Chapter 2
Security and Privacy Challenges in 6G Enabled Smart City

Kapil Sharma
https://orcid.org/0000-0001-8244-8009
Chandigarh University, India

Nikhil Singh
NDIM, Delhi

ABSTRACT

The research report "Security and Privacy Challenges in 6G Enabled Smart City" delves into the transformative potential of 6G technology, anticipated to be commercially available by 2030, and its implications for smart cities. As cities become more reliant on Internet of Things (IoT) devices, artificial intelligence (AI), and big data analytics, 6G will offer unparalleled speed, bandwidth, and ultra-low latency, driving the evolution of smart cities. However, this technological advancement also brings significant security and privacy concerns that must be addressed to protect urban infrastructures and citizens' data.

1. INTRODUCTION

1.1 Smart City

A smart city is an urban area that leverages technology and data to improve the quality of life, enhance sustainability, and optimise the efficiency of city operations. The fundamental concept of a smart city revolves around the integration of infor-

DOI: 10.4018/979-8-3693-8029-1.ch002

mation and communication technologies (ICT) and the Internet of Things (IoT) to address urban challenges and create a more connected and sustainable environment.

IBM defines a smart city as one that utilises interconnected information to understand and control its operations, thereby optimising the use of limited resources. More broadly, a smart city uses a framework of ICT to create, deploy, and promote development practices aimed at addressing urban challenges. This framework is designed to build a technologically enabled infrastructure that supports sustainability and connectivity within the city.

Smart city technologies are increasingly playing a critical role in various aspects of city operations, including transportation, energy management, and infrastructure development. By integrating ICT and IoT, cities can enhance their systems and structures, making them smarter and more responsive to the needs of their residents.

1.2 Urban Evolution: The Impact of 6G on Smart Cities

As urbanisation accelerates and technological advancements continue to shape our world, cities are increasingly adopting innovative technologies to enhance infrastructure, improve quality of life, and promote sustainable development. One of the most transformative advancements on the horizon is the advent of 6G technology, which is expected to become commercially available by 2030. This next-generation wireless technology promises exceptional speeds, vast bandwidth, and ultra-low latency, which will revolutionise connectivity and enable a new era of smart cities. These smart cities will rely heavily on the integration of Internet of Things (IoT) devices, artificial intelligence (AI), and big data analytics to function efficiently and responsively. However, as these technologies proliferate, the importance of security and privacy in protecting urban infrastructures and citizens' data cannot be overstated.

The transition from 5G to 6G represents a significant leap in wireless communication technology, poised to address the limitations of its predecessor and introduce a host of groundbreaking capabilities. While 5G brought about significant advancements such as enhanced mobile broadband, ultra-reliable low-latency communication, and massive machine-type communication, 6G aims to push these boundaries even further. The evolution from 5G to 6G is characterised by the ambition to seamlessly merge the digital and physical worlds, creating a unified and immersive experience.

5G laid the groundwork by providing faster data speeds, improved network reliability, and lower latency compared to previous generations. It enabled the proliferation of Internet of Things (IoT) devices and supported the development of smart cities, autonomous vehicles, and advanced healthcare applications. However, 5G still faced challenges related to coverage, spectrum efficiency, and the capacity to support an ever-increasing number of connected devices.