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WOMEN SAFETY ANALYTICS – PROCTETING WOMEN FROM SAFETY THREATS

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ABSTARCT- ***This project present an AI-based Women Safety Analytics framework designed to protect women potential safety threats by utilizing advanced technologies. The proposed architecture focuses on real-time monitoring using mobile devices, wearable sensors, and surveillance systems. It utilizes a hybrid Deep Learning (DL) model combining Long Short-Term Memory (LSTM) networks and Convolutional Neural Networks (CNNs) to analyze spatial-temporal patterns and predict safety risk levels. Validated using real-time and simulated datasets, the AI framework demonstrated high accuracy in threat detection and successfully predicted unsafe situations in advance. The implementation of this system is expected to reduce response time, enhance personal security, and improve emergency response efficiency, offering a scalable solution for intelligent safety management. The modern society demands high levels of safety, awareness, and rapid response systems, making traditional reactive safety approaches inadequate.***

KEYWORDS: Artificial Intelligence (AI), Women Safety Analytics, Predictive Monitoring, Machine Learning, Sensors, IoT Sensors, Safety Risk Index (SRI), Threat detection, Real-Time Alerts, Time-Series Data.

INTRODUCTION

The safety and security of women in modern society are critical prerequisites for social stability and individual well-being. Increasing incidents of harassment, violence, and unsafe environments highlight the limitations of traditional safety measures. These systems often rely on reactive approaches, which may not prevent incidents before they occur. It frequently results in delayed responses and increased risk to personal safety.

AI- based Women Safety Analytics systems aim to address these challenges by providing proactive and intelligent safety solutions. By utilizing real-time data,

Machine Learning, and IoT technologies, the system can monitor conditions, detect potential threats, and generate timely alerts. This approach enhances safety, improves response efficiency, and ensures better protection for women in both public and private environments.

LITERATURE SURVEY

AI-based Women Safety Analytics overcomes this limitation by analysing real-time data from mobile devices, surveillance systems, and wearable sensors to identify potential threats before they occur. Machine Learning algorithms recognize unsafe patterns and abnormal behavior, while IoT sensors and GPS tracking provide continuous monitoring of location and surroundings. This intelligent approach helps reduce response time, minimize safety risks, improve personal security, and enhance emergency support systems. Recent study materials also emphasize that integrating AI with Big Data analytics and cloud-based monitoring support faster decision-making and more reliable safety management. Women safety system depends on components such as mobile applications, smart surveillance, wearable devices, and communication networks to ensure real-time protection and rapid response.

RELATED WORK

Women safety studies and security system research highlight that traditional safety measures cannot always prevent unexpected threats or incidents. Recent research shows that Artificial Intelligence and Machine Learning can effectively predict and real-time inputs. IoT sensors and mobile-based applications enable continuous monitoring of location and surroundings, while GPS tracking ensures quick access to emergency services. Big Data analytics further improves threats detection and safety planning by analysing real-time and large-scale data. Overall, AI-based women Safety Analytics enhance personal security, reduces response time, and increases the reliability of safety systems.

EXISTING SYSTEM

The existing women safety mainly relies on manual methods and reactive approaches such as emergency helplines, self-defence tools, and reporting after incidents occur. Safety measures are often activated only during emergencies, which may delay timely assistance. These systems depend heavily on user intervention and lack continuous monitoring and predictive capabilities. As a result, threat detection is limited, response time may be delayed, and overall safety effectiveness is reduced. This can impact the security and confidence of

women in both public and private environments.

PROPOSED SYSTEM

The proposed system uses Artificial Intelligence (AI) and Machine Learning (ML) to predict and potential safety threats before they occur. IoT sensors and mobile devices continuously collect real-time data such as location, movement, and environmental conditions. AI analyses this data to detect abnormal behavior and risky situations, generating instant alerts and emergency notifications. This approach reduces response time, minimizes safety risks, and enables quick assistance. It also improves personal security, enhances threat detection, and ensures overall safety through continuous monitoring and intelligent decision-making.

SYSTEM ARCHITECTURE

The system architecture consists of IoT sensors, a data collection module, an AI prediction engine, and an alert and response system. Sensors and mobile devices continuously collect real-time data such as location, user activity, and environmental conditions. The collected data is stored and pre-processed before being analysed by Machine Learning algorithms. The AI model detects potential threats and evaluates risk levels based on behavioral patterns and abnormal activities.

Finally, instant alerts and emergency notifications are sent to users, guardians, or authorities for timely action and support.

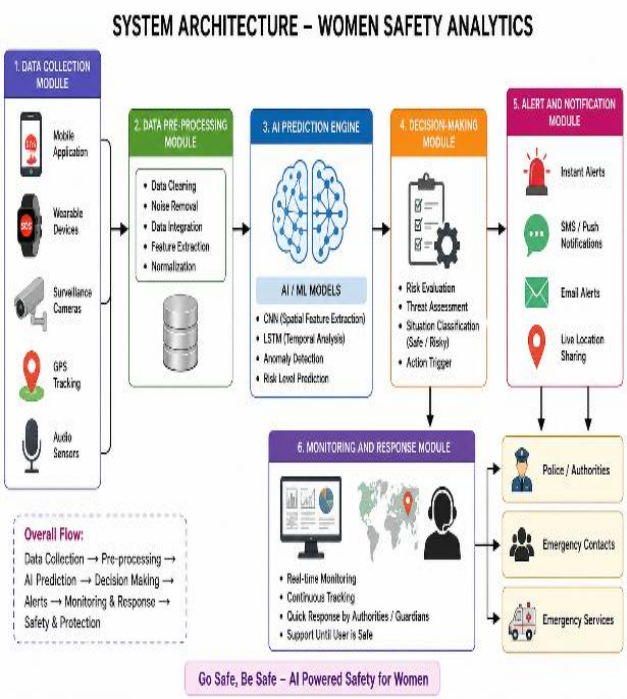

Fig 1: System Architecture

METHODLOGY DESCRIPTION

The methodology of the AI-based Women Safety Analytics system focuses on real-time threat detection and prevention. The proposed system collects real-time data from mobile devices, wearable sensors, and surveillance systems. The collected data is cleaned and processed before being analysed by an AI model. The AI compares the current data with previously observed patterns and behavioral data to identify unusual or risky situations. If a potential threat is detected, the system predicts the risk in advance and evaluates the severity level. Finally, an alert is sent to emergency

contacts, guardians, or authorities so that immediate action can be taken, improving safety and reducing response time.

RESULTS AND DISCUSSION

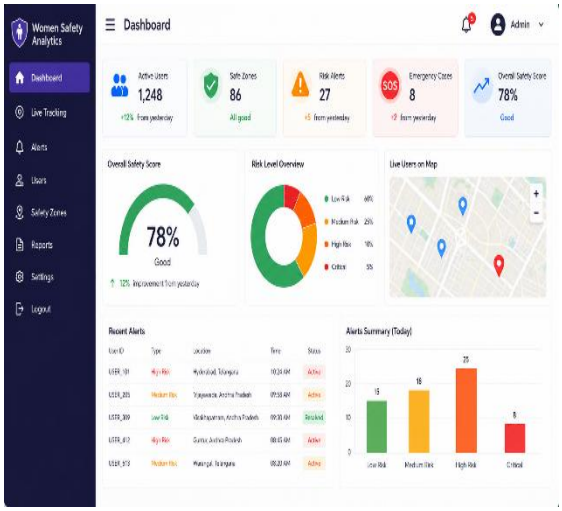

Fig 2: Safety Monitoring Dashboard

This dashboard provides a real-time overview of women safety status. It displays active users, safe zones, risk alerts, emergency cases, and overall safety score.

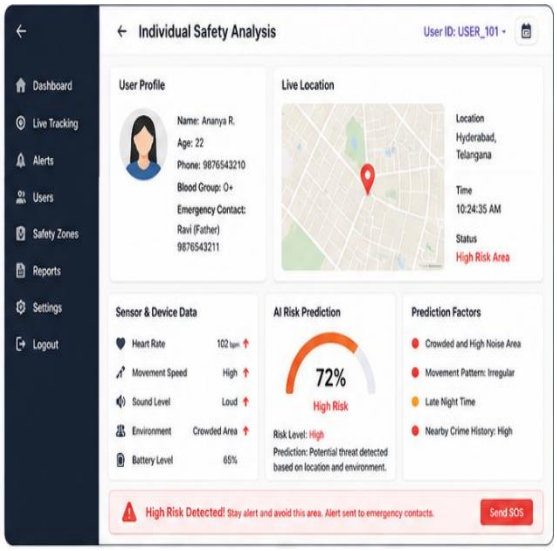

Fig 3: Individual Safety Analysis and Prediction

This page displays the analysis of an individual user's safety condition. It evaluates location data, movement patterns, and environmental factors to predict potential risk levels.

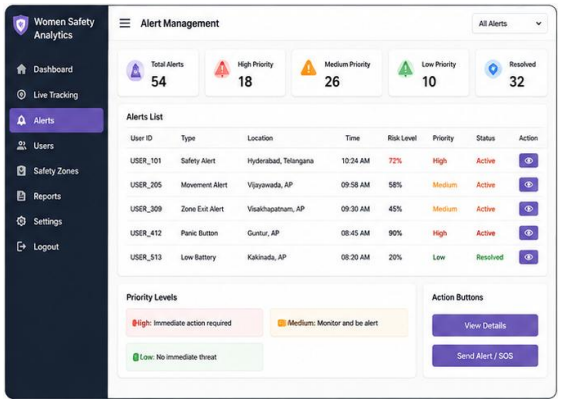

Fig 4: Alert Management and priority System

This page displays emergency alerts and prioritizes them based on risk level using AI prediction. It helps authorities respond quickly to high-risk situations.

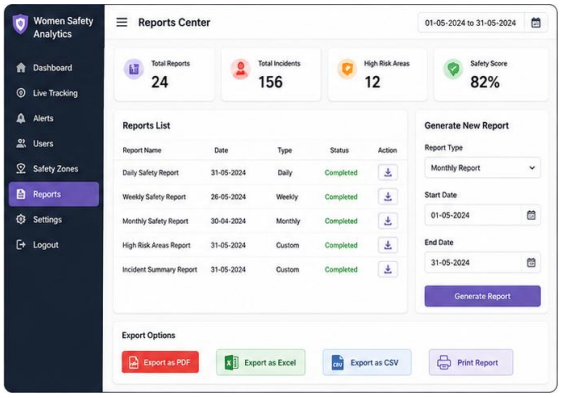

Fig 5: Reports Centre and Data Exports

This page allows users or authorities ton generate and export safety reports based on AI analysis and incident data.

CONCLUSION

The AI-based Women Safety Analytics system focuses on enhancing safety by

identifying potential threats before they become serious. This project uses Artificial Intelligence to detect unsafe situations and provide timely alerts instead of reacting only after incidents occur. It helps users and authorities take action at the right time, improving personal security and reducing risks. The system also minimizes response delays and increases the effectiveness of emergency support. Overall, AI-based Women Safety Analytics makes safety systems smarter, faster, and more reliable, contributing to a safer environment for women.

FUTURE SCOPE

The approach of AI-based Women Safety Analytics system can be further improved using advanced technologies and research. Future studies will focus on optimizing the deep learning models using techniques such as network pruning, quantization, and knowledge distillation to enable deployment on mobile and wearable devices. Research will explore transfer learning methods to adapt the system across different environments such as urban and rural areas without extensive retraining. Integration of multimodal data such as audio, videos, and biometric signals will enhance threat detection accuracy. The system can also incorporate behavior analysis and emotion recognition to identify distress situations effectively. Combining crime data and environmental factors will further improve prediction accuracy and support proactive safety measures.

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