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CHAT LENS

NLP-BASED CHAT INSIGHT SYSTEM

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Project Overview

ChatLens is an intelligent chat analysis tool that processes exported social media app chats to extract insights using NLP techniques. It visualizes patterns like message frequency, activity trends, and emotional tone. Built with Streamlit, it provides an interactive, user-friendly interface for real-time exploration. The tool automatically structures chat data into a readable format. Overall, it helps users understand their communication behavior through visual analytics.

Innovation and Ethical Considerations

ChatLens is unique for its integration of multiple analytical views like heatmaps, word clouds, and sentiment graphs. It delivers a visually rich experience through a dark-themed, interactive dashboard. The project emphasizes user data privacy by processing chats locally without storing them. It ensures ethical use by requiring consent for analyzed data. The design balances innovation, usability, and responsible AI principles effectively.

WORKFLOW

Problem Definition and Objective

People exchange countless messages daily, making it hard to manually analyze conversations. ChatLens addresses this challenge by transforming unstructured chat logs into meaningful insights. Its main objective is to identify trends, emotions, and user activity through automated text processing. The tool performs sentiment classification and presents data visually for better understanding. It simplifies analyzing personal or group chat behavior efficiently.

Launch ChatLens
User initiates the application

Data Acquisition
User exports and upload chat data

Data Preprocessing
Chat data is cleaned and tokenized

Sentimental analysis
NLP model analyzes emotions and sentiments

Statistical analysis
Key statistics and trends are identified

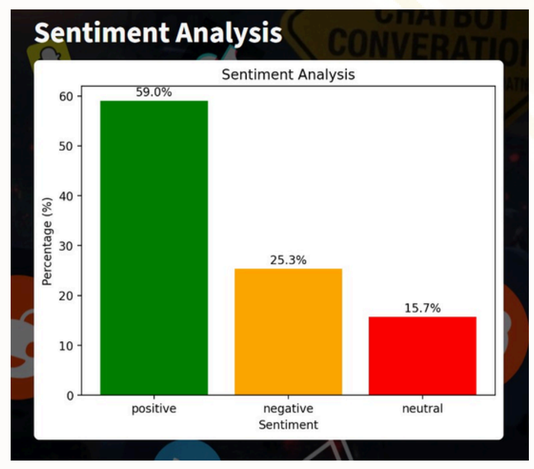
Visualization & Reporting
Results are displayed in chats and reports

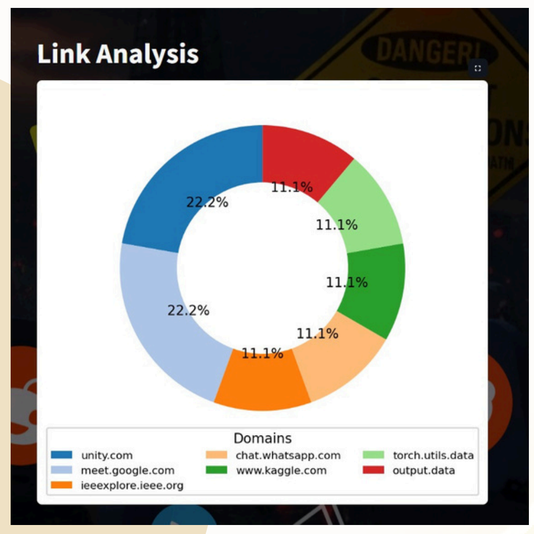
Digital Forensic Use
Insights are applied for forensic analysis

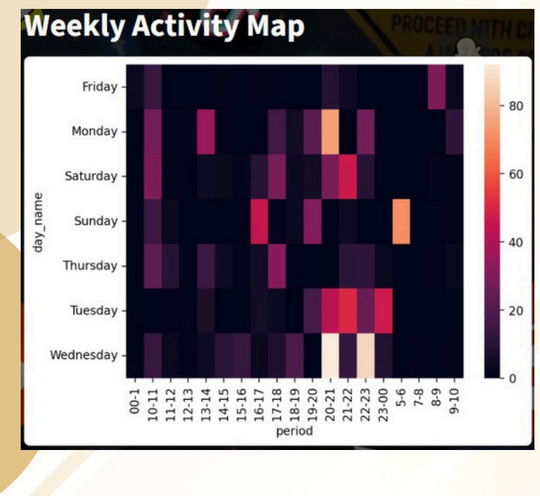
Data Handling and Model Developement

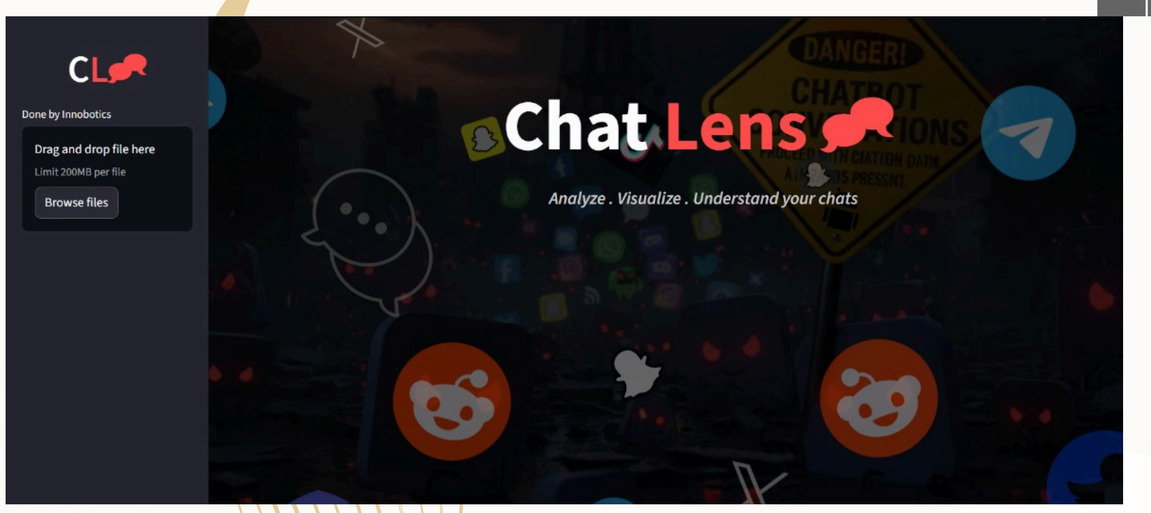
ChatLens reads exported chat files in .txt format and preprocesses them to extract messages, senders, and timestamps. The system cleans unwanted data like media notifications and system messages. It uses TF-IDF vectorization to convert messages into numerical data for model input. A sentiment analysis model (like Logistic Regression) classifies emotions as positive, negative, or neutral. These results are then displayed visually through interactive charts and word clouds.

RESULTS





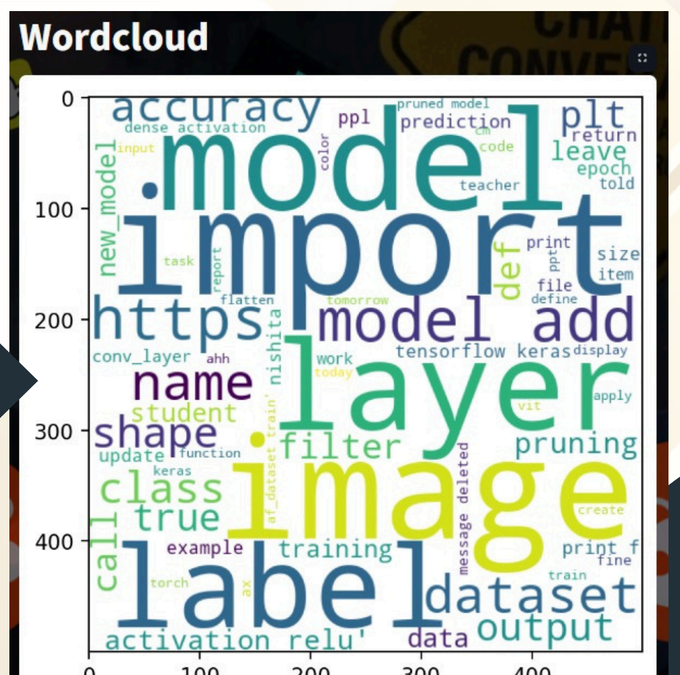




WEBPAGE

Use Case : Digital Forensics

In digital forensics, ChatLens helps analyze communication patterns within chat data. It can identify key participants, frequent contacts, and sentiment variations across conversations. Investigators can use it to detect behavioral changes or unusual message spikes over time. The visual outputs make large chat histories easier to interpret in legal or forensic contexts. Thus, ChatLens serves as a valuable communication analysis tool for investigative purposes.



Evaluation and Performance Analysis

The model's accuracy and efficiency were tested using standard evaluation metrics. A classification report showed over 85% performance across accuracy, precision, recall, and F1-score. The analysis confirmed that ChatLens provides reliable and consistent sentiment detection. Visual results align closely with human interpretation, ensuring dependable analysis. The system performs effectively across various chat datasets with minimal errors.

Link

SOCSE AI DAY, 2025