

# GIS Based Application Used for Tracing Terrorism

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**Abstract**— The goal of terrorism is to terrorize civilians, with the end goal of forcing the government to react to its upset citizens. The aim of this thesis is to investigate a study on terrorism that is as old as humans' willingness to use violence to affect politics. The primary goal of this thesis is to explore Google map facilities to build a map based application showing terrorism on an interactive timeline, including maps to show the areas and region where the terrorist attacks occur. To show terrorism in the past and present, the map is divided into four parts 1st century to 13th century, 14th century to 17th century, 19th century, 20th century and 21st century. The application can be accessed using any standard web browser and is implemented to make the application more responsive to the user. The aim of this thesis is to investigate a study on terrorism that is as old as humans' willingness to use violence to affect politics. known as Hash, hashing was a secretive Islamic sect active in Iran and Syria from the 11th century to the 13th century. The word terrorism and terrorist come from the Reign of Terror in 1793, following the French revolution. From the 19th century, radical political theories and improvements in weapons technology spurred the formation of small groups who effectively attacked nation-states.

**Key words:** GIS, Terrorism

## I. OBJECTIVE

The objective is to have a GIS application to give a better understanding of terrorist activities that have occurred all around the world. The terror incident in Paris has sparked renewed interest in the deployment of technologies in the fight against terror. Monitoring and anticipating terror plans is the key to staying ahead of the next unknown attack.

Despite the definition and dimensions of terrorism changing over the decades, GIS has been found to be a very effective tool.

It has the capability of preventing, predicting or countering terrorist attacks, while helping to strategize and support ground level combat operations.

### A. What is Geographical information system (GIS)?

Geographic location is an important attribute of activities, policies, strategies, and plans. Geographic information systems are a special class of information systems that keep track of not only events, activities and things, but also of where these events, activities, and things happen or exist [Longley, Goodchild, Maguire, Rind 2005 /1/].

### B. GIS Application in the Fight Against Terror

GIS application in the fight against terror begins with monitoring and surveillance to predict the four components (when, where, how, who) of terror activity. It moves on to disseminate critical information through the various public service agencies, homeland security systems and

intelligence departments. In the event of a terror attack, geospatial tools and technologies help to secure citizens and property as well as support the ground combat operations



Fig. 1: GIS Application in The Fight Against Terror

### C. GIS Tools and Technologies in Various Stages of Counterterrorism

An act of terrorism usually has a planning cycle. It does not happen out of the blue. Any terrorist activity thus displays distinct temporal trends, as pre-attack activities occur over a span of time. At the same time, the planning exposes a bimodal spatial pattern of both, preparation and target selection. The geospatial platform is able to project the terrorist's pre-attack activities in a space-time trajectory. This information is available in real time for a decision support system.



Fig. 2: Sequence of Events During the Paris Terrorist Attack

### D. Stages in GIS Implementation for Counterterrorism

#### 1) Monitoring / Surveillance

Terrorist movements, cross-border money laundering, unnatural terrain or ocean activities have a spatial component. Trends and hot spots are overlaid on maps for analyzing patterns of terrorist activities in real time

## 2) Preparedness

Based on the above, risk assessment is done. Vulnerable targets, personalities and locations are identified. Terrorists / terror groups with sudden movements or increased activities are analyzed and correlated spatially with political, ethnic or other factors.

## 3) Response

GIS enables sharing of data and analysis across agencies to build a tactical strategy. Potential attacks can be prevented with the use of geospatial tools and technologies that have become core to police surveillance and military intelligence.

## 4) Mitigation

Predictions of potential terror activities help to build resilience against damage to human life and property. Emergency response uses existing base maps and satellite imagery overlaid with crowd sourced information, drone surveillance data, terrorist locations and geo-tagged social media activity in real-time

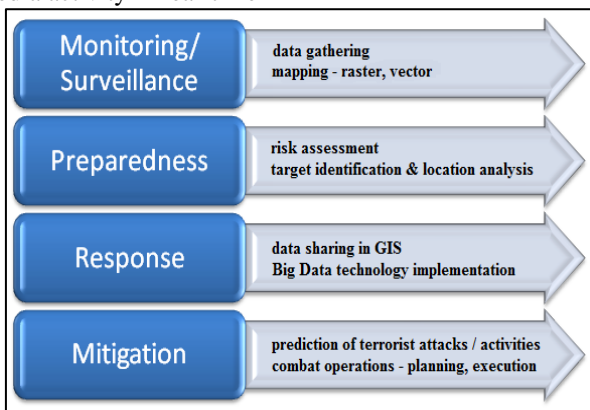


Fig. 3: Stages in GIS Implementation for Counterterrorism

## E. Geospatial for Countering Terrorism Geospatial for Crime Analysis

GIS technology enables a seamless flow of information between intelligence and law enforcements agencies for monitoring and combat operations, at the local or neighborhood level. However, there is need to differentiate the use of geospatial for countering terrorism from its use in crime mapping and analysis.

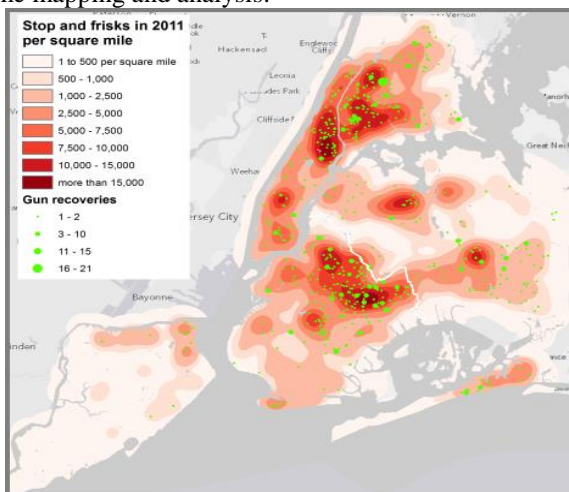


Fig. 4: Geospatial for Crime Analysis

## F. Areas of GIS Application in Counterterrorism

- 1) Terrorist / Terror Group Surveillance
- 2) Special Reconnaissance

- 3) Intelligence gathering and visualization

- 4) Military / Police operations
- 5) Contingency Planning
- 6) Timely decision support
- 7) Real-time management of field operations
- 8) Accuracy of rapid response
- 9) Development of training & combat plans
- 10) Area assessment – terrain, layout, location, roadmap
- 11) Monitoring of potential targets
- 12) Countering terrorist financing
- 13) Geospatial Intelligence (GEOINT)

## G. GIS Tools and Technologies in Use

- 1) Maps – aerial maps, satellite maps, road maps, bathymetric maps, hydrographic maps, geologic maps, soil maps, city utility network maps, political maps, thematic maps (military installations, nuclear plants, vulnerable sites) and so on.
- 2) Satellite Imagery
- 3) LiDAR
- 4) UAV (Unmanned Aerial Vehicle) or Drones
- 5) GPS technology
- 6) Analysis Tools and Techniques – Tapestry segmentation, Location analyses, Network analysis, radius buffering, 3D modeling of targets, hot spot mapping, spatial querying, spatio-temporal analysis, exploratory spatial data analysis, linear distance analysis, and so on.
- 7) Community mapping – crowdsourcing, Participatory GIS, geo-tagged social media activity
- 8) Technology mashups using Big Data platform

## II. GIS APPLICATION GUI

Homepage of the application include the menu on the left with the title to navigate to different pages The menu is made consistent throughout the application.

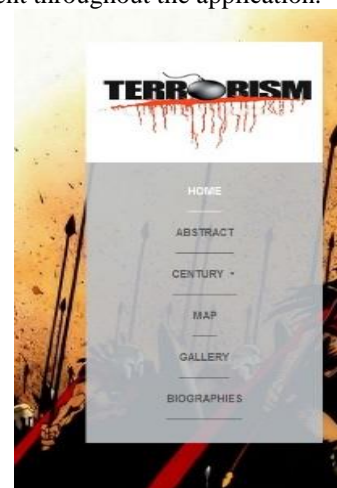


Fig. 5: GUI Application Interface

## III. GOOGLE MAPS

Google maps API is an API provided by Google maps to display maps inside your webpage. It was released in June 2005 and keeps improving by Google[9] . Using this we can display markers on specified latitude and longitude. It is also a free service and without any kind of ads. Google maps API is available as [10]

- 1) Google Maps Android API
- 2) Google Maps JavaScript API
- 3) Google Maps Geocoding API
- 4) Google Maps Directions API
- 5) Google Places API Web Service

I have used it as JavaScript API and used G maps to display markers on different latitude and longitude

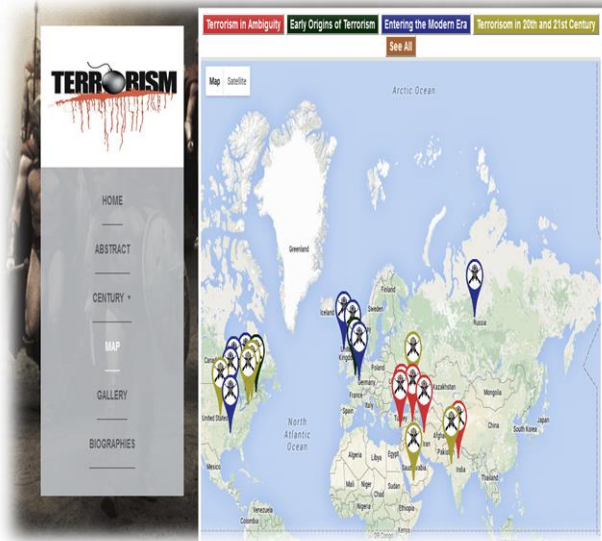


Fig. 6: Mapping terrorist activities

#### IV. RESULT & DISCUSSION

This small interaction application is based on the concept of GIS which reflect the spotting area of terrorist activities on the world MAP.

The use of GIS can systematize the decision making process for a proper resource distribution over the project areas. It has also been shown that the integration of GIS can be done without spending a large amount of money. After conducting the study of the sanitation facilities, GIS has enabled us to have a more conceivable picture of the area.

#### V. CONCLUSIONS

The problem considered in this paper is of great interest, because in recent years the areas susceptible to terrorist attacks have been widening. The methodology applied in this work has the aim of outlining the scenario associated with a terrorist attack or sabotage.

GIS Enabled Spatial data is used as for crucial importance to the Military Commander in the battle as it is for a decision-maker in the planning and development of a state's growth. The Ministry of Defense (MOD) in any country gathers data on routing, filtering, analyzing and presenting information for decision-making. The regional conflicts, rapid deployment and flexible response imposes heavy burden on military commanders, their staff and supporting system to keep up-to-date situation on the ground about enemy activities. Visualizing raw tabular data within a spatial framework has many benefits. Therefore digital mapping and GIS occupy center stage in activities as diverse as battlefield simulation, mission briefing and communications planning, logistics management and command control

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