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Agricultural Productivity System

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Abstract: *As modeling with data-driven techniques is directly impacted by factors beyond the technique being used, especially feature selection, feature engineering and tuning of parameters of models, our goal is to evaluate the impact of different practices for modeling sugarcane yield. For this, the performance of sugarcane yield models was evaluated taking into account multiple combinations of feature engineering, FS, model tuning, and use of different techniques. Due to the empirical nature of our modeling, the specific results apply only to the context of the origin of the data used for modeling, but the overall process can be viewed as one that can be adopted for modeling sugarcane yield from production data. The procedures can be adapted for other crops as the crop specific steps are related to the crop growth cycle. Core knowledge about sugarcane crop size can help industry members make more informed decisions. There exists many different combinations of climate variables, seasonal climate prediction indices, and crop model outputs that could prove useful in explaining sugarcane crop size. A data mining method like Classification can cope with generating a prediction model when the search space of predictor variables is large. Research that has investigated the accuracy of random forests to explain annual variation in sugarcane productivity and the suitability of predictor variables generated from crop models coupled with observed climate and seasonal climate prediction indices is limited.*

1. Introduction

For many pattern classification problems, a higher number of features used do not necessarily translate into higher classification accuracy. In some cases the performance of algorithms devoted to speed and predictive accuracy of the data characterization can even decrease. Therefore, feature selection can serve as a pre-processing tool of great importance before solving the classification problems. The purpose of the feature selection is to reduce the maximum number of irrelevant features while maintaining acceptable classification accuracy. A good feature selection method can reduce the cost of feature measurement, and increase classifier efficiency and classification accuracy. Feature selection is of considerable importance in pattern classification, data analysis, multimedia information retrieval, medical data processing, machine learning, and data mining applications. PSO is used to implement a feature selection and SVMs with the one-versus-rest method were used as evaluators for the PSO fitness function for five multiclass problems taken from the literature. The results reveal that our method elucidated a better accuracy than the classification methods they were compared to.

2. Existing System

The current traditional techniques used in India lacks sophisticated agricultural techniques including crop and soil analysis. Majority of farmers in our country practices subsistence farming where they do not uses high yielding variety of deed and fertilizers. Also, farmers had to access the data needed while on the go, including the ability to place orders for seed or fertilizer at any time or at any place. New farmers could not able to know the crop details and its yield based on seasons.

3. Literature Survey:

3.1.Gabriel M. Alves, Paulo E. Cruvinel, "Big Data environment for agricultural soil analysis from CT digital images", published in Semantic Computing (ICSC), IEEE Tenth International Conference, Feb 2016.

In precision agriculture an increase of data and information has been observed and new approaches to improve knowledge are now required. Therefore, studies on Big Data are being conducted to find innovative solutions as a means to analyze large data sets. In this work, we present a Big Data environment for agricultural soil analysis from computed tomography (CT) images. Our structure is planned in three layers: source; Big Data environment, and applications. We use Hadoop frameworkin the second layer to process CT images and discuss how the 3D reconstruction is performed. Another application in the structure is the statistical analysis of soil samples. The Big Data environment is developed as a soil analysis system to gain an understanding about the problems related to agricultural lands.

3.2.Tyrone T. Lin, Chung-Shiao. Hsieh " A Decision Analysis for the Dynamic Crop Rotation Model with Markov Process's Concept" Department of International Business, National Dong Hwa Univ., Hualien, Taiwan(tjlin@mail.ndhu.edu.tw,610033010@ems.ndhu.edu.tw)

This paper mainly explores when the agricultural industry faces grain crop price fluctuations and natural climate changes, it will take which level of price of grain crops and what probability of climate changes for developing a dynamic grain crop rotation model. In previous paper, the authors introduce the mixed strategy of game theory to construct a 2-player game. In consideration of the pursuit of the maximization of their own interests, the decision-making of dynamic grain crop rotation is the main focus of the previous paper, and it will be extended to a multiple stable dynamic grain crop rotation strategy cycle.And now the authors develop a stationary Markov processes the basis for a final decision. Markov chain is a method frequently used in decision-making and is a model simple to be discussed.

4. Need for new system

The current system lacks the adaptation of technologies for sustainable farming system from the farmer's perspective. Thus to improve the dissemination of technological information to farmers and to introduce the evolution of instrumentation for the implementation of a whole new farm environmental management, a new system is always needed. It also comprise of technologies that improve water management and reduce the wastage following harvesting.

5. Proposed System

The proposed System is intended to help the farmers and researchers to understand the crop field and to choose a suitable crop for it. Various parameters are considered from soil to atmosphere for predicting the suitable crop. Soil parameters such as type, ph level, iron, copper, manganese, sulphur, organic carbon, potassium, phosphate and nitrogen.

6. Modules and functions

The Product will perform the following functions:

- Dataset Acquisition
- Preprocessing
- Clustering
- Feature Selection
- Classification

6.1. Dataset Acquisition

- In this module is used to upload the weather details.
- It contains the 'Year', 'Rainfall', 'Area of Sowing', 'Yield', 'Fertilizers' (Nitrogen, Phosphorous and Potassium) and 'Production'.

6.2. Preprocessing

- Data pre-processing is an important step in the data mining process.
- If there is much irrelevant and redundant information present or noisy and unreliable data, then knowledge discovery during the training phase is more difficult.
- In this module we remove noise words and stemming words.

6.3. Clustering

- Clustering is a process of partitioning a set of data (or objects) into a set of meaningful sub-classes, called clusters.
- Help users understand the natural grouping or structure in a data set. In this module, we can implement clustering algorithm to group the features.

6.4. Feature Selection

- Feature selection is the process of selecting a subset of relevant, useful features for use in building an analytical model.
- Feature selection helps narrow the field of data to just the most valuable inputs, reducing noise and improving training performance.

6.5. Classification

- In this module, we have implemented classification algorithm to classify the data, finally predict the yield production.

7. Conclusion

Building an efficient classification model for classification problems with different dimensionality and different sample size is important. The main tasks are the

selection of the features and the selection of the classification method. In this paper, we used PSO to perform feature selection and then evaluated fitness values with a SVM, which was combined with the one-versus-rest method for five classification profiles. Experimental results show that our method simplified feature selection and the total number of parameters needed effectively, thereby obtaining a higher classification accuracy compared to other feature selection methods. The proposed method can serve as an ideal pre-processing tool to help optimize the feature selection process, since it increases the classification accuracy and, at the same time, keeps computational resources needed to a minimum. It could also be applied to problems in other areas in the future.

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