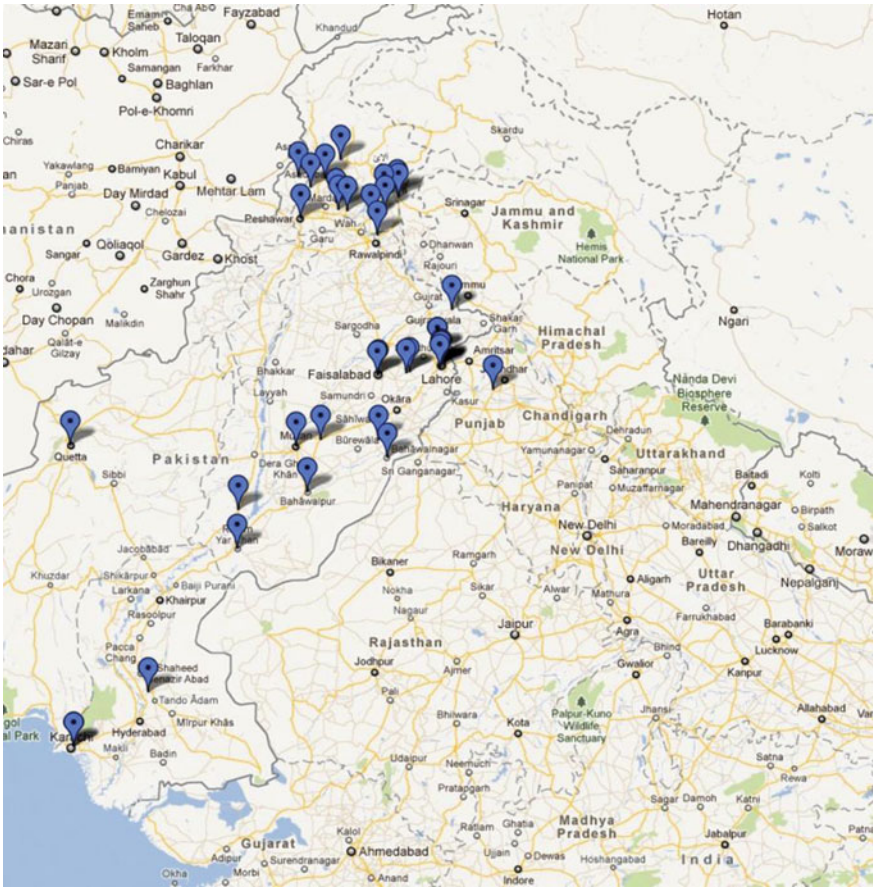

Fig. 1.2 Map showing locations of LeT training camps/offices as of December 31, 2010

camps down into those in Pakistan versus those in Jammu and Kashmir (most camps are in the so-called "Azad Kashmir" region of Pakistan currently controlled by the Pakistani Army).

1.3 Summary Statistics About LeT's Violent Activities

This section provides statistics about violent activities by LeT and its allies. The data used to generate these statistics was from the US Government's National Counterterrorism Center (NCTC) Worldwide Incident Tracking System (or WITS) database which represents not only the US government's definitive listing of terrorist acts (a violent act needs to satisfy various legal requirements for it to be considered a "terrorist" incident according to US law), but also the US

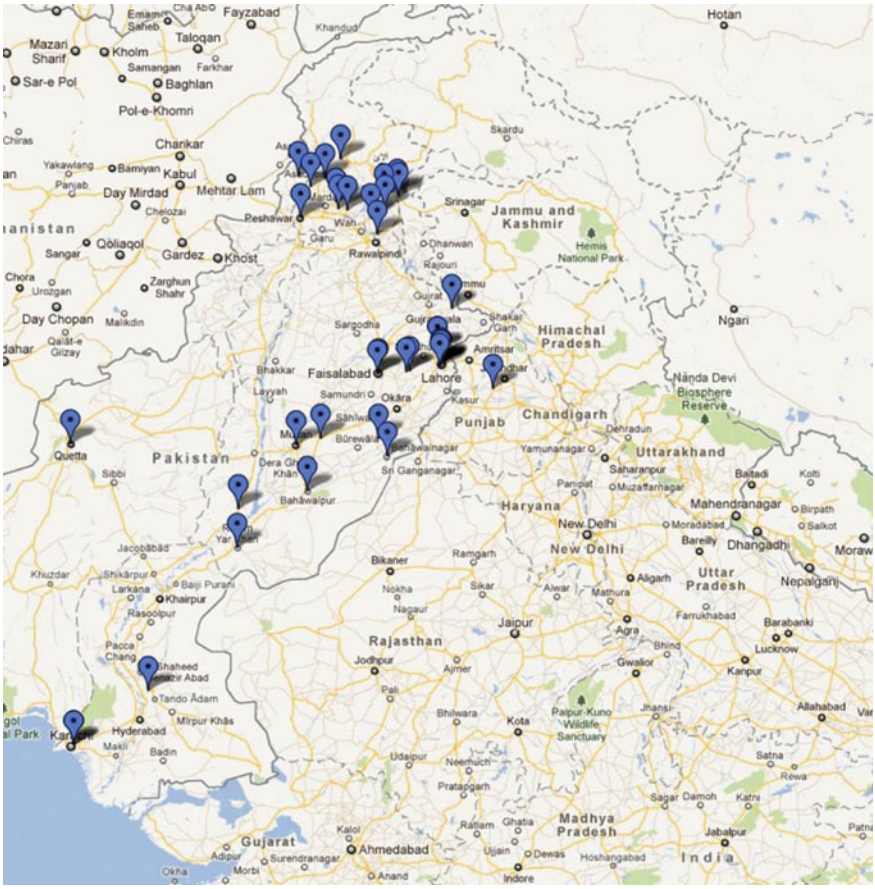

Fig. 1.3 LeT camps in Pakistan

government's determination of the perpetrators behind the act (United States Government, National Counterterrorism Center, Worldwide Incidents Tracking System 2011). Though there are many databases of terrorist incidents, WITS is used to generate these statistical summaries as it has the full weight and authority of the US government behind it. We note that the WITS data does not always "pin" responsibility for an attack on a group—but may make statements less definitive. All attacks where WITS' data implied that LeT may have done it were attributed to LeT.

Figure 1.5 shows the number of attacks carried out by LeT and its allies on an annual basis during the 2004–2011 period. The data for 2011 is incomplete—though it was compiled in late-December 2011.

Figure 1.6 shows attacks in Pakistan that were attributed to LeT by the NCTC.

Figure 1.7 shows the number of attacks attributed to LeT by the NCTC that occurred in India during the same period.

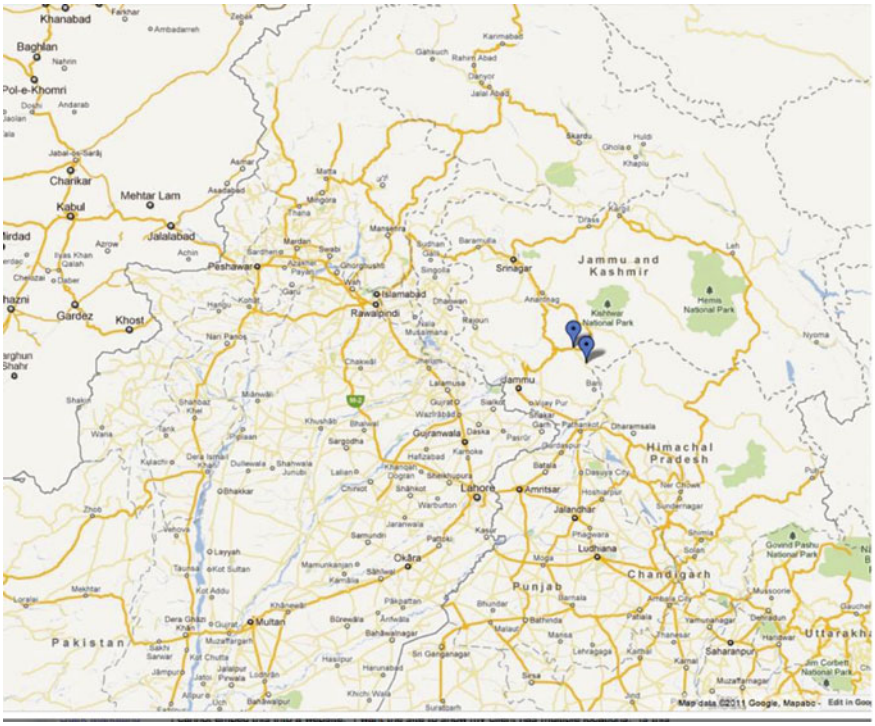

Fig. 1.4 LeT camp locations in Jammu & Kashmir

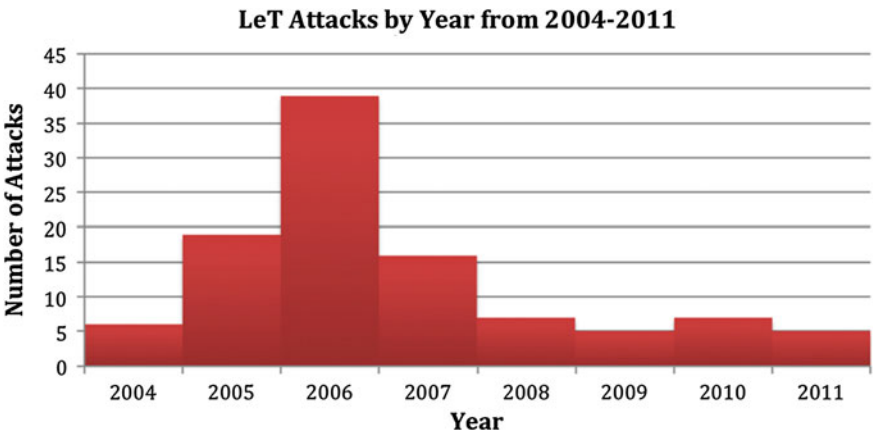

Fig. 1.5 Summary of number of attacks carried out by LeT by year

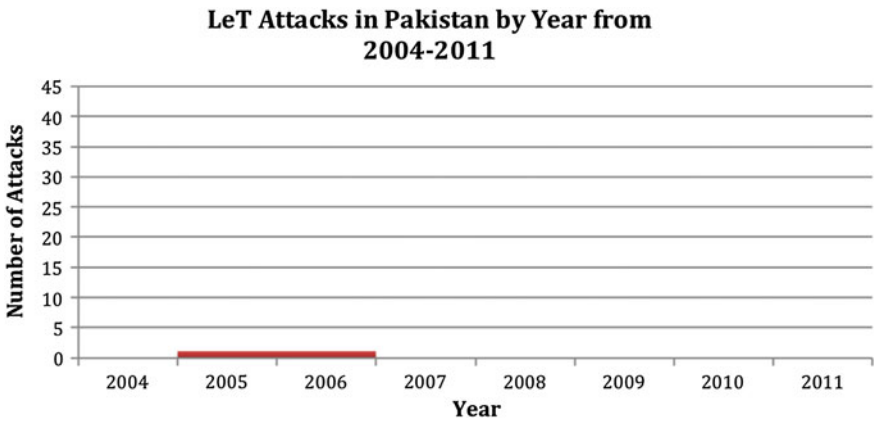

Fig. 1.6 Summary of number of attacks attributed to LeT in Pakistan, according to NCTC WITS

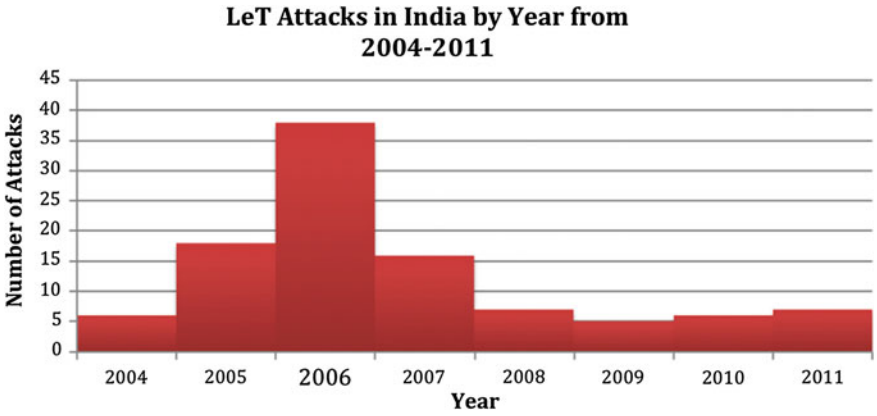

Fig. 1.7 Summary of LeT backed attacks in India

Figure 1.8 shows summary statistics for LeT backed attacks on public sites according to the NCTC.

Figure 1.9 uses NCTC data to show statistics about LeT backed attacks on religious sites during this period.

Figure 1.10 shows summary statistics generated from NCTC data pertaining to LeT backed attacks against transportation facilities.

Irrespective of which of Fig. 1.10 one considers, it is clear that 2006 was the year in which LeT and its allies carried out the most attacks and killed the most people. However, as mentioned earlier, one of the major cause of fatalities in 2006 was the July 2006 Mumbai blasts which has been variously attributed to different organizations (e.g., Indian Mujahideen).

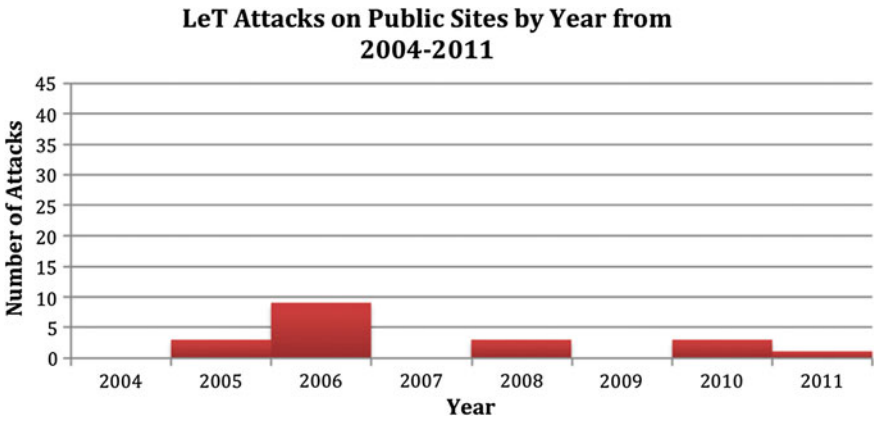

Fig. 1.8 Summary statistics on LeT backed attacks against public sites

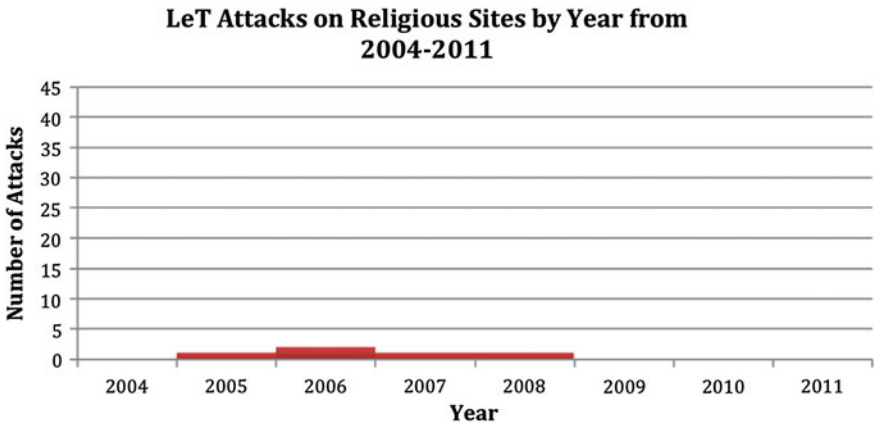

Fig. 1.9 LeT backed attacks against religious sites

1.4 Summary of Significant TP-Rules

Using the data gathered entirely from open sources (Appendix A contains details of the methodology), the system derived over 15,000 TP-rules associated with a wide variety of LeT's violent actions. These rules were painstakingly analyzed to identify the ones that satisfied two conditions:

- Quantitative conditions requiring, informally, that the rules be both accurate enough and be valid often enough—these are measured through conditions called *probability, support, inverse probability, and negative probability* and
- Qualitative conditions requiring, informally, that the rules could be explained to a researcher or policy maker without a quantitative background in "plain" English.