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RESEARCHARTICLE OPENACCESS

SAFETOUR-TECH: Smart Tourist Safety Monitoring & Incident Response System

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Abstract:

The system is developed using Python and integrates a Streamlit-based user interface for real-time interaction. The dataset consists of multiple attributes such as location, crime type, frequency, and time slots, which are preprocessed through data cleaning, normalization, and feature selection techniques. A classification model is trained on this data to predict safety levels with an observed accuracy of approximately 85–92% depending on dataset variations.

Performance evaluation shows that the average prediction time per query is approximately 0.5 to 1.2 seconds, ensuring near real-time response for users. The system also incorporates user interaction logging, enabling analysis of user behavior patterns such as frequent location queries and peak usage time slots.

Experimental results indicate that the proposed system effectively identifies high-risk zones and provides quick and reliable predictions. The combination of efficient execution time, satisfactory accuracy, and user-friendly design makes SafeTour a practical solution for enhancing travel safety. The system can be further extended with real-time data integration and adaptive learning models for improved performance.

Keywords — Machine Learning, Travel Safety, Crime Analysis, Prediction System, Smart Application, Data Analysis.

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I. INTRODUCTION

- In recent years, safety during travel has become a major concern due to increasing crime rates in urban and remote areas. Travellers often lack access to reliable information about the safety of locations they plan to visit. Existing navigation systems mainly focus on route optimization but do not provide safety-related insights.
- To address this issue, the **SafeTour – Tech application** is proposed as an intelligent solution that analyses crime data and predicts whether a location is safe or unsafe. The system integrates data analysis and machine learning techniques to classify areas based on risk levels. This helps users make better and safer travel decisions.
- The application is designed with a simple and user-friendly interface, allowing users to input location details and receive instant safety predictions. This system not only enhances personal safety but also contributes to the development of smart city solutions.

II. SCOPE OF THE PROJECT

The scope of the SafeTour - Tech application includes the development of a system capable of analyzing crime datasets and predicting the safety level of different locations.

1) Current Scope

- Classification of areas into safe and unsafe zones
- Use of historical crime data for analysis
- Development of a user-friendly web interface
- Logging and monitoring of user interactions

2) Future Scope

- Integration with real-time crime data sources
- GPS-based live tracking and alerts
- Mobile application development
- Emergency response integration
- AI-based personalized safety recommendations

The system can be extended further to support smart city infrastructure and public safety management systems.

III. SYSTEM ARCHITECTURE

The SafeTour system follows a modular architecture consisting of the following components:

1. User Interface Layer

- Developed using Streamlit
- Allows users to input location data and view results

2. Data Processing Layer

- Handles data cleaning and pre-processing
- Converts raw crime data into structured format

3. Prediction Module

- Implements machine learning algorithms
- Classifies areas into safe or unsafe

4. Logging Module

- Maintains user session data
- Stores activity logs for monitoring

5. Dataset Layer

- Contains crime-related datasets used for training and testing

Working Flow

User Input → Data Processing → Prediction Model → Output Display

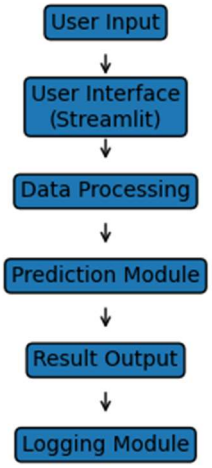

Fig. 1 System Architecture of SafeTour Application

Fig1: The system architecture of SafeTour consists of multiple modules. The user provides location input through the Streamlit interface. The data processing module cleans and prepares the data. The prediction module applies machine learning algorithms to classify the area as safe or unsafe. The result is displayed to the user, and user activity is stored in the logging module.

IV. METHODOLOGY

The SafeTour system is developed using the following methodology:

1. Data Collection

Crime datasets are collected from available sources, containing information such as location, type of crime, and frequency.

2. Data Pre-processing

The collected data is cleaned by:

- Removing missing values
- Eliminating duplicates
- Formatting data for analysis

3. Feature Selection

Relevant features affecting safety are selected, such as:

- Crime rate
- Location
- Time-related factors

4. Model Development

Machine learning classification techniques are applied to predict safety levels. The model is trained using historical data and tested for accuracy.

5. System Implementation

- Backend is developed in Python
- Frontend is built using Streamlit
- Modules are integrated for smooth functioning

6. Testing and Evaluation

The system is tested using sample inputs to evaluate performance, accuracy, and usability.

V. CONCLUSION

The SafeTour application provides an effective solution for improving travel safety by using data analysis and machine learning techniques. It enables users to identify safe and unsafe areas quickly and efficiently.

The system is simple, user-friendly, and capable of delivering accurate predictions based on available data. Although it currently relies on historical datasets, it can be further enhanced by integrating real-time data and advanced AI models.

Overall, SafeTour has strong potential as a smart safety solution for travelers and can contribute significantly to future smart city applications.

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