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CIVIC EYE : AI - Powered Public Safety Assistant

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Abstract: No ways rapidly rising crime rates due to digital fraud and which is limited access to real-time environmental updates, group of users struggle to stay informed and get quick assistance through various emergencies situations. This paper mainly focus on develops an intelligent, secure interactive chatbot to support strengthen for public safety for safely livelihood and digital crime , fraud awareness. This awareness acting as a digital link up between users and law enforcement securely, the chatbot identifies to provides local crime statistics with auto updates, practical safety guidelines, and access to essential support customer support services. It majorly queries a controlled crime dataset to assist user requests and helps users understand nearby current crime patterns and trends. Using NLP and ML methods, the proposed system identifies user intent and key challenging entities to generate exact accurate, conversational replies based on situational demands. The designed chatbot is wisely neural network model for query deep classification and NLTK for text cleaning, image and preprocessing. It also supports additionally online complaint registration, confirmations nearby police stations through an interactive map connecting platforms, and includes an SOS alert feature for urgent situations using Traffic Management System to it improves user accessibility, awareness, and communication for safer communities.

Keywords: Public Safety Chatbot, Crime Awareness System , NLP, Neural Network–Based Query Classification.

1. Introduction

Accessible real-time criminal awareness and user public safety support systems are becoming more and more essential as a consequence of quick development and expanding population mass. In the way users have frequently lack of data access to connected timely user information on local law enforcement resources, crime trends, and emergency support based on real-time alert monitoring system. The helpfulness of up-to-date crime data and online complaint registration platforms for the citizens often limited access their data complexity and lack of user-friendliness on existing social environment. Based on various crimes issues, used to analyze the Crime-Awareness-Bot offers too an interactive chatbot-based auto responsive solution that uses interactive progress natural language interaction to share automatic crime-related information to concerned parties. Based on analyzed data training crime datasets, the analyzed system permits users to get assistance, receive awareness messages automatically, and query crime statistics to share connected parties. The bot analyses automatically real time user input responsive and auto verifies based on existing data to analyses users safety and crime possibility statistics in a up-front conversational way. Statically user analyses environment based crime awareness, the initiative analyses offers features, which is used to complaint support and an SOS feature that uses users integrated real time map location and that services to help users find local police stations, connected authorized parties, and that facilitate quicker way access to law enforcement resources and improve real-time usability too Crime-Awareness-Bot enhances public engagement with crime data and encourages safer public community interactions.

2. Literature Survey

Mandalapu et al. [1], mainly projected to view to enhancing a realistic data analysis using ML and DL techniques for crime prediction. Analyzed datasets using currents trends, and difficulties, based on trending crimes happened. Which is very useful to justify subjective based algorithm selection ROI and emphasizes difficulties to identifies the data quality and interpretability too connect chatbot systems that interact with users. In their based on evaluation of the application of

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analyzed chatbots to assist the criminal justice system, Camello et al. [2] mainly focused on increased auto accessibility and decreased administrative work load for access publicly. The study backs up chatbots' appropriateness for use in public safety applications. It does not, however, suggest an integrated architecture that integrates SOS services, complaint support, and crime statistics. In their assessment of social media analytics for criminal investigations, Shakya and Ceh-Varela [3] covered techniques, patterns, and difficulties in obtaining useful data. Their research is pertinent to expanding crime awareness systems outside of organized datasets. Nevertheless, real-time emergency support is not directly addressed by social media data, which is noisy.

The online crime reporting system described by Pankaj Borde et al. [4] enhances citizen-law enforcement communication via a secure online platform. Both user trust and reporting efficiency are increased by the system. Natural language interaction and dataset-driven criminal awareness aspects are absent, nevertheless. Usability and trust were found to be important predictors of public acceptance of online crime reporting systems by Chan and Chau [5]. The difficulties in user acceptability of digital reporting are explained by their findings. AI-based conversational bots for safety support and guided reporting are not included in the study, nevertheless.

Varun Mandalapu et al. (2023) [6] published a systematic review on crime prediction using machine learning and deep learning, surveying over 150 articles and synthesizing trends in algorithmic crime forecasting and model performance. This work is valuable for understanding how data-driven models can anticipate crime patterns but is focused on prediction accuracy and algorithmic evaluation, not on public-facing awareness or reporting interfaces that combine NLP and location services.

Gerber [7] explored the use of machine learning techniques to forecast crime patterns using historical and spatio-temporal data. The study demonstrated that predictive models can support proactive policing and resource allocation. However, it focuses on analytical prediction rather than real-time public interaction or citizen-oriented chatbot assistance [12].

2.1. Research Gaps

Despite the advances highlighted above, existing research and systems exhibit several limitations that our project aims to address:

Limited Location-Aware Assistance : Most existing crime awareness and reporting systems focus on information delivery or complaint submission but lack real-time location-based SOS support. This restricts their utility in pointing consumers to neighbouring police stations or emergency services during crucial situations [8].

Restricted Conversational Intelligence : In spite of existence used in public service systems, to used chatbots lack of interaction data models. This lowers answer accuracy and decreases user participation in safety advice and crime reporting.

Insufficient Dataset-Driven Awareness : The focus of current research on crime prediction is on backend statistical analysis for use by law enforcement. However, public-facing platforms that inform individuals about crime trends and offer preventive advice seldom use these insights [9].

Narrow and Fragmented Functionality : The majority of current systems manage awareness, support, and reporting of crimes independently. Few combine SOS emergency features, dataset-driven awareness, and conversational assistance into a single, cohesive public safety platform.

Filling Research Gaps with Our Project : By combining several features into a unified system, the Crime-Awareness-Bot is intended to fill up the aforementioned gaps.

Integrated Location-Based SOS Support: The Crime-Awareness-Bot has a real-time SOS feature that locates local police stations using location services. This increases user safety in emergency situations and guarantees prompt access to emergency aid.

Advanced NLP-Based Interaction : In order to comprehend user intent and produce context-aware responses, our system uses Natural Language Processing algorithms. This facilitates easy conversational counsel for questions on crime awareness and help with complaints.

Dataset-Driven Crime Awareness Delivery : In order to give users area-specific crime statistics and awareness messages, the suggested system incorporates structured crime datasets. In doing so, backend criminal analysis is converted into useful, publicly available data [10].

Unified and User-Friendly Platform : SOS services, intelligent chatbot conversation, complaint guidance, and awareness messages are all integrated into one interface by the Crime-Awareness-Bot. Public interaction with criminal safety systems is strengthened by this cohesive design, which also improves usage [11].

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3. Proposed Methodology

In order to accomplish intelligent criminal awareness and public safety support, the criminal-Awareness-Bot approach describes the system's architectural design, development methods, software/hardware requirements, data processing pipeline, and interface mechanisms.

3.1. System Architecture and Flow

The Crime-Awareness-Bot is a web-based conversational intelligent system that integrates Natural Language Processing (NLP),dataset-driven crime information retrieval, complaint assistance, and location-based SOS functionality

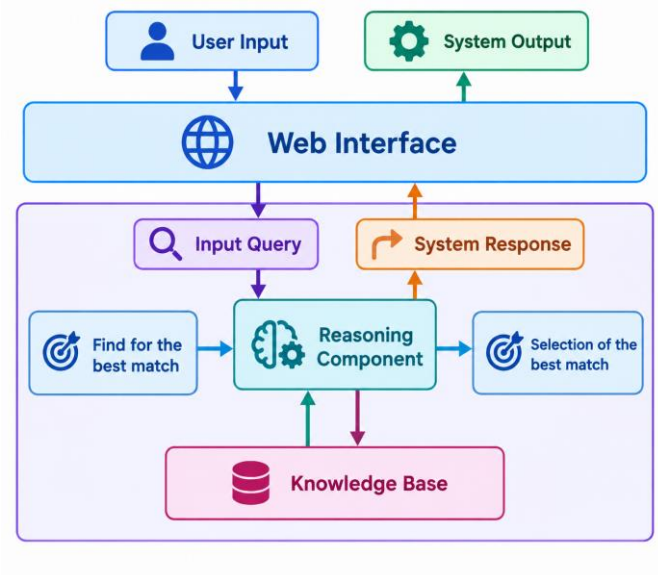

Figure.1 Architecture of the Web-Based Reasoning System

The figure illustrates the workflow of the proposed web-based reasoning system. User queries are submitted through the web interface and processed by the reasoning component, which searches the knowledge base to identify the best matching response. The selected response is then returned to the user as system output, enabling efficient and accurate query handling.

3.2. Software Components

The following software technologies are used in the implementation:

Backend: Python with Django REST Framework handles chatbot requests, dataset queries, and response routing.
NLP Module: Dialogflow is used for intent recognition and entity extraction, while NLTK supports text tokenization and preprocessing.
Frontend: React with JavaScript, HTML
Geolocation Services: MapBox APIs connected Responsive teams.
Database: A relational database stores the real time crime data, complaint records, and session wise user data automatically.

3.3. Data Processing and NLP Pipeline

Users majorly interactive with User Text Input, Intent Recognition, Text Tokenization [7] , Dataset Lookup and Response Construction, etc.

3.4. Complaint Registration Process

When a user connected to file a grievance, based on direction of identified targets and object reminders, the connected chatbot collect more information by the systematized interaction. Users may receive a confirmation with a allocated reference ID [12], when auto mapping the registered progress confirmed, later the backend saves the complaint.

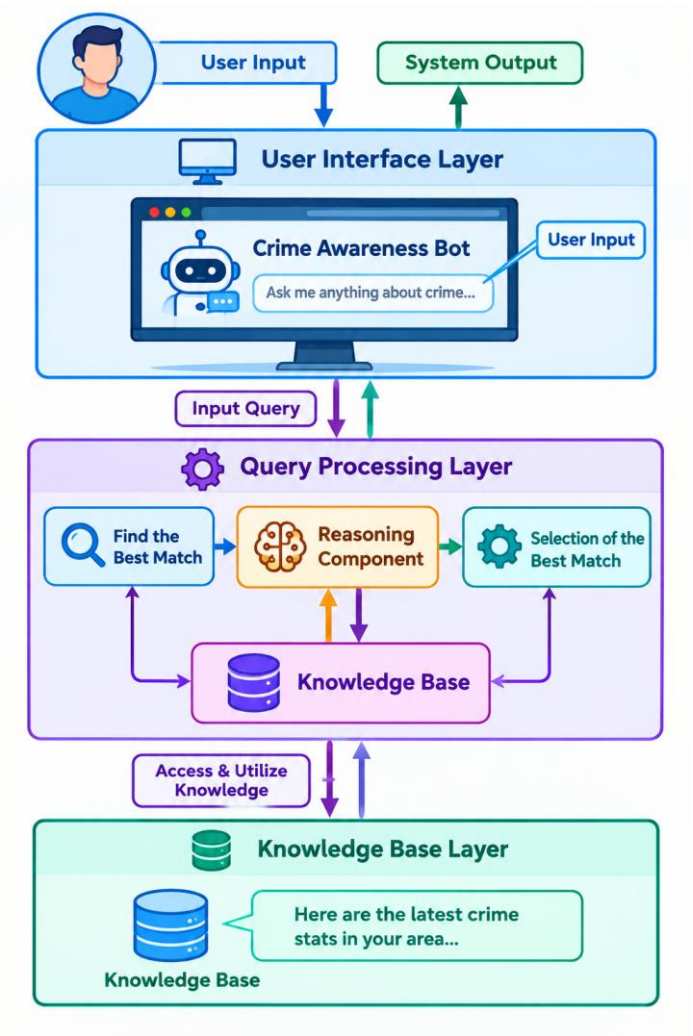

Figure. 2 Architecture of the Crime Awareness Chatbot

The suggested crime awareness chatbot's tiered design is shown in this picture. Through the user interface layer, the user communicates with the system and submits questions to a web-based chatbot [13]. The knowledge base layer offers the contextual information needed

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to produce precise system responses, which are subsequently sent back to the user, and holds structured criminal data.

3.5. Location-Based SOS Functionality

To support emergencies, the system employs:
Geolocation API: Fetches the current location of the user.
MapBox Integration: Displays an interactive map highlighting nearby police stations and emergency services based on the user's GPS coordinates.

4. Results and Discussion

4.1. Chatbot Interaction and Crime Awareness Response

The chatbot successfully processes natural language queries related to crime awareness and safety information. Using NLP-based intent recognition, the system retrieves relevant crime statistics and awareness messages from the dataset and presents them in a conversational format. This demonstrates effective dataset-driven crime awareness delivery [14].

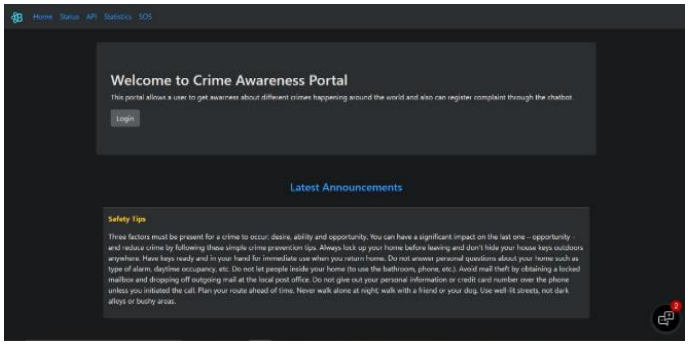

Figure. 3 Interface showing crime awareness response

This Figure shows the crime awareness chatbot interface that delivers crime updates through natural language interaction. It processes user queries in real time and retrieves relevant crime data and safety alerts for a specific locality. The interface improves public awareness by presenting dataset-driven insights in a clear and accessible manner.

4.2. Complaint Assistance and Guided Reporting

The system provides guided complaint registration through step-by-step conversational interaction. The chatbot's auto analyzed to assist based on complaint registration using a controlled conversational flow. These technique improves accuracy and user self-assurance in digital receipt broadcasting though rearrangement the grievance alert system.

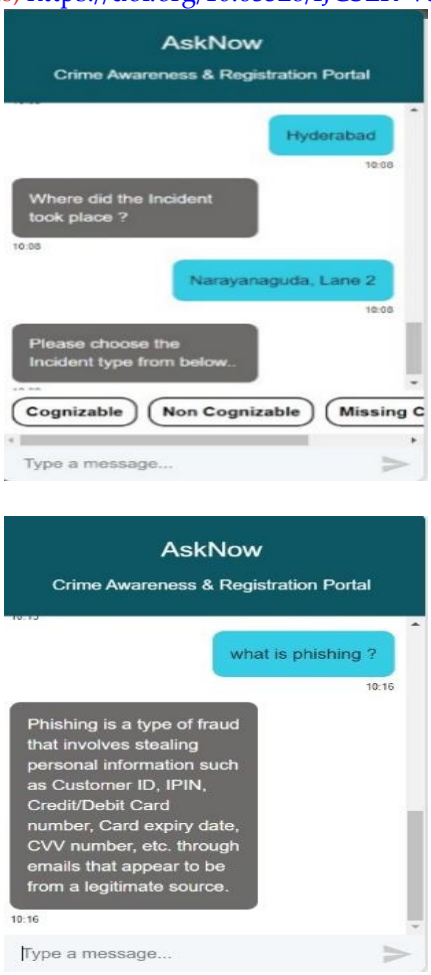

Figure. 4 Chatbot guiding user through complaint registration process.

4.3. Location-Based SOS Emergency Support

How the SOS interactive to users exact live map integration to connect precisely too identifies the user's position and deliver neighbouring police stations and rescue team alerts.

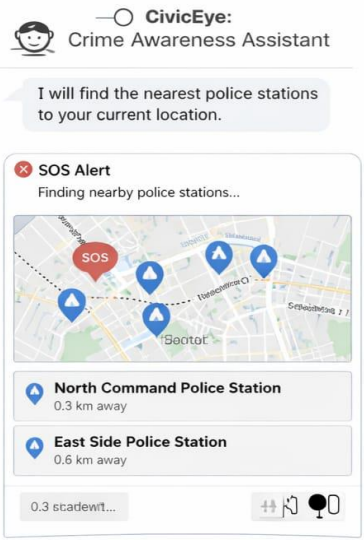

Figure. 5 Location-based SOS feature displaying nearby police stations.

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These mechanism enhance to permits immediate access for emergency services, auto verifying real-time location based on historical safety support analyses.

4.4. Performance Evaluation

Based on classified data analyses , and verifies the object accuracy and trend graph, auto testing along with actual user inquiries connect that the intent precise location recognition increased from 72% to 91%.

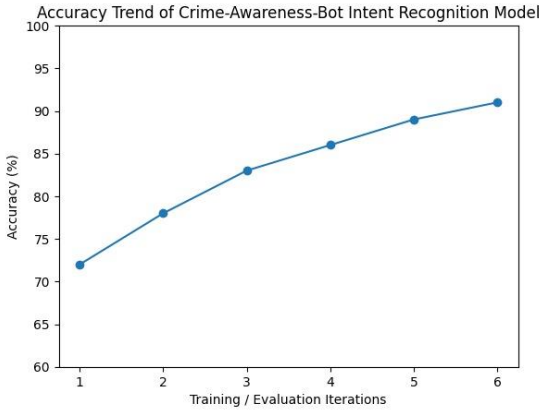

Figure. 6 Accuracy Trend of Crime-Awareness-Bo

The analysed data accuracy to proven the Crime Awareness Bot's auto intent recognition verifiable model with the multiple training iterations and connected loops. The accuracy consistently auto improves based on each user iteration, based on the existing data resources, and these pattern proves a effective model training and time.

5. Conclusion and Future Scope

The suggestive intelligent Chatbot analyses crime awareness recall as chatbot CivicEye, which objectives to progress public safety over sensitive and friendly communication. By provided that real-time, user-friendly, and AI data-driven auto synchronous solutions, based on auto replies according and which is fill the approach closes the gap between the various criminal awareness digital platforms. CivicEye serves a conversational AI enhance public facilitate prompt access from law enforcement resources through authorized progressive way. Future work may focus on incorporating predictive to crime data analytics, multilingual support based on locations, and increased user's privacy.

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