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A Systematic Review of Machine Learning Techniques and Applications in Soil Improvement Using Green Materials
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Abstract
According to an extensive evaluation of published studies, there is a shortage of research on systematic literature reviews related to machine learning prediction techniques and methodologies in soil improvement using green materials. A literature review suggests that machine learning algorithms are effective at predicting various soil characteristics, including compressive strength, deformations, bearing capacity, California bearing ratio, compaction performance, stress–strain behavior, geotextile pullout strength behavior, and soil classification. The current study aims to comprehensively evaluate recent breakthroughs in machine learning algorithms for soil improvement using a systematic procedure known as PRISMA and meta-analysis. Relevant databases, including Web of Science, ScienceDirect, IEEE, and SCOPUS, were utilized, and the chosen papers were categorized based on: the approach and method employed, year of publication, authors, journals and conferences, research goals, findings and results, and solution and modeling. The review results will advance the understanding of civil and geotechnical designers and practitioners in integrating data for most geotechnical engineering problems. Additionally, the approaches covered in this research will assist geotechnical practitioners in understanding the strengths and weaknesses of artificial intelligence algorithms compared to other traditional mathematical modeling techniques. © 2023 by the authors.

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