

# **APPLIED COMPUTING: THEORY, IMPLEMENTATION, APPLICATION**

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## Abstract

Applied Computing is the practice of embedding the realisation of Computer Science's latest technological advancements into industrial, business, and scientific intelligent solutions. Applied Computing stretches to a variety of fields, requiring an extensive knowledge of the specialised subject area and in many cases large teams of trained individuals to put into production. Applied Artificial Intelligence is considered as one of the major fields of Applied Computing. Artificial Intelligence has been introduced as an important tool in the implementation of Health, Business, Education, Entertainment, Tourism and more centred solutions as real world applications.

The theme of Artificial Intelligence transcends computing. However, computing is perhaps a field at the forefront of exploring intelligence for the purpose of practical benefits to human society. It is arguable, though informative, to consider the dawn of computational intelligence as a consequence of the ideas of Alan Turing and the progression of computation from fixed immutable programs, manifested in hardware configurations, to entirely software based representations which provide the necessary potential and flexibility for self-modification and reflexivity as considered to be necessary conditions of intelligence. It is recognised that Turing was a key driving force in the paradigm shift from hardware driven designs in computing to the realisation that computation is in fact universal and can be represented by a machine capable of spanning the space of all possible computations, without the need for specialist hardware realisations for each and every class of task considered. The transcendence of computation from explicit hardware to universal machines parallels developments such as that of the wheel and the shift in thinking experienced during the industrial revolution. Such developments however point to another important consideration, that perhaps the uniquely human processes of thought and intelligence may not be exclusively locked into the biological substrate, and may instead be contained and cultivated independently using modern computational platforms as a suitable carrier.

Such a shift in thinking towards the independent representation and elaboration of intelligent processes offers not only a practical means by which to advance our economies and commercial enterprises, but forces us to re-examine the nature of ourselves and the human condition. It is now recognised that a key product of thought constitutes an advanced information process, the basis of which can be established to various degrees within a computational paradigm. The shift from individualisation of thought to recognition of information processes in their own right, has forced society at all levels to re-examine the definition of productivity and the relationship between human workers and industry. The externalisation of intelligent processes enables information processing to be combined at unprecedented scale and speed, opening up new opportunities in terms of novel applications and motivating the continued expansion of the scope of data capture. Such a shift in paradigm forces us to re-evaluate many methodological aspects to ask how we may convert both physical and cognitive labour processes towards utilising the vast computational resource we now have available. So far we have been offered a glimpse of what the future may hold for Applied Computing, especially with information centric technologies such as the internet and world wide web continuing to generate demand through the connection of data resources with real world applications. It is expected that the continued advance of information oriented applications, as initiated by Turing and others, will be sure to produce many unprecedented and also many unanticipated changes in the near future.