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AI-Powered Soil Salinity Detection System

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Abstract: *In India, an important emerging sector is agriculture. The major challenge in agriculture and food security is soil salinity. It not only decreases the agricultural production of most crops but also affects the soil physicochemical properties and ecological balance of the area. The impacts of salinity include low agricultural productivity, low economic returns, and soil erosion. Soil salinity affects crop yield and soil health. Traditional soil salinity detection methods are labor-intensive, time-consuming, and often lack real-time capabilities. This project aims to leverage advanced technologies to provide a more efficient and effective solution for monitoring soil salinity. The primary objective of this project is to provide accurate salinity levels. Salinization levels are obtained by sensors to measure electrical conductivity, soil temperature, and moisture. Therefore, our proposed system consists of sensors in the soil to measure electrical conductivity and soil parameters that correlate with Random forest ML to detect soil salinity levels and robust hardware connections to facilitate data transmission from the sensors to the firebase database. Through parameters like EC, temperature, and moisture a decision on soil salinity level can be taken with the help of a dataset and output will be shown on the Android Application. This AI-powered soil salinity detection system represents a significant step forward in modern agriculture, combining sensor technology, cloud databases, and machine learning to address a critical agricultural challenge.*

Keywords: Soil Salinity, The Internet of things (IoT), smart agriculture, Random Forest Machine Learning, Cloud database(Firebase), Android Application

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