

Humanism through artificial intelligence?

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Abstract

Today's key challenges for future construction are well known and little disputed. On the one hand, we should put the brakes on climate change; on the other hand, we must prepare ourselves for its probably serious consequences. Doing this without fossil resources currently still poses considerable problems for the construction industry. At the same time, digitization and artificial intelligence are creating major opportunities. Already 50 years ago, Jos Weber stated that computers should become self-learning, artificial-intelligence-developing teaching sources for architects. While the most significant discovery of the past year in the field of chemistry was made by a software program and is discussed to be proposed for the Nobel price, in civil engineering these technologies have been used in a rather rudimentary way so far. In this article, current approaches, tools and areas of application for optimization in structural design are presented, discussed and classified.

Keywords: climate change, artificial intelligence, structural optimisation.

1 Introduction

Since the Renaissance, humanism has been the term used to describe a cultural and philosophical movement aimed at giving humanity the ability to improve its own existence by promoting science, art, education and critical thinking. Several centuries have passed since the term was coined and its implementation seems a long way off. Due to climate change, which we are accelerating through the use of fossil fuels, we are threatening the preservation of biodiversity on Earth, and thus our own, instead of improving it. This is despite the fact that there are many renewable energy sources such as solar energy, wind energy, hydropower, geothermal energy and biomass, which could completely cover the world's electricity and heating needs [1].

In the 1969 book "Operating Instructions for Spaceship Earth", architect and visionary Buckminster Fuller describes the world as a living system that is steered by mankind like a spaceship

[2]. Humanity lives in a world of limited resources and the survival and well-being of all people depends on how well we can use and distribute our resources. Rather than depleting our emergency reserves, he emphasizes the indispensability of shaping our society to be sustainable and environmentally sound by breaking through political and economic barriers. At the time, he coined terms such as sustainability and synergy, which today have degenerated into empty phrases.

2 A question of attitude?

The obstacles Fuller described would be increasingly easy to overcome today as technology evolves toward a more humane society. Developments in information technology and communications have made it possible for people from different parts of the world to communicate and share information in real time. Social media, messaging apps, video calls, email and other digital tools are now part of our everyday culture. The Internet has also increased access to information