Chapter 3

21st Century Technologies

“AI is more than a movie.”

Bill Gates

“Any sufficiently advanced technology is indistinguishable from magic.”

Arthur C. Clarke

3.1 Introduction

In this chapter, we introduce and outline four different 21st century technologies. The most important 21st century technology is ICT—information and communication technology. In many ways, it has come to be the backbone of society, and provides the infrastructure upon which other technologies can sit. It is extremely pervasive, rapidly increasing, and undoubtedly important. The future of ICT will see ever-increasing speed, reliability, interconnectivity and sophistication approaching that of the capabilities cyberspace offer.

A closely following 21st century technology is AI — artificial intelligence — with its endeavour to make “human-like” ma-
chines that are able to undertake intelligent action in the human world. AI has had some successes, although when the achievements are compared to the initial ambitious goals, the realities of what have been achieved are sometimes disappointing. At the start of the 21st century, AI is very much a part of daily life, with a tendency to embed intelligence within existing gadgets. The future of AI will see ever-increasing sophistication in the range of intelligent behaviour that machines can demonstrate.

Ubiquitous computing and ambient intelligence will embed many small and highly specialised devices within our everyday environment in such a way that they operate seamlessly and become transparent to the person using them. Ambient intelligence is sometimes described as the convergence of many different streams of computing, aiming to deliver “rich” environments that anticipate humanity’s every need. It will build upon ICT technologies, wireless Internet, and AI technologies. Both these possibilities will clearly be important components of future technology.

Finally, we introduce the idea of virtual AI as technology that (1) augments the natural physical world in ubiquitous computing environments, and (2) enhances the artificial virtual world through computer-facilitated life. We distinguish it from “real AI” as that AI which is pursued in isolation from ICT and Internet technologies, and which has largely dominated the 20th century non-virtual world. To some extent, the aims of “real AI” are slightly different from the aims of “virtual AI.” Real AI asked about reproducing human behaviour in a range of areas; virtual AI is more concerned with embedding intelligence in gadgets, supporting human action and human intelligence.

The objective of this chapter is to introduce and outline four different 21st century technologies, revealing them as (1) ICT — information and communication technology — the backbone of society providing the infrastructure upon which other technologies can sit, (2) AI — artificial intelligence — with its endeavours to make “human-like” machines that are able to undertake intelligent action in the human world, (3) ubiquitous computing and ambient intelligence — promising a seamless environment of information and communication between the human and computer world, and (4) virtual AI — enhancing Internet ICT with intelligence and sophistication, merging with ubiquitous computing to make a world where the interface between the virtual and real are continually blurred. We aim to provide a snapshot of the