Chapter 56
Augmented Reality (AR) Applications in Agriculture

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ABSTRACT

The new ICT technologies are not only quickly developing but they are also giving birth to newer ICT systems and tools. Using the Internet by means of mobile appliances increases the possibilities. The Internet network has become an essential communication tool in business processes recently. Nowadays the Internet-based applications are more and more successful in agriculture and different parts of the food industry. There are several application areas, such as extension services, precision agriculture, e-commerce, and information services, where the Internet is essential. While studying the use of Augmented Reality technology, it can be concluded that different types of services offer different possibilities. Mobile systems develop very dynamically both in regards to the speed of data transmission and services. New devices like tablets and new services like Cloud Computing, Augmented Reality, and Near Field Communication (NFC) have great potential in agriculture. Cloud Computing provides better resource management and effective cost control. Augmented Reality expands the control, and the NFC gives better personalized information exchange. However, the business assessment of these technologies must not be done only on the basis of the technology and taken out of its environment randomly, since the whole area is very complex. In this chapter, the authors show Augmented Reality and try to highlight the possibilities in agriculture.

INTRODUCTION

The development of information technology has had a considerable influence on the agriculture of the highly industrialised nations as well. There have emerged a number of new industry-specific technologies and new applications over the past few years, including the ever-widening agricultural application of mobile communications devices and technologies. Further considerable improvement is expected in the use of the augmented reality applications. According to research-developmental

and application trends as well as forecasts and expectations these technologies and services are to become widely applied tools in enhancing business innovations and supporting business management.

The focus of our research was the Augmented Reality applications based on mobile devices and the assessment of their effects on agriculture. Due to the fact that the development of applications and user applications require wide-ranging condition and effect the investigation of several conditions and effect mechanisms and research tasks were carried out.

BACKGROUND

In 1994, Milgram and Kishino (1994) proposed an AR-related theory, the Virtuality Continuum, which shows that AR is in between real and virtual environment (see Figure 1).

The Virtual Reality (VR) is when the user completely feels; recognise a fictitious world and the real world is replaced with the simulated one. The road from the real environment to the virtual environment is called Mixed Reality (MR). The Augmented Reality is a part of MR; the next step is the Augmented Virtuality. The AR is the real-world with content generated by a computer or another device. The content can be sound, video, graphics, geographical position and other data.

The mobile mixed reality is when we use mobile device and technology, including wireless communication, mobile devices and mobile software. The mobile MR can be done using the mobile device built in sensors, like camera, accelerometer, GPS, wireless connection.

Mobile Device in Augmented Reality has Several Limitations: The developers have to find ways to solve them. There are several possibilities to get better applications (Vazquez-Briseno et al., 2012):

1. **Image Resolution Reduction**: The reduction of pixels brings down CPU workload.
2. **Parametric tuning for computer vision algorithms.**
3. **Utilization of Assumptions and Heuristics:** The useful assumptions and heuristics can make the computer vision tasks easier.

Recent Technologies in Mobile Augmented Reality

Mobile phones are mainly voice-centered, but a wide range of further mobile services and functions exists. The new category called smartphone is a mobile phone with computer-enabled functions. The new sensors like built in camera and wireless functions help the user to input data. The integrated cameras that can be used to read visual codes, like Quick Response (QR) Code or the new Radio Frequency Identification (RFID) based Near Field Communications (NFC) are allows new interactions with people, places and things (Vazquez-Briseno et al., 2012).

Figure 1. Reality-virtuality continuum
Source: Milgram and Kishino (1994)
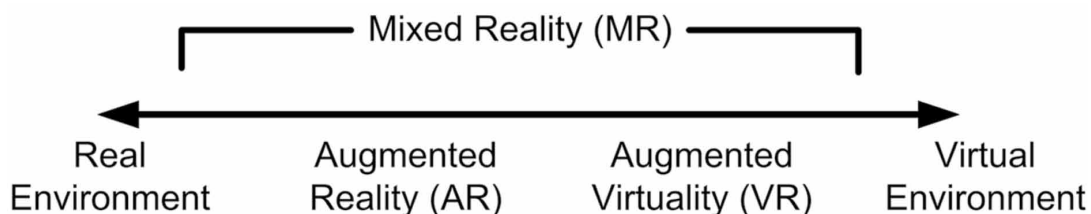
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