Chapter 2
A Brief History

ABSTRACT

In this chapter, the author presents a brief history of artificial intelligence (AI) and cognitive computing (CC). They are often interchangeable terms to many people who are not working in the technology industry. Both imply that computers are now responsible for performing job functions that a human used to perform. The two topics are closely aligned; while they are not mutually exclusive, both have distinctive purposes and applications due to their practical, industrial, and commercial appeal as well as their respective challenges amongst academia, engineering, and research communities. To summarise, AI empowers computer systems to be smart (and perhaps smarter than humans). Conversely, CC includes individual technologies that perform specific tasks that facilitate and augment human intelligence. When the benefits of both AI and CC are combined within a single system, operating from the same sets of data and the same real-time variables, they have the potential to enrich humans, society, and our world.

AI and cognitive computing are "based on the ability of machines to sense, reason, act and adapt based on learned experience" –Brian Krzanich, Intel CEO

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INTRODUCTION

This chapter provides a brief history of artificial intelligence (AI) and cognitive computing (CC). These terms are often used interchangeably, but there the approaches and objectives of each differ. As the popularity of AI grows, there remains a misunderstanding of the technical jargon that comes with it. Examples include terms such as 'deep learning', 'machine learning' (ML), 'speech recognition', 'text mining', 'neural networks' and many more. In layman's terms, AI is an understanding that is achieved by machines that interpret, mine and learn from external data in ways that the machine functionally imitates the cognitive processes of a human. These processes include learning from constantly changing data, reasoning to make sense of the data and related self-correction mechanisms. Human intelligence is rooted in sensing the environment, learning from it and processing its information. Thus, AI includes

- A simulation of human senses: sight, hearing, smell, taste and touch
- A simulation of learning and processing: deep learning, ML, etc.
- Simulations of human responses: robotics

AI applications includes problem-solving, game playing, natural language processing (NLP), speech recognition, image processing, automatic programming and robotics. CC refers to the development of computer systems based on mimicking human brains. It is a science that was developed to train computers to think by analysing, interpreting, reasoning and learning without constant human involvement. CC represents the third era of computing. In the first era (19th century) Charles Babbage, the 'father of the computer', introduced the concept of a programmable machine. Used for navigational calculation, his computer tabulated polynomial functions. The second era (1950s) resulted in digital programming computers like ENIAC[1] and ushered an era of modern computing and programmable systems.

CC utilises deep-learning algorithms and big-data analytics to provide insights. Thus, the brain of a cognitive system is a neural network: fundamental concept behind deep learning. A neural network is a system of hardware and software that mimics the central nervous system of humans to estimate functions that depend on a huge amount of unknown or learned inputs. By the 1980s, two trends affected the way experts and researchers began to unpack