

Chapter 1

Artificial Intelligence and Its Application in Engineering: A Comprehensive Review

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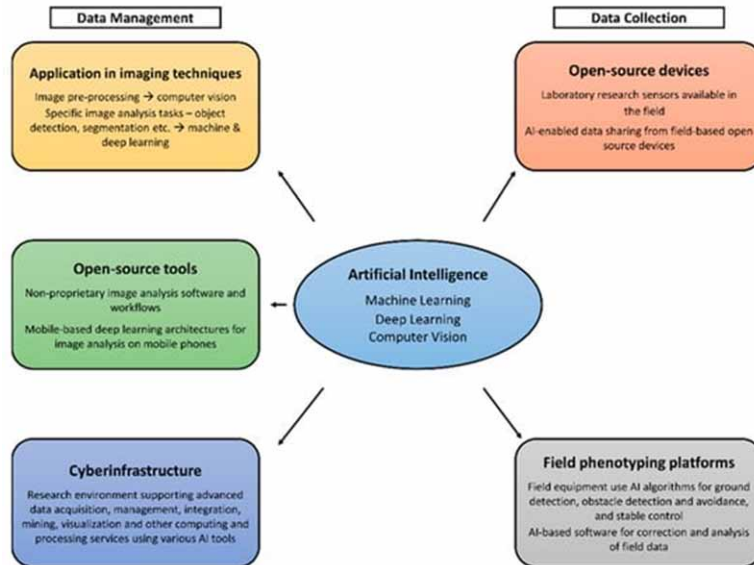
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ABSTRACT

Artificial Intelligence has transformative impact on precision medicine, structural health monitoring, and autonomous manufacturing systems, revolutionizing traditional approaches. This book chapter explores the challenges and ethical considerations inherent in AI implementation, addressing issues like data privacy, security, and human-AI collaboration. By scrutinizing real-world implementations and futuristic possibilities, this study paints a vivid picture of AI's profound influence on society. As Artificial Intelligence continues to evolve, its ethical integration into various sectors and the establishment of mutual trust between humans and machines emerge as paramount concerns. Amidst the rapid advancements, this research underscores the imperative of responsible AI development, ensuring a harmonious coexistence between artificial intelligence and humanity.

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Figure 1. Application of AI in phenomics [21]



1. INTRODUCTION

Artificial intelligence methodologies have impacted not only individual human survival but also every project lifecycle. A decent quantity of consideration has been given to sectors such as engineering, product engineering, examination, surveillance, management, repairs and upkeep of infrastructure, and item evaluations and testing. Artificial intelligence can potentially be advantageous for power systems. Additionally, with the aid of artificial intelligence techniques, specialists' capacity to create, source, and oversee state-of-the-art products and technologies in the fields of health, insurance, power, petroleum, and natural resources gas, education, aviation, production, and automotive has significantly increased in recent years. Rationale computation techniques have greatly contributed to the creation of higher capacity, more fuel-efficient aircraft in the aviation industry, as well as reduced asset availability and repair costs and times, by promptly detecting, alerting, and fixing defects. The globe continues to be in the initial stages of an improved production revolt powered by AI, despite the broad usage of artificial intelligence in tackling various technical and production difficulties [3]. AI does, however, also provide significant difficulties and dangers for engineering, including moral, societal, legal, and security concerns. Engineers must therefore use AI properly and ethically by being aware of its advantages and drawbacks [2].

2. FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE IN ENGINEERING

The topic "Fundamentals of Artificial Intelligence in Engineering" discusses the fundamental ideas and methods of Artificial Intelligence (AI) and how they relate to numerous engineering issues and fields. AI may be used to examine a lot of data and find patterns and insights.

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