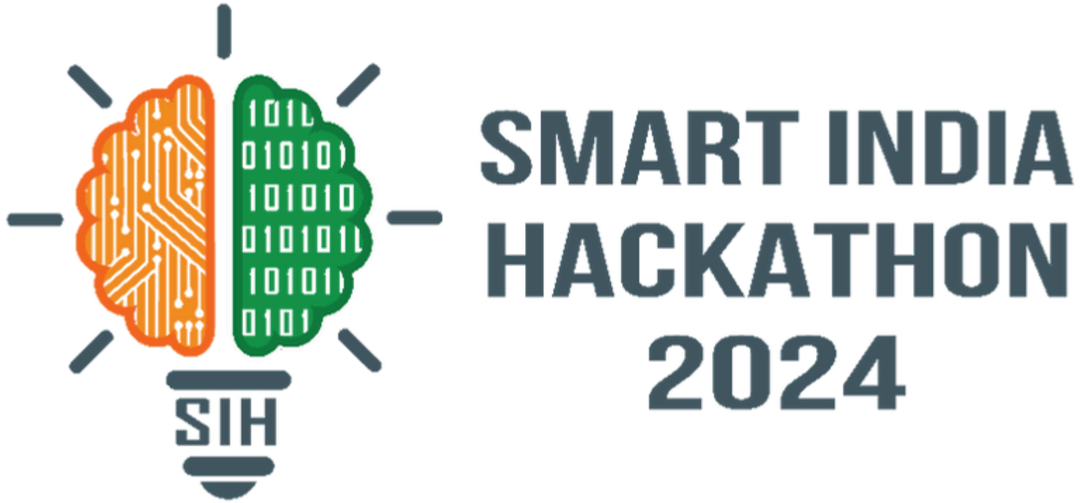
Smart India Hackathon

- **Problem Statement ID – 1605**
- **Problem Statement Title - Women Safety Analytics – Protecting Women from safety threats**
- **Theme - Miscellaneous**
- **PS Category- Software**
- **Team ID - 7**
- **Team Name - Acchedya**



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REALTIME WOMEN THREAT DETECTION SYSTEM

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AI MODEL

Real time Men:Women ratio (from CCTV)

Density of public buildings (count of CCTV)

History of incidents and past alerts

Manual input from police

- **AI model** will whitelist and rank top 10-15 CCTV footages based on **past alerts** and **past incidents**
- The website interface will continuously update the priority list in **real-time**, reflecting the latest data and potential threats.
- This will help in **early detection** of risk and police can reach out quicker

WEBSITE

Priority List	M:W
CCTV56	5:6
CCTV34	11:12
CCTV45	1:2
CCTV97	1:1

Alerts	
CCTV77	HIGH
CCTV9	HIGH
CCTV12	LOW
CCTV90	MODERATE
CCTV101	HIGH

Triggers instant alerts to the nearby police stations and registered emergency contacts

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TECHNICAL APPROACH

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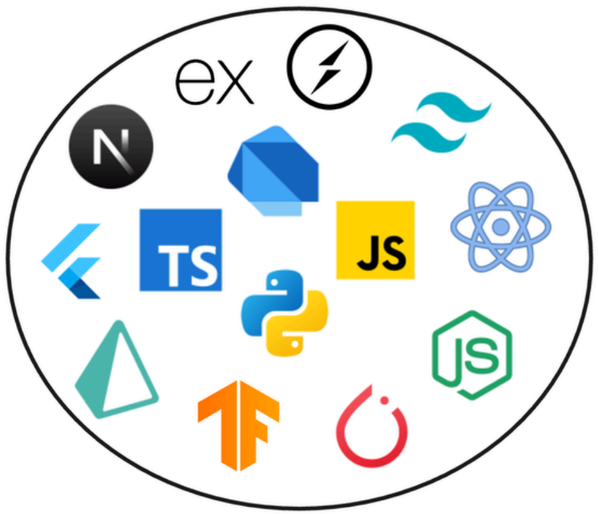
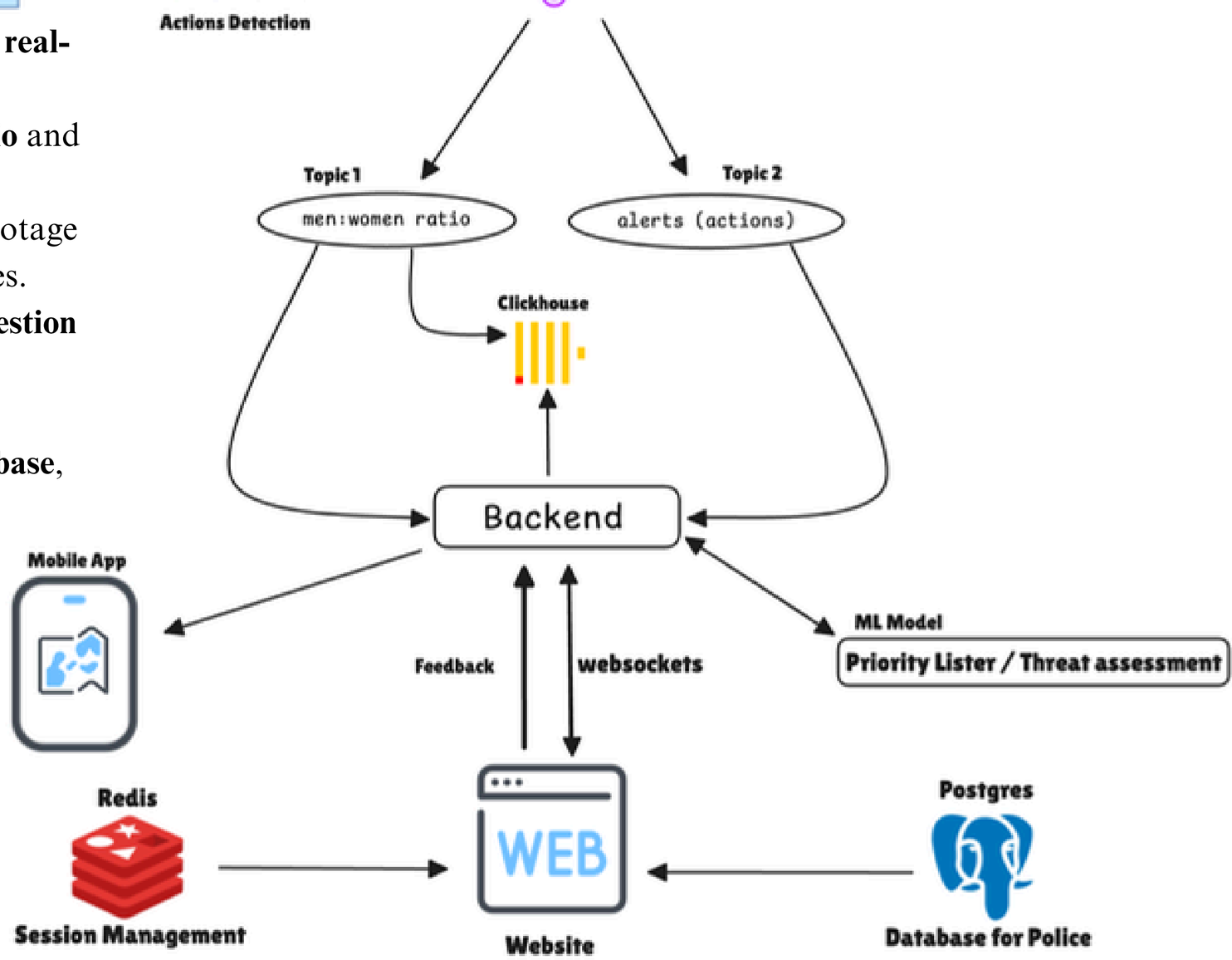
- Every frame of CCTV footage is captured and processed in **real-time**.
- Frames are analysed using a model to determine **gender ratio** and **actions**
- Kafka is well-suited for handling high volumes of CCTV footage due to its **scalability** and **real-time data streaming** capabilities.
- ClickHouse is chosen because it supports **real-time data ingestion** and **analytics**
- The gender ratio and alerts are then stored in **ClickHouse**
- The backend system communicates b/w **user interface**, **database**, **ml models**



Languages
Technologies
Frameworks



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FEASIBILITY AND VIABILITY

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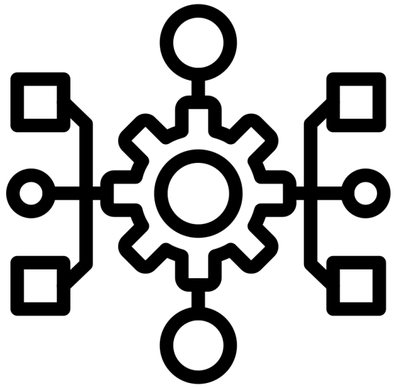
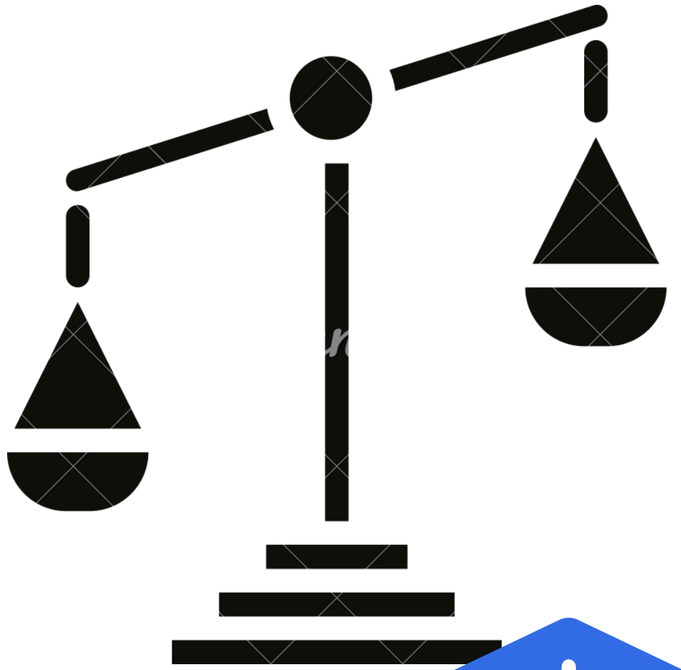
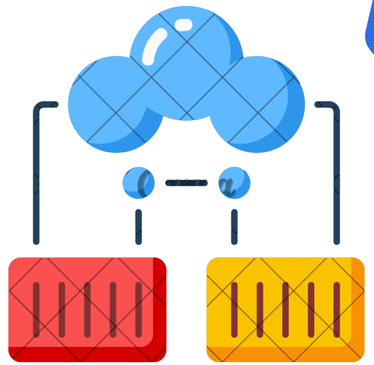
CHALLENGES

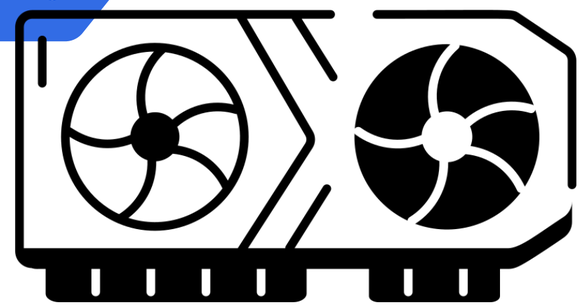
- Model Accuracy and Bias
- Real-Time Processing Scalability
- Integration with Law Enforcement
- Infrastructure Management

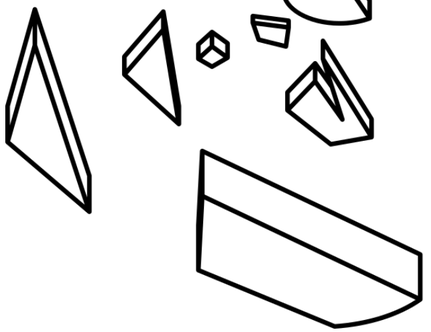
(Proper Utilisation of Resources)





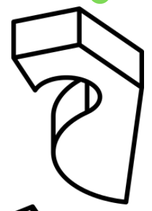






SOLUTIONS

- Train AI with diverse datasets
- Update it based on real-world performance
- Optimized Partitioning and Sharding
- Efficient Resource Utilization



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IMPACT AND BENEFITS

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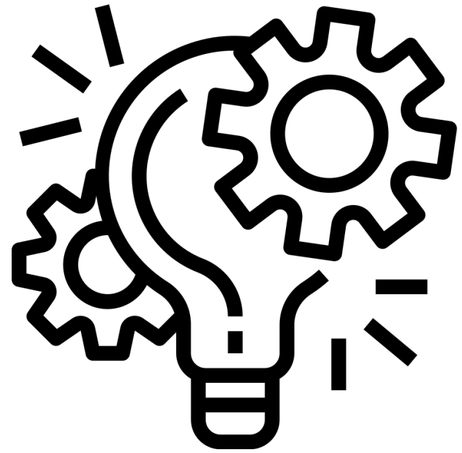
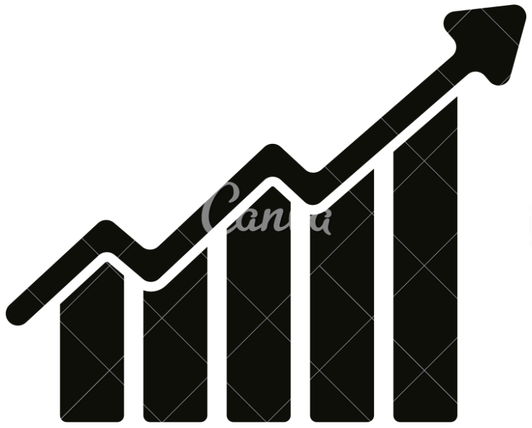


Potential Impact on the Target Audience

- Increased Safety
- Empowerment
- Community Trust
- Improved Response Times



Benefits of the Solution

- Economic Benefits: Reduces crime-related costs, such as law enforcement and medical care
- Environmental Benefits: Promotes safer routes, encouraging walking or public transportation
- Social Benefits: Enhances safety and reduces gender-based violence
- Technological Advancements

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RESEARCH AND REFERENCES

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- Real-Time CCTV Data Analysis: Research on the use of **YOLO** (You Only Look Once) for object detection and gender classification.
- Paper: "Real-Time Object Detection Using YOLO" - IEEE Research.

- **Kafka** for Scalability and Real-Time Data Streaming: Studies on Kafka's effectiveness in high-volume real-time data ingestion.
- Article: "Apache Kafka as a Distributed Streaming Platform" - Confluent.

- **ClickHouse** for Data Ingestion and Analytics: Articles highlighting ClickHouse’s efficiency in handling real-time analytical data.
- Research: "Efficient Analytical Data Processing Using ClickHouse" - ClickHouse Documentation.

- ML Models for **Gender Classification**: Research on integrating ML models for gender ratio and threat assessment.
- Study: "AI-Based Gender Detection for Security Systems" - SpringerLink.
- A Smart CCTV system leverages deep learning to revolutionise surveillance by integrating real-time object detection, facial recognition, anomaly detection, automated alerts, and advanced analytics, significantly enhancing security and safety - source.