**ABSTRACT**

Soil quality assessment and fertilizer recommendation can be defined as crucial activities for optimizing agricultural productivity and sustainability. Undesirable soil conditions and incorrect fertilizer application can lead to reduced crop yields and inefficient resource use, which are detrimental to farming operations. Correspondingly, optimal soil conditions and precise fertilizer application can be named as beneficial. Soil quality and nutrient management are essential in various domains, including crop production, environmental conservation, and food security. By nature, most farming practices aim for optimal soil health, but issues such as nutrient deficiencies or imbalances can still cause significant losses. Fertilizers are substances added to soil to improve its fertility and support plant growth. When soil conditions are not properly assessed or fertilizers are incorrectly applied, it can lead to suboptimal crop growth and wasted resources. Thus, rather than focusing solely on traditional farming methods, a solution which integrates soil quality analysis, precise fertilizer recommendations, and remote sensing technology is more effective. Soil health and nutrient management rely on accurate data collection and analysis, as well as timely and appropriate fertilizer application.

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**LIST OF ABBREVIATIONS**

AVGBB : Average Bank Balance

CC : Credit Card

CCAGE : Credit Card Age

CCFEQ : Credit Card Frequency

CLOC : Credit Card Location

CNP : Card Not Present

CURBB : Current Bank Balance

CUT : Card Used Today

GA : Genetic Algorithm

HMM : Hidden Markov Model

OD : Over Draft

ODT : Over Draft Time

PIN : Personal Identification Number