The Role of Artificial Intelligence in Concrete Constructions

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Abstract : Artificial intelligence has revolutionized the concrete construction industry and improved processes by increasing efficiency, accuracy, and sustainability. This article examines the applications of artificial intelligence in predicting the compressive strength of concrete, optimizing mixing plans, and improving structural health monitoring systems. Artificial intelligence-based models, such as artificial neural networks (ANN) and combined machine learning techniques, have shown better performance than traditional methods in predicting concrete properties. In addition, artificial intelligence systems have made it possible to improve quality control and real-time monitoring of structures, which helps in preventive maintenance and increases the life of infrastructure. Also, the use of artificial intelligence plays an effective role in sustainable construction by optimizing material consumption and reducing waste. Although the implementation of artificial intelligence is associated with challenges such as high initial costs and the need for specialized training, it will create a smarter, more sustainable, and more affordable future for concrete structures.