

# Chapter 12

## IoT–Based Smart Safety Analyzer for Women

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### ABSTRACT

*Despite significant technological advancements in modern times, the safety of women remains a persistent concern. It's important to develop IoT-based women's security systems with a user-centric approach, involving women in the design process to ensure the technology meets their needs effectively. An internet of things (IoT) based women's security system leverages connected devices and sensors to enhance the safety and well-being of women. These systems use technology to monitor, communicate, and respond to potential threats or emergencies. Artificial intelligence-based tools are employed to distinguish male individuals within designated women-only areas. The system assesses conditions by comparing specific attributes against its internal safety database. Upon detecting a potentially concerning scenario, the system promptly notifies the staff and triggers audible alarms for immediate attention. A "smart safety analyzer for women" could refer to a technological solution aimed at enhancing the safety and security of women in metro train.*

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## **1. INTRODUCTION**

In an era characterized by technological advancements and growing concerns over safety, the development of innovative solutions for enhancing security and addressing societal challenges is paramount. One such challenge is ensuring the safety and security of women in various public spaces. In this context, presented chapter delves into the creation of a “Smart Threat Detector for Women Security” by harnessing the power of crowd monitoring systems and differentiating between genders.

The need for such a system is underscored by the amalgamation of insights from several research papers that highlight the complexities involved in human behavior analysis, crowd monitoring, and gender detection. These research findings collectively advocate for the integration of artificial intelligence, computer vision, and deep learning techniques to craft a holistic solution that can contribute significantly to women’s safety.

The legislative authorities implement various preventive measures to control these activities, but their production rate remains unaffected. According to the most recent data from the National Criminal Records Bureau (NCRB), there were 428,278 cases of crimes against women in 2021, compared to 371,503 cases in 2020, reflecting a 15.3% increase. Over the past decade, the vulnerability of girls and women to threats has risen by as much as 44%. In response to this concern, several women’s protection tools have been developed, such as Hollaback, Fight Back, Guardly, On Watch, Family Locator, Sentinel, Street Safe, Circle of 6, B Safe, Cab 4 Me, and more (Hossain, 2016; Ramachandiran and Dhanya, 2019; Agarkhed, and Rathi, 2020).

In addition to these incidents of violence, women in India also face widespread harassment and discrimination. According to a survey conducted by the International Centre for Research on Women, 77% of women in India have experienced sexual harassment at some point in their lives.

These statistics highlight the urgent need to address the issue of women’s safety in India and take action to prevent violence and abuse against women. It is essential that we work to dismantle the systems of inequality and discrimination that contribute to violence against women and provide resources and support to victims of violence and abuse (Sunehra, D., 2020)

As we embark on this chapter, we aim to synthesize the knowledge and insights gleaned from these research papers to design and implement a Smart Threat Detector for Women’s Security in metro train. This system will leverage crowd monitoring techniques, machine learning, and gender differentiation algorithms to create a comprehensive solution that enhances the safety and well-being of women in public spaces such as metro train etc. The following sections of this report will delve into the methodology, implementation, and evaluation of our innovative system, demonstrating its potential to address a pressing societal concern.

## **2. LITERATURE SURVEY**

This chapter aims to enhance the safety of women in public spaces by leveraging advancements in artificial intelligence, computer vision, and deep learning. To achieve this goal, we have conducted a literature survey to understand the relevant research in the fields of human behavior analysis, crowd monitoring, and gender detection, as outlined below.

Bhardwaj et al. (2022) discussed human behavior analysis using machine learning techniques. This paper provides insights into the state of the art in machine learning and object tracking, which are crucial

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