# Chapter 2
# Internet of Things:
## Evolution and Potential for Preserving and Enjoying Cultural Heritage

**Imran Khan**
*Universiyty of Aveiro, Portugal*

**Lídia Oliveira**
🆔 https://orcid.org/0000-0002-3278-0326
*University of Aveiro, Portugal*

**Ana Carla Amaro**
*University of Aveiro, Portugal*

**Ana Melro**
🆔 https://orcid.org/0000-0001-9710-0574
*University of Aveiro, Portugal*

## ABSTRACT

*The potential of IoT applications is now recognized, namely the use the IoT as a technological solution for societal challenges such as in health, education, industries, tourism, agricultural, and for this chapter concern, in cultural heritage dissemination. This chapter presents the different evolutionary phases of IoT and its different generations, first-generation experienced embedded things, second-generation a complex social web of things, and third-generation experience the autonomous social objects and cloud computing. This chapter analyzes the characteristics of IoT, for example interconnectivity, intelligence, heterogeneity, safety, monitoring and control, big data and analytics, information sharing and collaboration. Furthermore, this chapter describes the different usage of IoT scenarios applications in some specific areas, such as agriculture, cultural heritage, and tourism.*

## INTRODUCTION

This chapter intends to achieve the following objectives:

i)    Provide knowledge about the chronological development of IoT technology from one generation to the upcoming generation.
ii)   Raise discussion about the emergence of digital technologies, such as IoT and understand IoT characteristics.
iii)  Describe and discuss the characteristics of IoT technology.
iv)   Discuss IoT usage scenarios and possibilities.
v)    Discuss the role and contribution of IoT technology for preserving and dissemination cultural heritage.

To write this chapter, the authors reviewed existing studies that describe IoT technology chronological development. In this context, this chapter splits the development of IoT into three generations. The time set for IoT development starts from 1974 to the present in which the chapter discusses all essential technologies that emerged into IoT. After analyzing the IoT development, this chapter describes the possible usage scenarios of IoT technology, especially in cultural preservation and dissemination.

This chapter is divided into two main sections. The first section describes the chronological development of IoT such as IoT generations, and the IoT characteristics. The second section describes the usage scenarios of IoT technology like IoT and cultural heritage. Lastly, this chapter added a conclusion and discussion of results.

## IoT GENERATIONS: CHRONOLOGICAL APPROACH

Currently, the Internet is one of the most demanding and useful technology to perform daily life activities, especially in education, entertainment, and business sectors. The relation between devices and Internet technology provides smart platforms; devices on these platforms have the freedom to make decisions and solve problems by themselves, without any human intervention (Gartner, 2015).

In the first forty years after the invention of the Internet technology by ARPANET (Ye & Huang, 2011), people used the Internet technology to create person to person or person to group connections, via e-mail, and social media's networks (O'Hara, 2013). Later, the usage of the Internet increased in all domains of human life, such as education, entertainment, and medical purposes. It is expected that, in the future, with the help of Internet technology, it will be possible to link every single device, machine, and objects through wired or wireless Internet protocol networks.

Internet technology integrates different types of applications and protocols that have capabilities to build a comprehensive and interconnected computer networks system. Moreover, through computer networks systems, billions of users interact with each other for educational, social, or business purposes. As such, one can agree that humanity is passing an era, in which communication and connectivity with other humans is not a big challenge. Lately, attention diverted to the development of systems, in which it will be possible to integrate human and digital devices. The integration of human and digital devices is called IoT (Internet of Things) (Buyya, & Dastjerdi, 2016).

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