Soil Moisture Content Prediction Using Machine Learning: A Review

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ABSTRACT

Soil Moisture Content (SMC) is a key factor for sustainable water management in agriculture. Agriculture is a dominant occupation in a country like India thus it is the largest drain of fresh water. Soil moisture is the amount of water present in the top layer of soil in a depth of 10cms.This paper reviews various soil moisture content prediction model using machine learning algorithms, novel algorithms and deep learning. Precision agriculture is a farm managing technique to study crop field by analyzing years of data using satellite images thus predicting irrigation needs according to crop water demand (CWD). Current study also reviews smart farming technique using the statistical data of soil moisture, humidity, speed of wind, types of soil and crop yield data. The paper mainly focuses on irrigation scheduling system using soil moisture prediction model and thus maximizing crop yield. Recommendation systems are being developed using supervised learning algorithms to predict crop yield and to reduce degradation of soil, also measure the soil absorption rate.

Keywords: *Soil water content, Machine learning, Recommendation system, Precision agriculture, deep learning*

1. Introduction:

In this current scenario agriculture is affected by various factors like industrialization, adverse effect on climatic changes and other environmental factors like land encroachment etc. To protect and promote agriculture is a need for survival. There are various methods to estimate Crop Water Demand (CWD) thus identifying the optimal amount of water for irrigation scheduling and to avoid reductions in yield. The climatic constraint of availability of water is a crucial problem during greenhouse effect, thus vegetation has major significance on the precipitation and soil moisture content.

Agriculture uses three fourth of the world's fresh water OECD, (2010). Water management of irrigated lands i.e. providing right amount of water at right time to achieve optimal crop production is important SAI (2010). Determining the plant water requirement Taiz & zeiger, (2006), Partial Root zone Drying (PRD) is a new deficit strategy used to save water without significance in yield (Dry et. al., 2000; Kang and Zhang (2004), Kirda et. al. (2004); Shao et. al.(2008); Tang et. al., (2005); Karandish and Simunek (2016). PRD was introduced by Dry and Loveys (1998), one half of the root zone is irrigated while other half is dried out. Various applications are being established under smart farming technique which are used for prediction of plant disease, forecasting weather, classification of crop according to types of soil, monitoring crop and crop yield, automatic irrigation system. Good