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Computer Engineering Department

CENG463 – Machine Learning

PROJECT PROPOSAL

EXECUTIVE SUMMARY AND OBJECTIVE: This project focuses on predicting and classifying terrorism incidents worldwide using machine learning techniques. By analyzing historical data on terrorist activities, the project aims to predict the likelihood of a terrorist attack in a specific region and timeframe and classify the type of potential attack. This project will include data preprocessing to prepare the dataset for analysis, followed by model training and evaluation using key metrics like accuracy, precision, and recall. The predictive model will help policymakers and security agencies allocate resources more effectively by identifying high-risk areas and potential attack types, enhancing prevention and response efforts.

1. PROJECT OVERVIEW

Project Title :	Predicting Terrorism Incidents Using Machine Learning
Project Team :	1. Faruk Kapan, 21050111026 2. Ali Emre Pamuk, 21050111021 3. Mert Altekin, 21050111065
Project Topic :	This project will use machine learning techniques to predict the likelihood and type of terrorist incidents based on historical data. This dual approach provides a comprehensive risk assessment, assisting policymakers and security agencies in identifying high-risk regions and preparing for probable attack types.

2. PROJECT DETAILS

• ALGORITHMS AND METHODS:

Prediction Model: The first model aims to predict the likelihood of a terrorist attack occurring in a given time and place, leveraging regression techniques. Initially, Linear Regression or Polynomial Regression will be applied in exploratory analysis to capture any potential temporal trends or cyclical patterns in attack frequency.

Classification Model: The second model will classify the type of attack likely to occur if an attack is predicted. This model will utilize classification algorithms like Support Vector Machines (SVM) or Probabilistic Classifier with features such as geographic location, weapon type, and target category.

Data Preprocessing: Preparing the dataset for analysis, including data cleaning, handling missing values, encoding categorical variables, and splitting the dataset into training and testing sets.

Model Training and Evaluation: Each model will be trained on separate training sets and evaluated for performance. Key evaluation metrics such as accuracy, precision, recall, and confusion matrix will be used to assess how well the models perform in predicting and classifying terrorist attacks.

Reporting: Reporting of findings. After training and evaluating model, a comprehensive report including methodology, results and analysis will be prepared.

● **EVALUATION METRICS:**

Accuracy: Measures the proportion of correctly classified instances overall.

Precision: Indicates the proportion of true positives out of all predicted positives..

Confusion Matrix: A tool to visualize true positives, false positives, true negatives, and false negatives, helping to identify classification errors and improve accuracy.

- **DATASET:** The project will use the “Global Terrorism Database (GTD)”, a comprehensive dataset containing global terrorism incidents with attributes such as location, type of attack, weapon used, and number of casualties.

● **TIMELINE:**

Week 1	Data collection and preliminary analysis.
Week 2	Data preprocessing.
Week 3	Model training and evaluation.
Week 4	Results reporting and presentation preparation.

● **DELIVERABLES:**

- a) A predictive model that estimates the likelihood and type of terrorist attacks based on historical data.
- b) A final report detailing the methodology, results, and key insights.
- c) A presentation summarizing findings and recommendations.