SIDDAGANGA INSTITUTE OF TECHNOLOGY, TUMAKURU- 3

(An Autonomous institution affiliated to Visvesvaraya Technological University- Belagavi, Approved by AICTE,
Accredited by NAAC with 'A' Grade, Awarded Diamond College Rating by QS I-GAUGE & ISO 9001:2015 certified)

MINI PROJECT REPORT

ON

"TERRORISM VULNERABILITY DATA VISUALIZATION FOR INDIAN STATES"

submitted in the partial fulfillment of the requirements for the VI semester,
Bachelor of Engineering in Computer Science and Engineering
By

Aditya Ranjan	**1SI20CS005**
Anshika Tyagi	**1SI20CS015**
Bipul Kumar	**1SI20CS024**

Under the guidance of

Mr. Raghavendra M M.E

Assistant Professor.

Department of Computer Science and Engineering

(Program Accredited by NBA)

Academic Year: 2022-23

Siddaganga Institute of Technology, Tumakuru-3

(An Autonomous institution affiliated to Visvesvaraya Technological University- Belagavi, Approved by AICTE, Accredited by NAAC with 'A++' Grade, Awarded Diamond College Rating by QS I-GAUGE & ISO 9001:2015 certified)

Department of Computer Science and Engineering

(Program Accredited by NBA)

CERTIFICATE

This is to certify that the mini project entitled "TERRORISM VULNERABILITY DATA VISUALIZATION FOR INDIAN STATES" is a bona fide work carried out by **ADITYA RANJAN – 1SI20CS005, ANSHIKA TYAGI – 1SI20CS015, BIPUL KUMAR – 1SI20CS024** of VI semester **Computer Science and Engineering**, **SIDDAGANGA INSTITUTE OF TECHNOLOGY** during the academic year 2022-2023.

Signature of the Guide
Mr. Raghavendra M M.E.
Assistant Professor

Signature of the Convener
Prof. Thejaswini S MTech
Assistant Professor

Signature of the HOD
Dr. A S Poornima
Prof. and Head, Department of CSE

Signature with Date

ACKNOWLEDGEMENT

First and foremost, I extend my heartfelt appreciation to my project supervisor Mr. Raghavendra M for their invaluable guidance, support, and expertise throughout the entire project. Their insightful feedback and continuous encouragement played a pivotal role in shaping the project's direction and ensuring its overall success.

I am immensely grateful to the Siddaganga Institute of Technology for providing me with the necessary resources, infrastructure, and access to relevant data, which were instrumental in conducting this research. The support and opportunities offered by the institute have been invaluable in the realization of this project. I am indebted to the academic community and researchers whose previous work served as a foundation for this project.

Their pioneering contributions and published studies provided valuable insights and frameworks that guided my research efforts. I would also like to express my gratitude to my family and friends for their unwavering support, understanding, and encouragement throughout this journey. Their belief in me and their constant motivation was vital in overcoming challenges and keeping me focused on the project's goals. At last, I would like to thank all the anonymous reviewers and individuals who provided feedback during the project's development and testing phases. Their critical input and constructive suggestions significantly contributed to improving the quality and effectiveness of the final product.

ABSTRACT

Terrorism remains a critical challenge to national security in India, necessitating the development of effective strategies to anticipate and prevent potential threats. This abstract introduces a terrorism vulnerability prediction model tailored specifically for Indian states. The model utilizes a data-driven approach, integrating historical data, socio-political factors, and geographical attributes to forecast the vulnerability of different states to terrorist activities. By leveraging advanced machine learning techniques, the model analyzes and identifies patterns, correlations, and trends within a diverse dataset, enabling accurate predictions of states at higher vulnerability.

The proposed model incorporates various data sources, including past terrorist incidents, socio-economic indicators, demographic information, and geopolitical factors, all relevant to the Indian context. By examining these multidimensional aspects, the model enhances the understanding of key indicators and risk factors associated with terrorism. Policymakers, law enforcement agencies, and security professionals can benefit from the model's predictive capabilities to allocate resources effectively, strengthen surveillance and intelligence gathering, and implement targeted counter-terrorism strategies at the state level. This proactive approach enhances security preparedness, reduces response time, and minimizes the potential impact of terrorist incidents in Indian states.

The integration of data-driven methodologies into counter-terrorism efforts is crucial for effective risk assessment and prevention. This research abstract emphasizes the significance of the terrorism vulnerability prediction model for Indian states. By combining historical data and advanced analytical techniques, the model assists in identifying states with a heightened risk of terrorist activities. This valuable tool empowers authorities to take preventive actions and strengthen security infrastructure accordingly. The model's accurate predictions contribute to the ongoing discourse on counter-terrorism strategies and provide a foundation for proactive measures to safeguard Indian states, ultimately enhancing national security.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Terrorism vulnerability is a crucial aspect of national security and is a major concern for many countries, including India. To effectively address and mitigate the threat of terrorism, it is important to clearly understand the vulnerability of different regions within the country toward terrorism. This visualization can be used to identify the states that are most at risk of terrorist attacks and understand the patterns and trends in terrorist activity across the country and develop effective strategies to counter-terrorism. The data visualization includes a map of the Indian territory which is colour coded with different colours to indicate the severity of the threat, with red indicating the highest risk. This visualization can be further analyzed to identify areas of high vulnerability and target resources accordingly.

The model will consider various factors that make a state more susceptible to terrorist attacks, including demographics, socioeconomic conditions, political instability, and past incidents of terrorism. To develop the model, we use data from the “The Global Terrorism Database” which includes various sources, including government reports, news articles, and academic research. We will employ data mining techniques to extract relevant data and identify the factors that significantly impact a state’s vulnerability to terrorism. By analyzing the resultant data, policymakers and security officials can identify the states that are most at risk and take steps to improve security and prevent future attacks. It can also help to inform public awareness campaigns and community preparedness efforts. Overall, terrorism vulnerability data visualization is a valuable tool for understanding and managing the threat of terrorism in India and with the potential to be further expanded for other countries, can be used to protect citizens and prevent terrorist attacks worldwide. The development of a terrorism vulnerability prediction model has numerous benefits for policymakers and security agencies in India. The model can help identify the areas where terrorist groups are likely to operate, allowing the authorities to take preventive measures. Additionally, the model can help to prioritize the allocation of resources to vulnerable areas to enhance the security infrastructure. Moreover, the model can serve as a tool to identify and address the underlying causes of terrorism, such as social and economic disparities.

The project's methodology will involve several stages: data collection, cleaning, feature selection, and model development. The model is trained using the data from the "The Global Terrorism Database" by START.inc with the dedication of being used for national security. The model is built on four hidden layers of neural network with ADAM's Optimization, with the resultant prediction being plotted using the Folium Map Library. The data visualization obtained can be specifically used for analyzing previous and evading future terrorist attacks.

CHAPTER 2

LITERATURE SURVEY

SL NO.	TITLE	AUTHOR	PUBLISHED	DESCRIPTION
1	Quantitative Analysis of Global Terrorist Attacks Based on the Global Terrorism Database	Tim Berners-Lee	2021	The research paper describes a study that used the Global Terrorism Database (GTD) to analyze past terrorist attacks and predict future trends. The grading standards for terrorist attacks were classified into five levels based on the degree of hazard, and the top ten terrorist attacks with the highest degree of hazard in the past two decades were listed. The study also used K-means cluster analysis to classify terrorists according to region, type of attack, type of target, and type of weapon used. The researchers identified several attacks that might have been committed by the same terrorist organization or individual at different times and in different locations, and the top five categories were selected based on the degree of sabotage inflicted by the organization or individual. Finally, the study analyzed the spatiotemporal evolution of terrorist attacks in the past three years and predicted that the Middle East, Southeast Asia, Central Asia, and Africa will be the regions most seriously affected by future global terrorist events. The study also found that civilians are the targets most at risk for terrorist attacks, and the corresponding risk index is

				considerably higher than it is for other targets. The results of the study can be used to improve awareness and prevent terrorism, enhance emergency management and rescue, and provide a solid and reliable basis for joint counterterrorism efforts in various countries and regions.
2	Crime Belt Monitoring via Data Visualization: A Case Study of Folium	Sunday Adeola Ajagbe, Matthew Abiola Oladipupo, Emmanuel O. Balogun	International Journal of Information Security, Privacy, and Digital Forensics Vol. 4, No. 2 June 2020	The research paper explores the use of data visualization tools, specifically Folium, to monitor and analyze crime patterns in Nigeria. The author highlights the issue of violent clashes and cattle rustling in Nigeria, particularly by the Fulani ethnic group, which has resulted in thousands of deaths and threatened national security. The author argues that data visualization tools are essential to effectively analyze and communicate the information contained in large datasets. Folium, a powerful library in Python, is used in the study to create several types of leaflet maps, with interactive features such as zooming and clicking to view details. The spatial data, which includes geographical features such as latitude, longitude, and altitude, is used to create a dashboard that can display crime patterns and trends. The paper provides a step-by-step guide on how to use Folium to create a crime belt monitoring system, which

				includes importing the necessary libraries, setting up the map, and displaying crime data. The author also shows how to create heat maps and choropleth maps using Folium, which can help identify areas with high crime rates. The study demonstrates the effectiveness of data visualization tools in analyzing and communicating complex data, with the potential to improve decision-making and increase situational awareness for law enforcement and security agencies.
3	Activation Functions: Dive into an optimal activation function	Vipul Bansal	2022	This survey explores the importance of activation functions in neural networks and evaluates the performance of various activation functions in terms of training speed and accuracy. The paper provides an overview of the most commonly used activation functions and presents a comparative analysis of their performance on various datasets. The results indicate that the choice of activation function can significantly impact the performance of a neural network and that certain functions are better suited for specific tasks. The paper concludes by recommending the use of the optimal activation function based on the specific task and dataset at hand.
4	Exploratory Data Analysis of Towing Operations in	Rangavittal Narayana	Journal of Geography, Environment, and Earth	The author uses Folium to create an interactive map of towing activity across the city. The paper shows how

	Washington DC using Python Folium Library		Science International in December 2021	the Folium library can be used to visualize spatial data, including the use of colour coding and other visual elements to highlight patterns and trends in the data. The author also created a time-series map using Folium, which showed the change in towing activity over the course of a year. The paper discusses the potential applications of this approach for transportation planning and management in urban areas, as well as the benefits of using interactive maps to visualize and explore complex datasets.
5	A Survey on Activation Functions for Deep Learning	Xinyu Zhao, Xianzhi Wang, and Chunyan Xu	Neural Computing and Applications in 2021	The research paper discusses the importance of activation functions in deep learning and provides a comprehensive survey of various activation functions. The paper the role of activation functions in deep learning and the impact on the performance of neural networks. It then provides a detailed explanation of various activation functions such as sigmoid, hyperbolic tangent (tanh), rectified linear unit (ReLU), leaky ReLU, parametric ReLU (PReLU), exponential linear unit (ELU), scaled exponential linear unit (SELU), and maxout. The authors discuss the advantages and disadvantages of each activation function and provide examples of when each activation function might be useful. They also provide a comparison of the

				activation functions in terms of their performance and speed of convergence. The paper also discusses recent advancements in activation functions such as Swish and Mish. Overall, this paper provides a comprehensive survey of activation functions in deep learning, their advantages and disadvantages, and their impact on the performance of neural networks.
6	Unsupervised Initialization for Training Deep Feedforward Neural Networks	Yuhuang Hu	2021	In this paper, the authors propose a new unsupervised weight initialization method that uses principal component analysis (PCA) to initialize the weights of a deep neural network. The method starts by training a shallow autoencoder on the data and then uses the PCA components of the encoder weights to initialize the weights of the deep neural network. The authors demonstrate that their method can achieve competitive performance on various benchmark datasets.
7	On the Convergence of Adam and Beyond	Sashank J. Reddi	International Conference on Learning Representations (ICLR) in 2018	This research paper provides an analysis of the ADAM optimization algorithm and its variants and evaluates their performance on a variety of datasets. The authors show that while ADAM is effective in many cases, it can lead to poor convergence on certain types of problems and that there is a need for more robust optimization algorithms.

CHAPTER 3

PROBLEM STATEMENT AND OBJECTIVES

PROBLEM STATEMENT

Terrorism is a significant threat in India, and the country has experienced numerous terrorist attacks in the past. To prevent future attacks, it is essential to have an accurate and reliable terrorism vulnerability prediction model that can identify the states at the highest risk of terrorist attacks. The model can be built using a data-driven approach, leveraging various indicators such as historical terrorist activities, and security infrastructure all contained in the "Global Terrorism Database".

To develop an effective terrorism vulnerability prediction model for Indian states, it is necessary to analyze and process a massive amount of data using advanced analytical techniques such as machine learning algorithms. The model should identify the most significant indicators of vulnerability and develop a weighted index to rank the states based on their vulnerability. It should also identify the key factors that influence vulnerability and use these factors to develop a predictive model. The model should be validated against historical data and refined as new data becomes available to ensure its accuracy.

The terrorism vulnerability prediction model for Indian states can be a game-changer for the government and security agencies in India. The model can help them to allocate resources effectively and prioritize their efforts to prevent and mitigate the impact of terrorist attacks. By identifying the emerging threats and potential hotspots of terrorist activities, the model can enable early intervention and prevention. The model's scalability and adaptability to new data and changes in the security landscape can ensure its long-term effectiveness. Ultimately, the model can enhance the preparedness of the government and security agencies in India to prevent and mitigate the impact of terrorist attacks.

OBJECTIVES

The objectives of a terrorism vulnerability prediction model for Indian states could include:

- Identifying high-risk areas: The model could be used to identify regions within each Indian state that are most susceptible to terrorist activities. This would help security agencies prioritize their resources and take pre-emptive measures to prevent attacks.

- Assessing potential targets: The model could also be used to assess the vulnerability of different types of targets, such as public transportation, government buildings, or tourist attractions, and help security agencies take preventive measures to protect these sites.

- Predicting future threats: By analyzing patterns and trends of past terrorist attacks, the model could help predict potential future threats and provide early warning to security agencies.

- Developing effective counter-terrorism strategies: The insights from the model could be used to develop effective counter-terrorism strategies, including increasing surveillance, intelligence gathering, and enhancing security measures.

- Mitigating economic impact: Terrorism can have a significant economic impact, especially in regions that heavily rely on tourism or other industries. A vulnerability prediction model could help identify potential threats to these industries and help develop strategies to mitigate the economic impact of terrorist attacks.

- Understanding the modus operandi of terrorist groups: The model could help identify the tactics, techniques, and procedures (TTPs) of terrorist groups and their preferred targets. This information could be used to develop effective counter-terrorism strategies and enhance the preparedness of security agencies.

- Enhancing inter-agency coordination: A terrorism vulnerability prediction model could be used as a tool for different security agencies to collaborate and share information, which can lead to more efficient and effective counter-terrorism efforts.

- Building public confidence: Terrorism can create fear and anxiety among the public. A vulnerability prediction model could help security agencies be better prepared to prevent attacks, which could help build public confidence and trust in the ability of security agencies to keep them safe.

CHAPTER 4

SYSTEM DESIGN

The system architecture for a terrorism vulnerability prediction model for Indian states is designed as follows:

Data collection: The first step in developing a terrorism vulnerability prediction model is to collect relevant data. This includes data on past terrorist attacks in India, the presence of terrorist groups, and the security measures in place. The data is obtained from a range of sources, including government agencies, academic research, media reports, and public records. The "Global Terrorism Database" by START.inc was utilized for this purpose.

Data Preprocessing: Encompass cleansing and preprocessing of the collected data to ensure consistency and remove any inconsistencies or errors. This step involves data cleaning, feature extraction, normalization, and handling missing values.

Feature Engineering: Identification and selection of the most informative features from the pre-processed data. This involves statistical analysis, domain expertise, and data exploration techniques. Features may include factors like geographic location, population density, economic indicators, social unrest, and past terrorist activities.

Model Selection: Selection of an appropriate machine learning or statistical model for predicting terrorism vulnerability based on the selected features. The "Terrorism Vulnerability Prediction Model" is based on neural networks which in collaboration with Adam's Optimizer. The choice of model depends on the complexity of the problem and the available data.

Training and Validation: Training the selected model using the training data and tuning its parameters to optimize performance. The model is validated and tested to ensure that it is accurate and reliable. This involves using historical data to evaluate the model's performance in predicting past attacks, as well as testing the model on new data to assess its ability to predict future attacks. Iteratively refining the model if necessary.

Model Deployment: Once the model achieves satisfactory performance, deployment of the model into a production environment where it can be utilized for real-time predictions. It can be implemented to inform counter-terrorism efforts. The model could be used to identify high-risk areas, assess potential targets, and predict future threats, as well as to develop effective counter-terrorism strategies.

Monitoring and Evaluation: Continuously monitor the model's performance and evaluate its predictions against new data and real-world incidents. Implement mechanisms for feedback and retraining if the model's performance deteriorates over time or if new factors need to be considered.

CHAPTER 5

HIGH-LEVEL DESIGN

The methodology of a terrorism vulnerability prediction model for Indian states would depend on several factors, including the available data, the scope of the analysis, and the desired outcome. However, a general methodology for developing such a model could involve the following steps:

Data collection: The first step in developing a terrorism vulnerability prediction model is to collect relevant data. This could include data on past terrorist attacks in India, the presence of terrorist groups, and the security measures in place. The data could be obtained from a range of sources, including government agencies, academic research, media reports, and public records.

Data preparation and analysis: The data collected in the previous step would need to be cleaned, processed, and analyzed to identify patterns and trends that could be used to predict vulnerability. This could involve using statistical methods and machine learning algorithms to identify correlations and relationships between different variables.

Feature engineering: The analysis could be used to create new features or variables that could be used to predict vulnerability. For example, if the analysis indicates that terrorist attacks are more likely to occur in areas with high population density and low-security measures, these factors could be used as features in the model.

Model development: Once the features have been identified, a predictive model can be developed using machine learning algorithms. This could involve using techniques such as logistic regression, decision trees, or neural networks to predict the likelihood of a terrorist attack occurring in a particular region.

Model validation and testing: The model would need to be validated and tested to ensure that it is accurate and reliable. This could involve using historical data to evaluate the model's performance in predicting past attacks, as well as testing the model on new data to assess its ability to predict future attacks.

Implementation: Once the model has been validated and tested, it can be implemented and used to inform counter-terrorism efforts. The model could be used to identify high-risk areas, assess potential targets, and predict future threats, as well as to develop effective counter-terrorism strategies.

Monitoring and updating: The model would need to be continuously monitored and updated to ensure that it remains accurate and relevant. This could involve updating the data used in the model, as well as refining the algorithms and techniques used to predict vulnerability.

CHAPTER 6

TOOLS AND TECHNOLOGY

HARDWARE REQUIREMENT

Hardware	Minimum Requirement
Processor:	1.4 GHz 64-bit, Intel i3(or above) or AMD
Memory:	2 GB or more
Disk Space:	32 GB or more,10 GB or more for Foundation Edition
Operating System:	Windows, Linux, Mac
Display:	(800 × 600) Capable video adapter and monitor

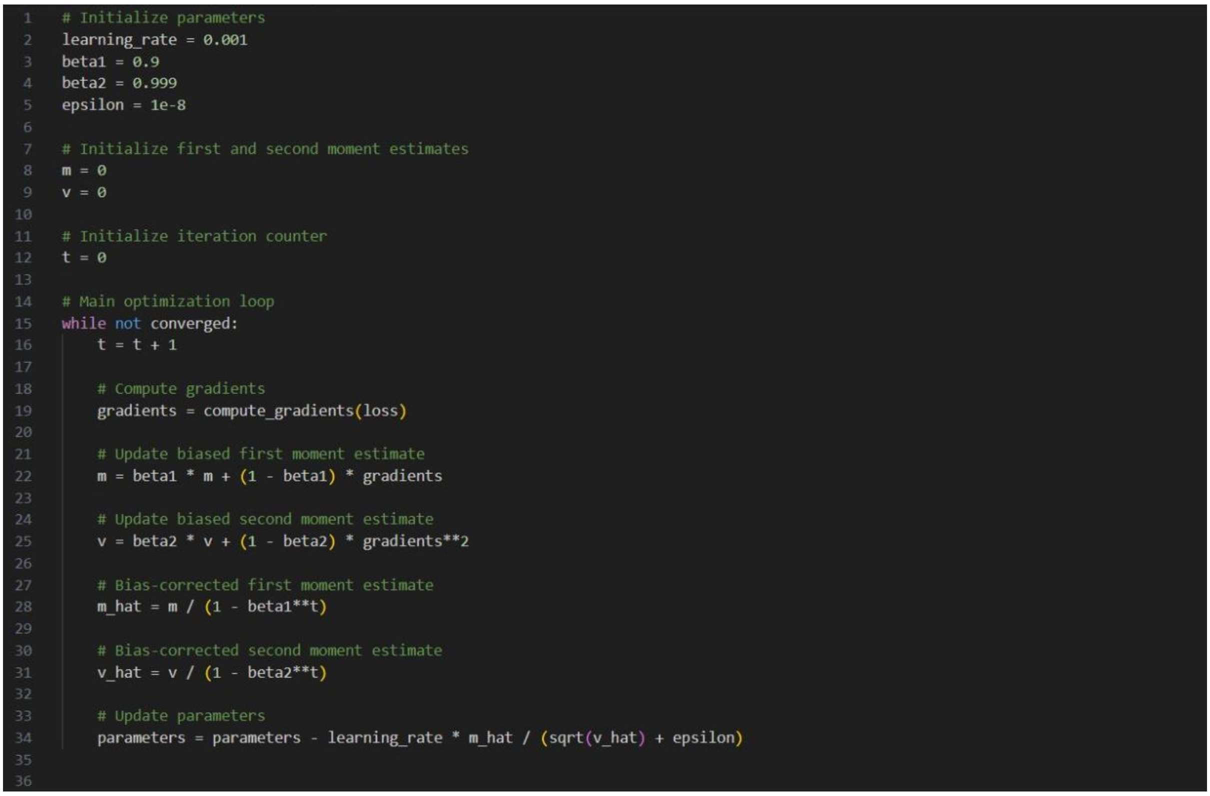
SOFTWARE REQUIREMENT

Code Editor:	Visual Studio Code
Languages:	Python, HTML
Distribution:	Anaconda
IDE:	Jupyter Notebook, Google Colab
Libraries:	Folium, NumPy, Matplotlib
Packages:	Pandas, JSON, OS
Version Control:	Git and GitHub
Microsoft Office Tools:	Excel, Word, PowerPoint
Browser:	Google Chrome, Firefox (or any other)

CHAPTER 7

IMPLEMENTATION

The Terrorism Vulnerability Data Visualization Model implements the ADAM's Optimizer algorithm



```
# Initialize parameters
learning_rate = 0.001
beta1 = 0.9
beta2 = 0.999
epsilon = 1e-8

# Initialize first and second moment estimates
m = 0
v = 0

# Initialize iteration counter
t = 0

# Main optimization loop
while not converged:
    t = t + 1

    # Compute gradients
    gradients = compute_gradients(loss)

    # Update biased first moment estimate
    m = beta1 * m + (1 - beta1) * gradients

    # Update biased second moment estimate
    v = beta2 * v + (1 - beta2) * gradients**2

    # Bias-corrected first moment estimate
    m_hat = m / (1 - beta1**t)

    # Bias-corrected second moment estimate
    v_hat = v / (1 - beta2**t)

    # Update parameters
    parameters = parameters - learning_rate * m_hat / (sqrt(v_hat) + epsilon)

```

- learning_rate represents the step size that determines how quickly the optimizer adjusts the parameters.
- beta1 and beta2 are exponential decay rates for the first and second moments, respectively.
- epsilon is a small constant added to the denominator for numerical stability.
- m and v are the first and second moment estimates initialized to zero.
- t is the iteration counter.
- compute_gradients (loss) calculate the gradients of the loss function with respect to the parameters.
- parameters are the model parameters being optimized.

The ADAM optimizer computes exponentially decaying averages of past gradients (m) and past squared gradients (v) and then uses these estimates to update the parameters. The division by the bias-corrected first and second-moment estimates (m_hat and v_hat) ensures that the updates are appropriately scaled.

CHAPTER 8

RESULT

Based on the objectives mentioned, here are the expected tangible outcomes for a terrorism vulnerability prediction model for Indian states:

- Targeted Security Measures: The increased presence of security personnel and resources in identified high-risk areas. Implementation of physical security measures, such as surveillance cameras, checkpoints, and access controls, in vulnerable locations. Improved security protocols and practices to protect potential targets, such as public transportation, government buildings, and tourist attractions.

- Timely Intervention and Prevention: Early detection and prevention of potential terrorist threats through proactive measures. Prevention of attacks and reduction in the number of successful terrorist incidents. Disruption of terrorist activities through targeted interventions based on the model's predictions.

- Strategic Counter-Terrorism Strategies: Informed decision-making in developing and refining counter-terrorism strategies based on the insights provided by the model. Identification of trends, patterns, and modus operandi of terrorist groups, enabling targeted and intelligence-driven operations. More effective utilization of resources and capabilities to combat terrorism at a strategic level.

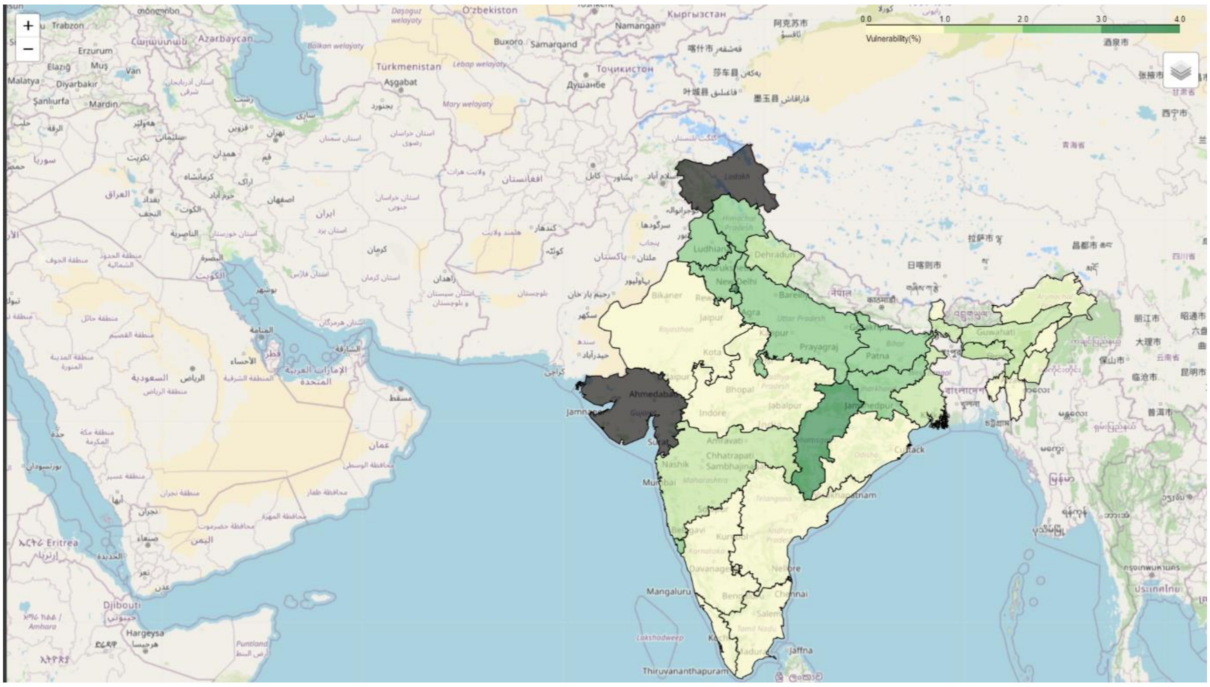
- Safeguarding Economic Sectors: Protection of industries and economic sectors vulnerable to terrorist attacks, such as tourism, transportation, and critical infrastructure. Minimization of disruptions and economic losses caused by terrorist incidents. Preservation of investor confidence and promotion of a secure environment for business and economic growth.

- Strengthened Inter-Agency Collaboration: Enhanced coordination, information sharing, and collaboration among security agencies, intelligence organizations, and law enforcement agencies. Improved joint efforts in intelligence gathering, threat assessment, and preventive actions against terrorism. Streamlined and efficient exchange of information and resources for a comprehensive counter-terrorism approach.

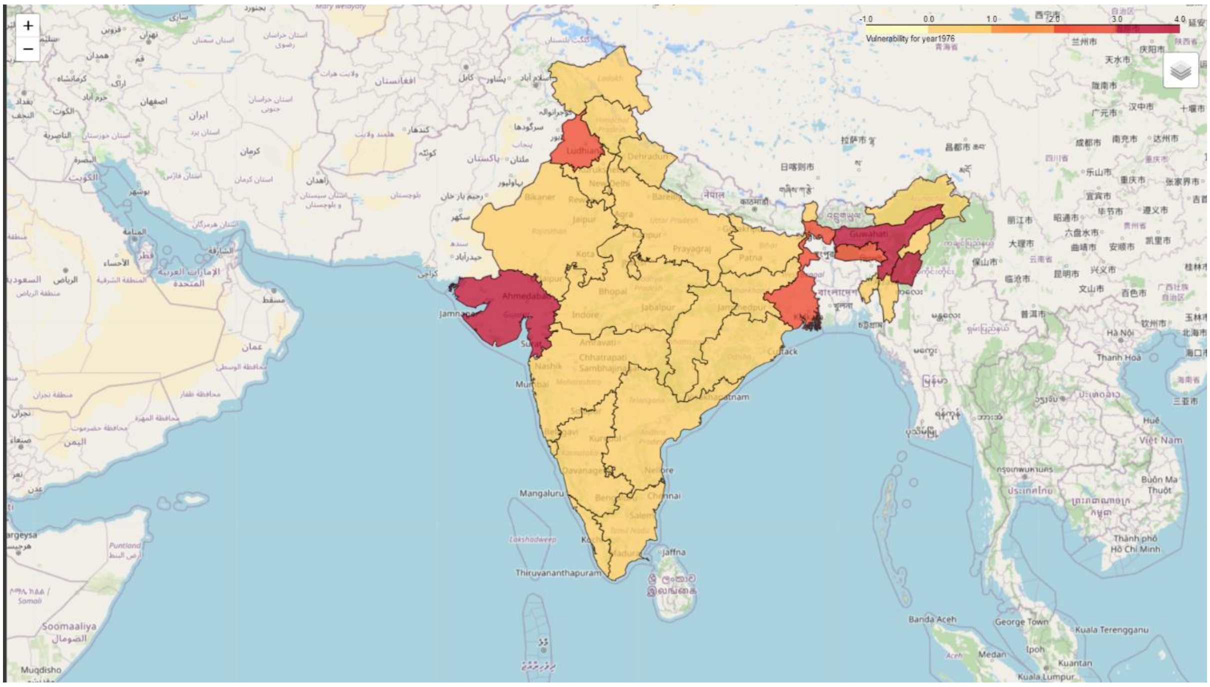
- Public Confidence and Trust: Increased public confidence in the ability of security agencies to prevent and respond to terrorist threats. Improved perception of safety and security among citizens, residents, and visitors. Heightened trust and cooperation between the public and security agencies, leading to increased reporting of suspicious activities and community engagement in counter-terrorism efforts.

CHAPTER 9

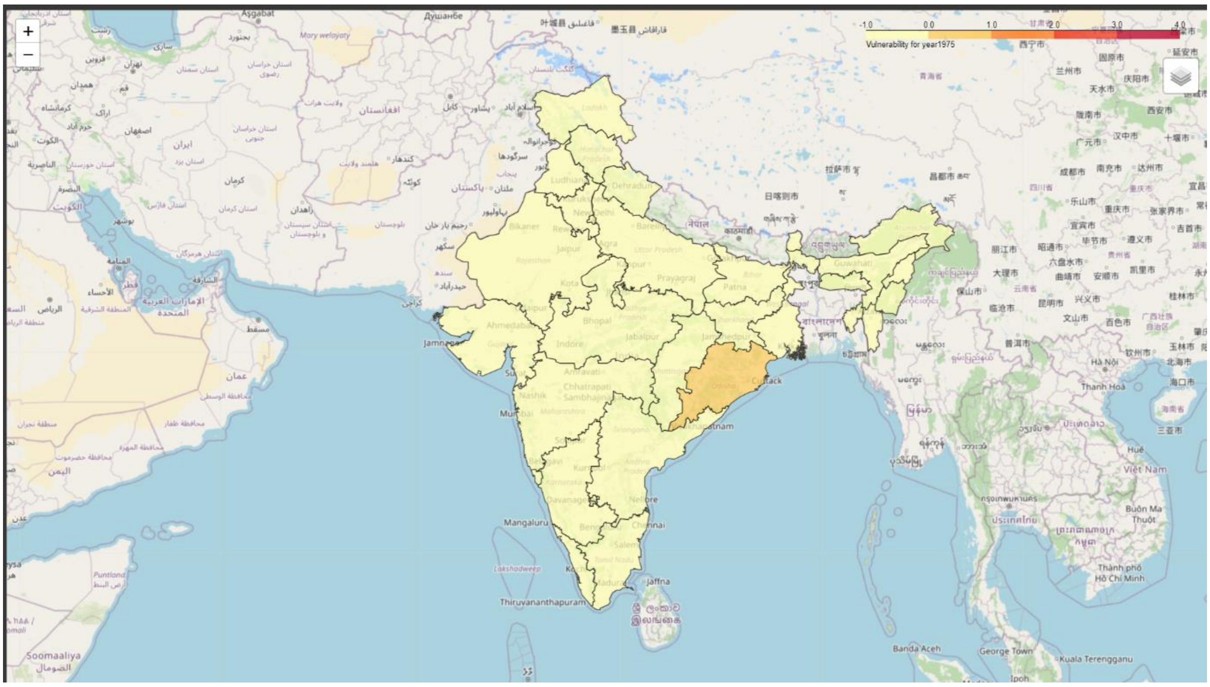
SNAPSHOTS



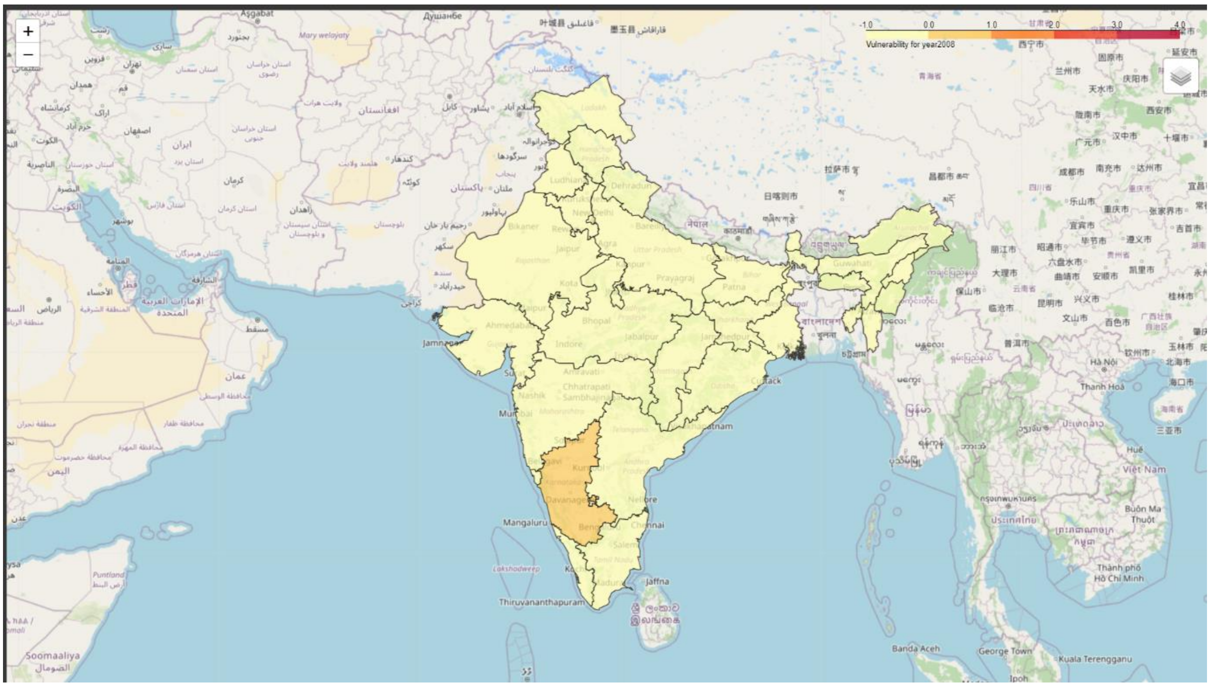
Visualization



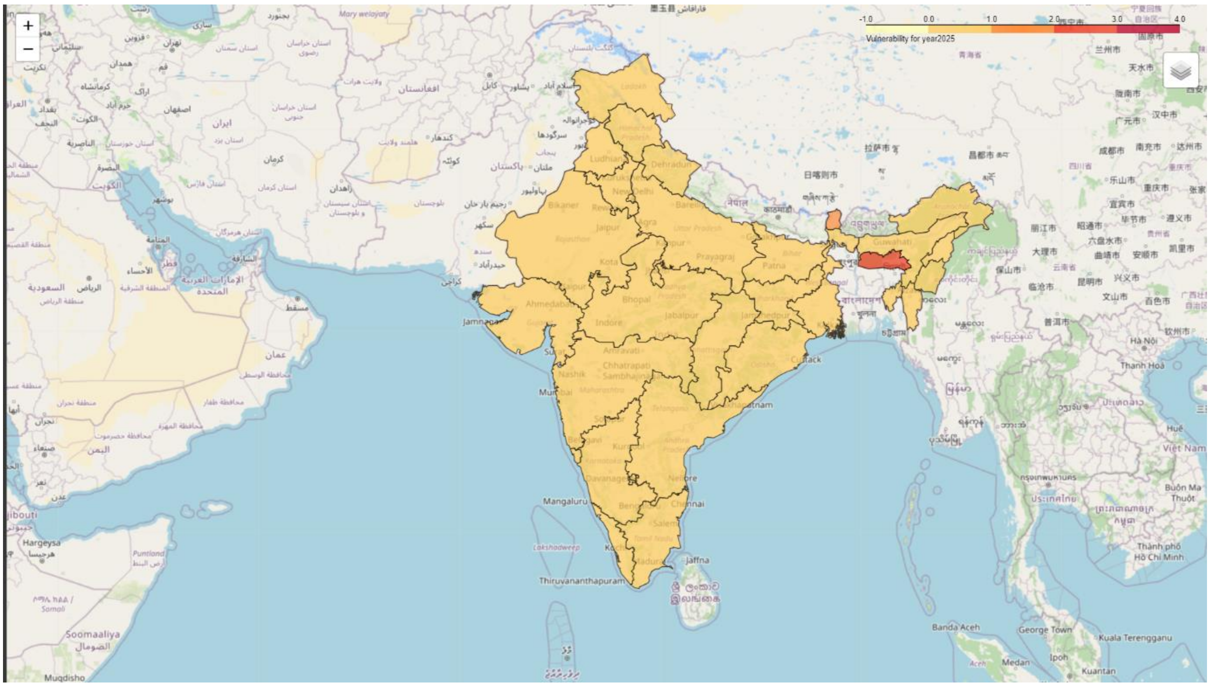
Prediction for All States in 1976



Prediction for Orissa in 1975



Prediction for Karnataka in 2008



Prediction for All in 2025

CHAPTER 10

CONCLUSION

Terrorism is a global issue that affects every country and poses a significant threat to public safety and security. In India, terrorist activities have been a major concern for many years, with several terrorist organizations operating in different parts of the country. These organizations aim to cause harm to civilians, disrupt the peace and stability of the country, and challenge the authority of the government. Therefore, it is essential to develop effective strategies to combat terrorism and ensure the safety of citizens.

The terrorism vulnerability prediction model can identify potential high-risk areas and predict possible terrorist activities. Such a model can be developed using data science and data visualization techniques, which involve analyzing vast amounts of data and extracting meaningful insights. The data used to develop the model can include historical information on terrorist activities, socio-economic indicators, demographic information, and geographical features. Data visualization techniques can then be employed to present the findings in a visually appealing and understandable manner. The output of the model can be in the form of a risk map that indicates the likelihood of terrorist activities in different areas.

The implementation of a terrorism vulnerability prediction model can be a significant step in preventing and combating terrorism. By providing an early warning system, law enforcement agencies and government officials can take proactive measures to prevent terrorist attacks and ensure the safety of citizens. However, it is crucial to ensure that the model is continuously updated and refined to incorporate new data and variables to ensure its accuracy and effectiveness.

In conclusion, the development of a terrorism vulnerability prediction model for Indian states can be a useful tool in predicting potential terrorist activities and identifying high-risk areas. The use of data science and data visualization techniques can facilitate the development of the model and ensure its accuracy and effectiveness. The implementation of the model can assist in taking proactive measures to prevent terrorist attacks and protect citizens, thereby contributing to the overall safety and security of the country.

CHAPTER 11

REFERENCES

- Global Terrorism Database (GTD): https://www.start.umd.edu/gtd/
- Folium Official Documentation: https://python-visualization.github.io/folium/
- Official Jupyter Documentation: https://jupyter.org/documentation
- Quantitative Analysis of Global Terrorist Attacks Based on the Global Terrorism Database [Tim Berners-Lee 2021]
- Crime Belt Monitoring via Data Visualization: A Case Study of Folium [Sunday Adeola Ajagbe, Matthew Abiola Oladipupo, Emmanuel O. Balogun, 2020]
- Activation Functions: Dive into an optimal activation function [Vipul Bansal, 2022]