A Non-deterministic Finite Automata Model for Identification of Ambiguities in USDA Triangle Soil Texture Classification: A Novel Approach

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Abstract

Finite automaton is the core concept of computer science used for designing abstract mathematical machines. Soil texture classification model plays crucial role in agriculture engineering to increase water productivity and yield. The USDA triangle soil texture classification is most widely used model and it comprises of 12 classes. The sand, silt and clay fractions of soil are the input elements for USDA classification model. In this paper, we propose a novel non-deterministic finite automata model for USDA triangle soil texture classification and identified the ambiguous classes. As far as we know, this is the first time that a finite automata framework has been proposed for soil texture classification. Experimental results of this work, reveals that 50% of USDA triangle soil texture classes are ambiguous. In addition, the proposed non-deterministic finite automata model for soil texture classification opens up future research to design unambiguous extended USDA soil texture classification model using deterministic finite automata.

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