Chapter 1
Artificial Intelligence:
Concepts and Notions

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ABSTRACT

In recent years, artificial intelligence (AI) has gained attention from policymakers, universities, researchers, companies and businesses, media, and the wide public. The growing importance and relevance of artificial intelligence (AI) to humanity is undisputed: AI assistants and recommendations, for instance, are increasingly embedded in our daily lives. The chapter starts with a critical review on AI definitions since terms such as "artificial intelligence," "machine learning," and "data science" are often used interchangeably, yet they are not the same. The first section begins with AI capabilities and AI research clusters. Basic categorisation of AI is presented as well. The increasing societal relevance of AI and its rising inburst in our daily lives though sometimes controversial are discussed in second section. The chapter ends with conclusions and recommendations aimed at future development of AI in a responsible manner.

INTRODUCTION

Artificial Intelligence is a powerful and transformative technology. On one hand, AI embraces huge potential to provide real social, economic and environmental benefits. It is considered as an area of critical importance for national competitiveness. McKinsey Global Research, for instance, estimates that the use of AI will add as much as $13 trillion to global GDP by 2030 (Bughin et al., 2018). On the other

hand, the growing use of algorithms raises potential ethical concerns toward the societal relevance of AI.

There are many inconsistencies and confronting points of view when it comes to AI. Artificial intelligence quite often is compared and even is defined related or opposed to human intelligence. Regarding its application AI is divided into "strong" (AI for general applications) and "weak" AI (AI for practical applications) thus conradicting cognitive science versus engineering.

The chapter starts with a critical review on AI definitions since terms such as "artificial intelligence," "machine learning," and "data science" are often used interchangeably, yet they are not the same. The first section begins with AI capabilities and AI impact. Basic categorisation of AI is presented as well. The increasing societal relevance of AI and its rising penetration in our daily lives though sometimes controversial are discussed in second section. The chapter ends with conclusions and recommendations aimed at future development of AI in a responsible manner.

Background

In 1956, American computer scientist John McCarthy organised the Dartmouth Conference, at which the term 'Artificial Intelligence' was first adopted. Research centres emerged across the United States to explore the potential of AI. If we assume the following stages of the life cycle of technology: 1/ technological invention or discovery, 2/ technological emergence, 3/ technological acceptance, 4/ technological sublime (the value of technology is fully appreciated), and 5/ technological surplus (Kendall, 1999) where exactly could we position AI nowadays? Is AI an emerging technology?

The emergence of almost every new technology is accompanied by estimates of the speed with which it will obtain universal use. In fact, an examination of such cases indicates that the adoption cycle of the new technology - from invention through early use to more widespread use and then general use - is usually about 25 years (Ein-Dor, 2011). According to Anyoha (2020) the adoption cycle in AI will be much longer. This research shows, for instance, that Arthur Clarke and Steve Kubrik prediction that "…by the year 2001 we will have machines with intelligence that matched or exceeded human's" was quite overstated.

The evolution timeline of AI is presented in Figure 1.

As it shown in the figure, AI is still being invented 50 years after the idea first evolved. Various AI technologies is still being created, even the conceptual foundations of AI are continually evolving. Thus, AI is still very much an emerging technology. The Gartner (2019) predictions regarding the life cycle of AI main tools and applications are shown in Table 1.

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