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<td>Artificial intelligence refers to the replication of human intelligence in machines that are encoded to think like humans and imitate their actions. The word may also be applied to any machine that displays qualities related to a human mind for example understanding, learning, and problem-solving. As technology advances, previous benchmarks that defined artificial intelligence become out-dated. Artificial intelligence has made its way to almost every sector and has resulted in better efficiency of the traditional processes. In this chapter, the author discusses the current applications, future prospects, and possible threats of artificial intelligence.</td>
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<td>Artificial intelligence evolves rapidly and will have a great impact on the society in the future. One important question which still cannot be addressed with satisfaction is whether the decision of an intelligent agent can be predicted. As a consequence of this, the general question arises if such agents can be controllable and future robotic applications can be safe. This chapter shows that unpredictable systems are very common in mathematics and physics although the underlying mathematical structure can be very simple. It also shows that such unpredictability can also emerge for intelligent agents in reinforcement learning, especially for complex tasks with various input parameters. An observer would not be capable to distinguish this unpredictability from a free will of the agent. This raises ethical questions and safety issues which are briefly presented.</td>
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The Fourth Industrial Revolution is affecting all disciplines and represents a new way of using technologies that are fusing the physical, digital, and biological worlds. An analysis of possible future applications of artificial intelligence, sensors, and robotics in industries suggests that different technological trends are reshaping the industrial production, in this way demanding a different workforce. This leads to the automation of processes and it demands a workforce with engineers possessing knowledge of disciplines like computing, mechanics, and process management. In this scenario, the main objective of this investigation was to study new ways to educate engineers in two perspectives: in small scale face-to-face education and in large-scale distance education. In both perspectives of small- and large-scale courses, the same discipline with the same lecturer is considered as a way to allow for better comparisons. The chosen discipline is simulation of systems.

Chapter 4
Cognitive Computing and Its Applications ................................................................. 47

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Aishwarya Madhav Mujumdar, Vellore Institute of Technology, Chennai, India
Abhijit Biswas, Vellore Institute of Technology, Chennai, India

Cognitive computing is a combination of cognitive science and computer science. Cognitive science is study of the human brain and its functionality whereas computer science seems to have severe impacts in our personal lives, healthcare, etc. Use of massive unstructured data in past few years have led to invention of cognitive systems. Programmable computers focused on fast calculations of large amounts of data whereas cognitive systems are intended towards exploring data, finding new correlations, and context in data in order to come up with new solutions. The goal of cognitive computing is to increase boundaries of human perception instead of replacing the way human thinks. A new industrial revolution in the form of cognitive computing is responsible for job automation healthcare, transportation, home automation, and many more. This chapter includes a brief history of cognitive computing and also the eras of computing in order to understand the growth of cognitive computing in future and also the applications based on cognitive technology.

Chapter 5
Digital Manufacturing and the Fifth Industrial Revolution .......................................... 69

Rami Alkhateeb, Rafik Hariri University, Lebanon
Razan Lebdy, Rafik Hariri University, Lebanon

Industrial revolutions highly impact the workforce, skill of every occupation, and society. Many businesses have implemented appropriate competitive advantages to take lead of the market, when others yet didn’t recognize the pace of the current industrial revolutions and digital transformations. This chapter emphasizes the cooperation between different sectors of digital manufacturing that requires a reinvention of the working routine to exploit big data and analytics in addition to the market network. This chapter will also put into further detail the driving forces behind the unpredictable rapid technological revolution and trends of digital manufacturing. With equal emphasis, the authors regarded ethics as the very first priority to retain a safer world for humanity. Readers will develop a strong foundation to keep adaptive control and preventive strategy against any disruption and leave an opportunity to attain an even better future.
Chapter 6
The Big Data Era: Data Management Novelties for Visualizing, Exploring, and Processing Big Data

Maria K. Krommyda, National Technical University of Athens, Greece
Verena Kantere, National Technical University of Athens, Greece

Large datasets pertaining to many scientific fields and everyday activities are becoming available at an increasing rate. Processing, analyzing, and understanding the information that they offer poses significant technical challenges. There are many efforts dedicated to the development of big data exploration, analysis, and visualization applications that will improve the value of the information extracted from these datasets. An analysis of the state-of-the-art in these applications is presented here along with open research challenges that have not yet been tackled sufficiently. Also, specific domains where big data applications are needed are presented, and unique challenges are identified.

Chapter 7
Automated App for Mental Health Analysis: A Need to Fight Against Growing Crisis in the 21st Century World

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Devendra Kumar Chaturvedi, Dayalbagh Educational Institute, Agra, India
Mayank Gupta, Tata Consultancy Services, India
Parul Singhal, ABES Engineerig College, Ghaziabad, India

Many apps and analyzers based on machine learning have been designed already to help and cure the stress issue, which is an epidemic. The project is based on an experimental research work that the authors have performed at Research Labs and Scientific Spirituality Centers of Dev Sanskriti VishwaVidyalaya, Haridwar and Patanjali Research Foundations, Uttarakhand. In their research work, the correctness and accuracy have been studied and compared for two biofeedback devices named as electromyography (EMG) and galvanic skin response (GSR), which can operate in three modes—audio, visual, and audio-visual—with the help of data set of tension type headache (TTH) patients. They have realized by their research work that these days people have lot of stress in their life so they planned to make an effort for reducing the stress level of people by their technical knowledge of computer science. In their project, the authors have a website that contains a closed set of questionnaires from SF-36, which have some weight associated with each question.

Chapter 8
Automating Pain Reduction Using Biosensors and Realtime Adaptive VR

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Alexiei Dingli, University of Malta, Malta

Recent years have seen digital game mediums taking conventional amusement, entertainment, and leisure industries by storm. They have revolutionized the system to the extent that the industry cannot now even dream of doing without this overwhelming reality. The same game mediums that have capitalized on intrinsic leisure aspects have simultaneously focused with equal vigour on other equally, if not more, important collateral objectives. This chapter builds on this concept and discusses work currently being carried out at the University of Malta. The research brings together various concepts synonymous with the field of artificial intelligence and automation to propose the use of games as a means of distraction therapy for individuals undergoing painful clinical treatment procedures.
Chapter 9
The Gaming Experience With AI ................................................................. 141

Preety Khatri, Institute of Management Studies Noida, India

There are several uses of artificial intelligence in games that are useful for the better game design. With the help of AI, we can improve the games in different ways by simply playing them. In the game industry, when artificial intelligence of the game enhances to the profitable value of the game, this adds to better game reviews, which results to improve the experience of the player. By using AI, we can control both the player as well as non-player characters of the game. AI emphasizes on optimizing the performance of play, which means to measure the degree to which a player comes across the goals of the game, in case of player character. Whereas the role of AI in case of a non-player character emphasizes automatic game balancing mechanisms as well as allow dynamic difficulty adjustment. The use of AI for the empathetic player experience can improve and drive the design process of games. This chapter explores gaming with AI.

Chapter 10
Brand Experience in the Internet of Things: Development of an Experience Interface (ExI) .......... 158

Thomas Heinrich Musiolik, Berlin University of the Arts, Germany

The internet of things, as well as data from connected devices and other digital technologies, can facilitate seamless customer service, rapid problem-solving, and the more efficient deployment of skilled resources – they can offer unique and emotional brand experiences. This chapter discusses what experiences are, how the promise of experience is made, how to develop an experience interface (ExI), and why it will be in the future critical to the success of brand experiences in the internet of things.

Chapter 11
Integration of Artificial Intelligence Into Austrian Journalism: A Potential Threat to Austrian Journalism? .............................................................. 182

Cigdem Elikci, University of Lincoln, UK

This chapter aims to highlight the changes that journalism in Austria should expect. The authors analyse the data collected on Austrians’ habits of consuming news through intelligent virtual assistants (IVAs). Furthermore, the importance and potential of the devices run by artificial intelligence (AI), such as IVAs and natural language generation software, are highlighted. The status quo and Austrian journalists’ knowledge about IVAs and their predictions about the attitude of citizens towards those devices are outlined. AI in journalism industry is not only discussed as an assistant to ease the workflow of journalists in Austria; it is also represented as a potential threat which creates filter bubbles due to personalized news consumption through IVAs.

Chapter 12
Applications of Artificial Intelligence in Media and Entertainment ........................................ 201

Richard Lachman, Ryerson University, Canada
Michael Joffe, Independent Researcher, USA

Emerging developments in AI will have a tremendous impact on the world of media and entertainment. While the general public is focused on entertainment-related technology such as virtual reality and augmented reality, perhaps more significant is the technological transformation of how media experiences
are created. Many of the signals about how and where these technologies will affect our lives are below the surface, deeper inside the pre-production and post-production process. This chapter will survey some of the ways in which AI affects the stories we consume, issues of ethics and equity surrounding the use of the AI in media, and early signals that presage a tectonic shift in the business of content production.

**Chapter 13**
The Bad, the Good, and the Rebellious Bots: World’s First in Artificial Intelligence........................................221

_Silvia Lombardo, Independent Researcher, Italy_

The researcher explores the world’s first use of AI. In the “Bad Bot” section, the authors look at the negative impact of AI in politics with the first elections won in history through the use of AI’s bots and trolls propaganda, and how it could bring to a more dystopian future with deepfakes. In the “Good Bot” section, they focus on positive case studies; starting with the 2021 Tokyo Olympics and health, they explore AI techniques applied from the infinitive small, Higgs Boson, to the infinitely large, dark matter; we’ll meet Cimon at the Space Station; AI in climate change and pioneer UN projects such as “Earth” and “Humanitarian” AI; in education, they look at the latest use of AI helping schools and EU project “Time Machine.” They also see examples done to tackle the “Bad Bots” section looking at what is being implemented. This chapter will finally look at the world’s first rebellious behaviour in bots with funny examples that will make you think.

**Chapter 14**
Deciphering Factual Realities in the Process of Securitizing Artificial Intelligence.........................................238

_Muhammed Can, University of Minho, Portugal_

The advent of artificial intelligence has shifted the outlook of great power politics over the last decade. China and the US are the main competitors in the technology front of new ‘Cold War’. Big data, 5G, quantum computing, algorithmic warfare, cybersecurity, and many other concepts are getting more topical as the day wore on. Chinese social credit system, mass surveillance systems, and exportation of these technologies to the third countries are the epicentre of the vast majority of current debates. Having said that, ‘Securitization Theory’ plays a pivotal role in determining the realities on the ground and how societies are being affected by the AI narratives particularly produced in media and academia. Therefore, this chapter seeks to reach appropriate answers on how to reify the current status of AI-based technologies via securitization theory’s significant premises.

**Chapter 15**
Estimating Visual Saliency for Omnidirectional HDR Images ........................................................................249

_Kenji Hara, Kyushu University, Japan_

A unified decomposition-and-integration-based framework is presented herein for the visual saliency estimation of omnidirectional high dynamic range (HDR) images, which allows straightforward reuse of existing saliency estimation method for typical images with narrow field-of-view and low dynamic range (LDR). First, the proposed method decomposes a given omnidirectional HDR image into multiple partially overlapping LDR images with quasi-uniform spatial resolution and without polar singularities, both spatially and in intensity using a spherical overset grid and a tone-mapping-based synthesis of imaginary multiexposure images. For each decomposed image, a standard saliency estimation method is then applied for typical images. Finally, the saliency map of each decomposed image is optimally integrated.
from the coordinate system of the overset grid and LDR back to the representation of the coordinate system and HDR of the original image. The proposed method is applied to actual omnidirectional HDR images and its effectiveness is demonstrated.

**Chapter 16**

Emerging Technology Amendment Study in Smart Agro Farming to Diagnose the Agro Product Diseases................................................................................................................................. 273

*Nilamadhab Mishra, School of Computing Sciences and Engineering, Vellore Institute of Technology, Bhopal, India*

Environmental habitation and ecosystem management are some vital issues for agro-farming. Smart monitoring of the agricultural activities is the major issue in recent years due to a range of factors including diseases growing, environmental changes, product promotion and distributions, and the apparent onset of global warming. With the advancement of new computing technologies in agricultural sectors, the smart agro farming has evolved in order to diagnose the agro product diseases, measure the moisture in the soil, measure the soil and environment temperature, measure fertilizers and pesticides, web-based product promotion and distribution, and others. The major problem is to address is the lack of the most appropriate agriculture inputs to continue the smart production activities. These inputs include farm equipment, seeds, planting materials, and livestock. Soil identification and classification are also the major factors in order to select the production of a particular crop for a specific soil type.

**Chapter 17**

Transhumanism Without Mind Uploading and Immortality ................................................................. 284

*Stefan Lorenz Sorgner, John Cabot University, Rome, Italy*

Elon Musk regularly advertises for the simulation argument, stressing that he regards it as highly likely that we live in a computer simulation. However, it must be noted that the argument can be reconstructed such that its line of thought can be rationally grasped. This, however, does not necessarily mean that it is a plausible argument. The argument presupposes the anthropology that human beings can be uploaded onto a hard drive, which is based upon the view that humans are nothing like a software running on our body which serves as our hardware. It is this understanding of the human species which has been employed by many transhumanists who stress that immortality is near. The author will explain the line of thought underlining the simulation argument while they will, at the same time, explain that it is neither highly likely that we live in a computer simulation, nor that we can upload our personalities onto a computer, and even if this was possible, it would not enable us to become immortal.

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