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(57) Abstract :
The method for the development of a machine learning-based Intelligent Agricultural Decision Support System (IADSS) that uses soil categorization and fertilizer optimization to improve agricultural sustainability and productivity. The suggested system analyses soil characteristics like pH, texture, moisture, and nutrient content using a variety of supervised learning algorithms, such as support vector machines and decision trees. The algorithm suggests the best fertilizer types and dosages for a given crop based on the soil type classification. The model was trained and validated using an extensive dataset that included soil samples and historical crop yield data, and it demonstrated great accuracy in classification and recommendation tasks. The technology is intended to help farmers make data-driven decisions that will improve production while lowering input costs and their negative effects on the environment. This study highlights the potential of AI-powered precision agriculture solutions, promoting intelligent farming methods and tackling the worldwide issues of sustainable resource management and food security. FIG.1

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