Abstract--Ensuring the safety of residents and visitors is one of the major priorities of the Kingdom of Saudi Arabia (KSA).We briefly review the related literature and performed gap analysis in Section 2.Index Terms--IoT & Smart City Application, Huge Crowd gatherings, Assistance of Pilgrims, Spatio-Temporal Modeling Smart cities employ smart technologies to deal with major challenges by providing innovative solutions and establishing Deanship of Scientific Research, Islamic University of Madinah, Madinah, Kingdom of Saudi Arabia smart infrastructure.Mainly due to their low energy consumption, reliable signal detection with advanced BLE gateway devices, and accurate distance estima- tion methods.In another report [2], by IoTA major cities of the world are investing more than $ 1 billion in the year 2020 for various initiatives including smart waste management, intelligent traf- fic control, energy and environmental management, and smart technologies for ensuring the safety of the residents.Public safety is a major concern and a feature of any smart city and there are several examples of public safety projects planned for smart cities [3] including real-time crime reporting (Zetkey [4]), video analytics (BriefCam [5]) for law enforcement departments, etc.This paper aims to facilitate law enforcement departments in the city of Madinah to effectively track and locate missing persons from vulnerable groups in various scenarios.BLE beacons are easily available in a wearable bracelet that broadcast beacons and Bluetooth enabled devices, such as, cell phones or specific BLE gateways can reliably detect these beacons in the places even if there are no network signals available.The main objective of this research is to facilitate the Madinah Police and Department of lost and found in Masjid-e- Nabavi to ensure the safety of residents and visitors in terms of tracking and locating missing persons from vulnerable groups using state-of-the-art IoT based system. We propose an IoT based system with a proactive approach to help security officials in Madinah and the Department of lost and found in Masjid e Nabavi in two major safety issues: 1) Tracking the companion of missing person found by a security official and 2) Tracking the missing person using reported location via IoT based system.Other IoT sensors applications are remote health care monitoring such as [6], [7] However, most of them are for general residents and do not consider the groups in the society which are prone to getting lost during events or crowded gatherings.The proposed so- lution integrates both apps in IoT devices to enable efficient tracking and locating missing persons.There are some residents in Madinah who are vulnerable or prone to getting lost in crowded areas, including children, the elderly, and people with certain diseases and disorders.Besides, the Kingdom receives millions of visiting pilgrims in Madinah and Makkah and thousands of them get lost every year around Masjid-e-Nabavi and Masjid Al Haram.Madinah alongside Makkah receives millions of visiting pilgrims for Umrah and Hajj throughout the year.Secondly, in the case of missing pilgrims, caretakers face additional challenges, such as, communicating (not knowing the Arabic language) and the procedures to follow in such situations.BLE beacons providing a viable solution for IoT devices implementation in a wide range of applications.The security department will deploy officials with handheld receivers with a BLE gateway device to search for missing persons in the targeted area.Considering the importance of the safety of residents and visiting pilgrims in Madinah, in this paper, we propose a smart city application design for tracking and locating the missing person using an emerging Internet of Things (IoT) based system.We propose to evaluate the performance of Bluetooth low energy (BLE), low power wide area network (LPWAN), technologies, both

individually and as a hybrid solution. The majority of reported cases include chil- dren, then elderly women, men, and people with disabilities and disorders. The department of lost and found in Masjid- e- Nabavi in Madinah follows a manual system to report and locate missing persons with the help of police personnel. To deal with these issue, we investigate the two major low power technologies BLE [9] and loRaWAN [5] emerged in the last few years for various IoT application use cases. LoRaWAN allows a wide range of private network deployment with easy interactions with various types of IoT devices. Internet of Things sensors with analytics is playing a vital role in providing smart city solutions. 1