

SMART INDIA HACKATHON 2024



TITLE PAGE

- Problem Statement ID - 1605
- Problem Statement Title – Women Safety Analytics
- Theme - Miscellaneous
- PS Category - Software
- Team ID -
- Team Name (Registered on portal)



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SAFE SPHERE



IDEA / SOLUTION :

A comprehensive Women Safety Analytics system :

- ❖ **Monitors** scenes in **Real-time** using advanced analytics.
- ❖ **Detects** and classifies people by **Gender**.
- ❖ **Counts** the number of men and women present.
- ❖ Identifies **alone Women** at night or women surrounded by men.
- ❖ Recognizes **distress Gestures** for quick alerts.
- ❖ **Hotspot Identification** where incidents are likely to happen.
- ❖ Alerts **Law Enforcement** to prevent potential threats.

Communication Channel (Mobile App):

- ❖ Connects the **smartwatch** to the mobile app.
- ❖ **Hotspot Alerts** : Sends alerts based on **crime data** from the area.

PROBLEM RESOLUTION :

Government Authorized Surveillance Software :

- ❖ **Level 1** : **Detect persons** and determine **gender**.
- ❖ **Level 2** : Identify **lone women** in the scene.
- ❖ **Level 3** : Count and provide **male-to-female ratio**; if males out number females.
- ❖ **Level 4** : Monitor and alert based on **suspicious behavior** in women (e.g., facial expressions, hand gestures) considering the **gender ratio**. Then send alerts to nearby **patrol teams** or **police**.

UNIQUE VALUE PROPOSITIONS (UVP) :

User Authorized Smartwatch:

- ❖ **WATCH Function** : Hold **SOS button** for **5 seconds** to activate; prompts with "ARE YOU IN DANGER?"—if **unresponsive**, sends alerts to **emergency contacts** and authorities.
- ❖ **FEATURES** : SOS alert , Audio sensing , GPS Integration, Battery Efficiency, Speed Monitoring, Health Monitoring .

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TECHNICAL APPROACH

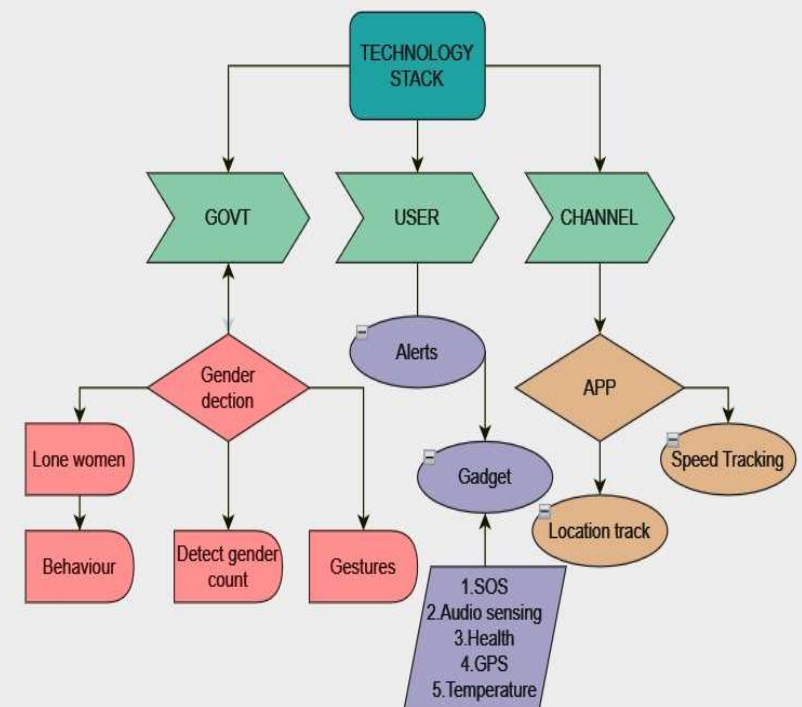


TECHNICAL APPROACH :

Public Surveillance Software

- ❖ **Person detection and Gender detection** -- AWS cloud services- (Amazon rekognition) . AWS SDK (Boto3 for Python)
- ❖ **Lone Women** – DBSCAN , (to create JSON response.)
- ❖ **Count men/ women** - python (NumPy library)
- ❖ **Surround by men** - Geometric Logic (Bounding box)
- ❖ **Behaviour analysis** – AWS Sagemaker (custom ML models)
Lambda functions (trigger alerts).
- ❖ **Hotspot areas** : GPS Positioning : **Triangulation**,
 - cellular : **cell tower triangulation**. Data Aggregation : **Kalman filter**.
 - Geofencing and hotspot detection: **spatial indexing R-trees** , **Threshold** based detection.
 - Alert generation: **For android** – **FCM** (Firebase cloud Messaging).
 - For IOS-** **APN**(apple push notifications).
- ❖ **ML models** : Neural networks (CNN), DBSCAN
- ❖ **Mobile App** : Flutter

PROCESS FLOW :



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FEASIBILITY AND VIABILITY



FEASIBILITY :

- ❖ **Technical** : Smartwatch technology and **AI for real-time detection** are available.
- ❖ **Market** : **High demand** for women's safety solutions.
- ❖ **Financial** : Initial costs are **high**, but there's **strong revenue potential**.
- ❖ **Operational** : Feasible to produce and support on a **large scale**.

VIABILITY :

- ❖ **Technical** : Feasible to build a reliable and functional device.
- ❖ **Market** : Unique features can attract users and stand out in the market.
- ❖ **Financial** : Potential for profitability and investor interest.
- ❖ **Operational** : Can scale production and support efficiently.

CHALLENGES AND STRATEGIES

- ❖ **Technical** :
 - **Challenge**: Accurate behavior detection.
 - **Strategy**: Advanced AI and extensive testing.
- ❖ **Market** :
 - **Challenge**: Gaining user trust.
 - **Strategy**: Strong marketing and endorsements.
- ❖ **Financial** :
 - **Challenge**: High development costs.
 - **Strategy**: Seek investment and partnerships.
- ❖ **Operational** :
 - **Challenge**: Quality control in production.
 - **Strategy**: Implement strict quality checks and reliable partners.

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IMPACT AND BENEFITS



POTENTIAL IMPACT ON TARGET AUDIENCE

- ❖ **Increased Safety** : Real-time alerts and monitoring.
- ❖ **Greater Awareness** : Better personal safety awareness.
- ❖ **Empowerment** : Immediate help and tracking.

BENEFITS OF THE SOLUTION

- ❖ **Social** :
 - **Safer Environment** : Enhances personal and community safety.
 - **Support** : Encourages vigilance and support networks.
- ❖ **Economic** :
 - **Cost Reduction** : Lowers costs related to safety incidents.
 - **Job Creation**: Provides jobs in tech and manufacturing.
- ❖ **Environmental** :
 - **Eco-Friendly** : Potential for sustainable materials.
 - **Efficient** : Reduces waste with smart design.

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RESEARCH AND REFERENCES



RESEARCH & REFERENCE LINKS :

❖ <https://github.com/vamsibro713/SIH>