

# The Role of AI in the Development of Mechanical Engineering

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## Abstract

AI is being utilised in a vast array of mechanical engineering applications, such as design optimisation, predictive maintenance, quality control, and process automation. For instance, AI-based design optimisation techniques can assist engineers in creating more efficient and effective designs, whereas predictive maintenance algorithms can detect and diagnose defects in machinery before they cause significant problems. In addition, AI is being used to increase the productivity and sustainability of manufacturing processes. By analysing data from sensors and other sources, artificial intelligence algorithms can identify inefficiencies in the production process and suggest enhancements to reduce waste and energy consumption. In mechanical engineering, the future of AI is promising, with numerous opportunities for further innovation and development. It is anticipated that developments in areas such as autonomous vehicles, smart factories, and robotics will accelerate the adoption of artificial intelligence in mechanical engineering, thereby transforming how we design, construct, and use machinery. AI has become an integral part of mechanical engineering, allowing engineers to design more efficient, reliable, and sustainable machines. With ongoing research and development, the potential applications of artificial intelligence in mechanical engineering are virtually limitless, and the future appears promising for this exciting and rapidly evolving field.

**Keywords:** *Artificial Intelligence, Mechanical Engineering*

## 1. Introduction

Artificial intelligence (AI) has emerged as a key technological catalyst in mechanical engineering, transforming how machines are designed, operated, and maintained. Using advanced algorithms, machine learning techniques, and big data analytics, AI has enabled engineers to create wiser and more efficient systems that can optimise performance, reduce