

Computational intelligence the technologies for ambient intelligence

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ABSTRACT

Adaptability and advanced services for ambient intelligence require an intelligent technological support for understanding the current needs and the desires of users in the interactions with the environment for their daily use, as well as for understanding the current status of the environment also in complex situations. This infrastructure constitutes an essential base for smart living. Computational intelligence can provide additional flexible techniques for designing and implementing monitoring and control systems, which can be configured from behavioral examples or by mimicking approximate reasoning processes to achieve adaptable systems. This session will analyze the opportunities offered by computational intelligence to support the realization of adaptable operations and intelligent services for smart living in an ambient intelligent infrastructure.

INTRODUCTION

Ambient intelligence is a new field that adds intelligence to our everyday settings while also making them more responsive to human presence. Ambient intelligence (AmI) research builds on breakthroughs in sensor networks, pervasive computing, and artificial intelligence. AmI research has strengthened and expanded as these key sectors have undergone great growth in recent years. Because AmI research is progressing, the emerging technologies have the potential to revolutionise everyday human existence by making people's surroundings more adaptable and flexible.

We present a study of the technologies that make up ambient intelligence, as well as the applications that are significantly impacted by it, in this paper. We are particularly interested in research that makes AmI devices "intelligent." The problems and opportunities that AmI researchers will confront in the coming years are also highlighted.

The ability to acquire and apply knowledge in new contexts is referred to as intelligence. The term "artificial" refers to something created by humans, whereas "ambience" refers to the environment in which we live. We also prefer to think of ambient intelligence (AmI) as something artificial; natural AmI events are studied in

biology and sociology.

The focus of this study is on human-centric technologies, which necessitate close collaboration between humans and artificial intelligence (AI) in their interactions with the environment. Many computer-generated AI solutions are based on the concept of simulating neurological functioning and human intellect. Smart and intelligent systems that surround the user and deploy AI technology.

In this sense, AmI is not a particular technology, but rather a user's experience with the services supplied by those systems. The cost functions used to optimise AmI systems are typically tied to improving the subjective human experience, which can only be measured indirectly. As a result, selecting the best objective/cost functions that satisfy the subjective human experience in AmI is critical to a successful application of AI and AmI.

Artificial Intelligence (AI) and Ambient Intelligence (AmI) advancement follows the same rules and laws as ICT progress. Many of these principles are exponential, such as Moore's law. Despite signals that progress is slowing, AI and AmI are expected to continue to advance at a high pace for the foreseeable future.

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a more detailed description), whereas AmI appears to be a less difficult task. Super-AmI, on the other hand, may evolve even faster than superintelligence as a result of embodiment, embedding, and interactions with people. Indeed, some researchers in the field prefer the term Computational Intelligence (CI) over artificial intelligence (AI) - for example, in IEEE papers (AI). In this paper, we'll use the phrase "superintelligence," which refers to both AI and AmI technology.

The job of understanding the context that surrounds the user, for example, has been a barrier for AI applications in smart environments (detailed in several subsequent sections).

The core idea is that AI and AmI are two closely related fields that are both largely reliant on the development of the information society and both have a significant impact on human development. We evaluate the information-society rules as one of the markers of the past and future to better comprehend the driving forces that support and proliferate the future growth of AI and AmI.

The creation, distribution, use, integration, and manipulation of information is a major economic, political, and cultural activity in an information society. Digital information and communication technologies (ICTs) are the key drivers, resulting in an information explosion that is radically affecting all facets of our society. The information society has surpassed the industrial society and is on its way to becoming a knowledge or intelligent society.

A variety of statistics can be used to highlight the tremendous increase of information. For example, between 1986 and 2007,

the world's technical capacity for storing information rose at a steady

yearly pace of 25%. The world's computing capability increased from 3.0 10⁸ MIPS in 1986 to 6.4 10¹²

MIPS in 2007, a growth rate of more than 60% per year over the last two decades. As evidenced by the rapid expansion in the number of Internet users, this progress has resulted in a major boost for human civilization.

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