

CHAPTER

7

PUTRAJAYA EVENTS MOBILE AR USING GOOGLE MAPS

Masitah Ghazali, Muhammad Syahir Farhan Mat, Aida Ali, and Hizral Ashraq

7.1 INTRODUCTION

Augmented reality (AR) is a powerful technology that can blend the digital world into real-world space for multiple purposes. The main reason for its creation is to enhance natural environments and offer perceptually enriched experiences by overlaying the real world with computer graphics-generated objects. AR is different from virtual reality (VR) as VR has its cyber environment, while AR adds to the existing world as it is. AR has been evolving over the years, which opens the creation of a few interesting applications ranging from customer service, games, and even educational purposes (Abid, 2025). During the pandemic, when physical outdoor activity cannot be conducted, physical events that require people's engagement are blocked, thus the experience and benefits of such events cannot be felt by some. For example, the pandemic prevents unfortunate souls from experiencing events such as the *Hari Raya* Celebration, *Pesta Tanglung*, and even graduation ceremonies. Inspired by this issue, AR can be utilized to address it, enabling individuals to experience lively events through their mobile devices before these events can occur in person.

The pandemic outbreak has caused the world to take a break from usual social and ceremonial festive events. It forces everyone to practice safe distance from each other to minimize the spread of the virus, which is known as social distancing, where one cannot easily touch others and uses hand sanitizer all the time when they are outdoors. Moreover, the pandemic has damaged many sectors within the tourism and hospitality industry, including the educational sector (Shariff, 2022).

This issue has compelled us to manage festive events in accordance with the new standard, all while maintaining the festival's value and purpose. The existence of AR has opened a new opportunity where any event can be commenced by using AR, where it's accessible, interesting, and safe in the current environment. The idea is to replicate the events component, such as exhibition booths, stage performances, and even small games, in a three-dimensional (3D) representation overlying the real-world space where the event once took place.

The AR application is accessible from a mobile Android device. Interaction between the user and the application consists of screen touches and camera tracking. This application is a great alternative to physical events, as it takes place in a safe virtual space that still retains a similar environment and sense of merriment. The next section of the paper will cover some background and related work towards this project, which includes AR and its global positioning system (GPS)-based SDK and the case study of the Putrajaya event.

7.2 MOBILE AUGMENTED REALITY

Mobile AR is now one of the most rapidly growing areas for AR applications. Mobile AR makes use of commonly available hardware such as smartphones and tablets. Because AR exists in the world, it makes sense for AR applications to be mobile and accessible so that people may experience them wherever they make the most sense, whether that is at a specific exhibit in a museum or in an open field in Africa.

Mobile devices that support AR are swiftly becoming more powerful and less expensive. Furthermore, new hardware possibilities, like mobile projection devices, are emerging, allowing new sorts of mobile AR applications to function and make sense. There is a distinction to be made between “portable” and “mobile” augmented reality applications. Some people are more eager than others to accept the requirements of carrying extra technology for AR applications. Some mobile technology is quite evident to people nearby, while others in the area may not even notice when someone is engaging in an AR experience. If adequate connectivity is not currently available in the location where the mobile AR application is intended to be utilized, a computer network can be created if necessary (Braud et al., 2017).

Mobile phones are the easiest way to deliver AR applications. Nowadays, mobile phones have evolved, as they can have a good camera and a processor that is good enough to render low- and medium-quality AR applications. Apart from that, AR applications in mobile phones allow easy interaction and a point-of-view mechanism on AR. Smartphones are the main consumer platforms that enable AR devices to overcome issues related to battery consumption, cellular connectivity, and the costs of developing applications such as smart glasses and dedicated headsets.

7.2.1 Global Positioning System and Location-based Augmented Reality

Global positioning system (GPS) and location-based AR are responsive to any mobile device’s sensors. There are no restrictions on where objects can be placed because they can be retrieved at any moment, regardless of time or weather conditions. Apart from using GPS position, it also combines the street view data, such as buildings and roads. For example, see Figure 7.1, this method uses Google Maps AR that allows users to see and navigate around a city through virtual navigation on their screen (Kleftodimos et al., 2023).