World Academy of Science, Engineering and Technology
International Journal of Mechanical and Mechatronics Engineering
Vol:16, No:06, 2022

Artificial Intelligence for Generative Modelling

Authors : Shryas Bhurat, Aryan Vashistha, Sampreet Dinakar Nayak, Ayush Gupta

Abstract : As the technology is advancing more towards high computational resources, there is a paradigm shift in the usage of these resources to optimize the design process. This paper discusses the usage of 'Generative Design using Artificial Intelligence' to build better models that adapt the operations like selection, mutation, and crossover to generate results. The human mind thinks of the simplest approach while designing an object, but the intelligence learns from the past & designs the complex optimized CAD Models. Generative Design takes the boundary conditions and comes up with multiple solutions with iterations to come up with a sturdy design with the most optimal parameter that is given, saving huge amounts of time & resources. The new production techniques that are at our disposal allow us to use additive manufacturing, 3D printing, and other innovative manufacturing techniques to save resources and design artistically engineered CAD Models. Also, this paper discusses the Genetic Algorithm, the Non-Domination technique to choose the right results using biomimicry that has evolved for current habitation for millions of years. The computer uses parametric models to generate newer models using an iterative approach & uses cloud computing to store these iterative designs. The later part of the paper compares the topology optimization technology with Generative Design that is previously being used to generate CAD Models. Finally, this paper shows the performance of algorithms and how these algorithms help in designing resource-efficient models.

Keywords : genetic algorithm, bio mimicry, generative modeling, non-dominant techniques
Conference Title : ICAIMEA 2022 : International Conference on Artificial Intelligence in Mechanical Engineering Applications
Conference Location : Venice, Italy
Conference Dates : June 16-17, 2022