Machine Learning Technique for Practical Engineering Use

Suchith H C, Sumanth, Suraj K S, Swasthik, Mr. H Harshavardhan,

Alvas Institute of Engineering and Technology, Mijar, suchithsachi@gmail.com

Alvas Institute of Engineering and Technology, Mijar, sumanthshettynitte28@gmail.com

Alvas Institute of Engineering and Technology, Mijar, surajaithal8@gmail.com

Alvas Institute of Engineering and Technology, Mijar, swasthikmoolya14@gmail.com

Alvas Institute of Engineering and Technology, Mijar, harshavardhan@aiet.org.in

ABSTRACT

In the age of Industry 5.0, where the digital world generates massive amounts of data, AIML has emerged as a powerful tool for analyzing and interpreting this data. It has proven successful in various fields such as intelligent control, decision making, computer graphics, and computer vision and many more. The performance in AIML and deep learning methods has led to their widespread adoption in real-time engineering applications. These tools are necessarily required for creating intelligent, automated tools that can recognize the data in areas like healthcare, cybersecurity, and intelligent transportation systems. Machine learning encompasses different strategies, including reinforcement learning, semi- supervised, unsupervised and supervised learning algorithms. This study aims to comprehensively explore the utilization of ML in managing real world engineering applications, enhancing their functionality and intelligence. By investigating the applicability of various machine learning approaches in domains such as cybersecurity, healthcare, and intelligent transportation systems, this research contributes to our understanding of their effectiveness. Additionally, it addresses the research goals and difficulties associated with ML in practical life. This study serves as reference for industry professionals, academics, and decision-makers, providing insights and benchmarks for different use cases and real-world applications.

Key words : Reinforcement learning, Semi-supervised learning, Unsupervised learning, Supervised Learning

1. INTRODUCTION

1.1 Machine Learning Evolution

In the modern year, data has become a part and parcel of our lives, with real-time engineering applications generating substantial amounts of data in various formats, such as unstructured, semi-structured, and structured data. This wealth of data presents opportunities for developing intelligent applications across different domains. For instance, the author leverages cybersecurity data to derive valuable insights and applies them in the creation of automated and intelligent cybersecurity applications. Similarly, in this article, the author utilizes mobile data to gain meaningful insights and employs those insights to develop contextually aware, smart applications [2]. The success of real-time engineering applications relies on effective data management tools and technologies that enable the extraction of valuable knowledge and insights in a timely and intelligent manner.

Machine learning is a subfield of artificial intelligence, has gained significant traction in data processing and analysis, revolutionizing the way applications operate intelligently. In the context of Industry 4.0, which represents Industrial Revolution, machine learning has emerged as a prominent technology that enables applications to learn from experience and enhance system performance without explicit programming [7]. It plays a crucial role in automating conventional industrial and manufacturing processes by facilitating intelligent data analysis. By implementing various optimized and efficient machine learning algorithms, real-time engineering applications can tackle real-world problems through intelligent data analysis. These algorithms encompass different types, namely reinforcement learning, unsupervised learning, semi supervised learning, and supervised learning. They provide the framework for developing intelligent applications that leverage data analysis to address complex challenges.

1.2 Types of methods used in Machine Learning

Some of the Machine Learning approach are as follows:

1. Reinforcement learning

This technique involves training models to get the output/decisions through interaction with an environment and receiving feedback in the form of rewards or penalties. It is particularly useful in optimizing decision-making processes.