Literature Survey

Exploratory Analysis of RainFall Data in India for Agriculture

Title:

Exploratory Factor Analysis on Characteristic Indexes of Rice-irrigated Management Zones

Abstract:

Good irrigation-management zone is the basis of agricultural water management, which can lower cost of irrigation management effectively. Irrigation management is influenced by a lot of factors (such as topography, geomorphology, climate, irrigation level and soil characteristics etc.), which makes zone partition very difficult. The paper proposes a method to conduct a proper application of Exploratory Factor Analysis (EFA) to the key index system, in which appropriate and adequate sampling data is used. The following principles or steps are adopted: Reduce the dimension of the factor space by ranking score for each of 7 indexes and then selecting factors that their accumulative contribution rate exceeds 0.8; Investigate the irrigation factors according to data acquired during the period 1952~2004 from 37 rice-irrigated experimental stations of Heilongjiang province, China; Select the key irrigated management factors depending on their factor score; and analyze the rationality of rice irrigated management zones. Three common factors are extracted that account for 81.2% of the total variation, and they are: the first common factor that includes 10°C accumulative temperature and frostless period, the second common factor that consists of regular irrigation quota and seepage quantity, and the third principal factor for rainfall of growth period. The results from EFA provide insights into the issue of rice-irrigated management level for large-scale zones, and give a good reference to agricultural zone partition on irrigated management.

Title:

Machine Learning Techniques For Rainfall Prediction: A Review

Abstract:

Review work and comparison of different approaches and algorithms used by researchers for rainfall prediction is shown in a tabular form. Intention of this paper is to give nonexperts easy access to the techniques and approaches used in the field of rainfall prediction.

Title:

Hybrid Prediction Models for Rainfall Forecasting

Abstract:

In this study, several hybrid forecasting models are proposed that are combinations two feature selection techniques, Gradient boosting and Random forest with various machine learning techniques, viz Support Vector Machine (SVM), adaboost, Neural Network (NN) and K-Nearest Neighbour (KNN). These model have been applied to the past 11 years (2007 2017) weather data to predict rainfall in town of carry, North caroliana. The performances of these algorithms have been computed on different metrics F-score, precision, recall, accuracy. Empirical findings have shown that the proposed model i.e GB-Adaboost is superior when compared with others without feature selection.

Title:

Clock hour correction effect on extreme value analysis of rainfall on Western Coast of India.

Abstract:

Continuous hourly rainfall data from a monsoon rainfall site on the western coast of India was taken and the effect of time discretization of rainfall records on the EVA was studied. The objective was to evaluate CHCF from limited continuous hourly data from the site. The effect of the process of data selection (FW or SW) as well as the data length (17 or 68), on EVA was also examined.

Title:

A rainfall trend analysis for agriculture irrigation system management case study: Sansai district - Chiangmai province

Abstract:

This paper propose an analysis average annual rainfall in the future for agriculture purpose planning. The Decision and policy makers in managing irrigation for agriculture and promoting farm in Sansai District, Chiang Mai. In the study, researchers used data on average monthly rainfall of the year 1993-2012, at the station in Sansai District, Chiang Mai of Hydrology and Water Management Northern Irrigation Department to analyze trends and predict the trend of rainfall. The rainfall trend analysis is predicted based on the analysis of time series and descriptive statistics. The average annual rainfall data analysis has proposed. The trend of the average monthly rainfall in the next 5 years ahead is increasing. Sansai District, Chiang Mai is the trend increased in the period January-October of each year and will decline during November-December of each year. The results of this analysis will be used in planning, water management, irrigation of agricultural crops and the amount of water that is appropriate.

Title:

Rainfall Prediction for Enhancing Crop-Yield based on Machine Learning Techniques

Abstract:

The agriculture industry is the backbone of the economy in nations like India. Many agricultural crops in India have been impacted by climate change. As a country's population grows, its reliance on agriculture grows, and the country's economic process suffers as a result. In this situation, crop yields have a significant impact on the country's economic progress. There were insufficient food grains to feed the populace. Despite the existence of numerous methodologies or procedures for estimating agricultural production, their accuracy is not up to par. According to the literature review, there are no acceptable remedies or technologies to address the aforementioned condition. This method represented a push toward over-mechanization of agriculture. Agriculturists were encouraged and supported to engage in technology-based farming. This initiative attempts to assist farmers in forecasting future harvests and properly managing their costs by taking into account variables such as temperature, rainfall, and land acreage. To forecast the crop output of a certain agriculture region depending on the quantity of rainfall, the proposed method employs machine learning techniques and multilayer Perceptron.

Farmers will be able to anticipate crop yields prior to planting and make the appropriate investment decisions as a result of this research. To estimate agricultural yields early in the harvest, this approach also focuses on appropriate marketing and storage stages. The findings of the suggested system are made available to the farmer group. The suggested technique is beneficial for precisely anticipating agricultural yield output.

Title:

Empirical Combination of Landsat 7 and 8 Imagery to Detect the Phenological Changes in Rainfed Cropland Vegetation

Abstract:

Seasonal rainfall is the dominant driver of grain yield in Australia where grain crops are grown in rainfed, broadacre farming systems. Effective monitoring of within-farm scale management and crop response is of great importance to grain growers in Australia. Landsat data have the potential to bridge the gap between broadacre cropping and precision agriculture. However, the images acquired by different Landsat sensors are subject to the conditions of the sensors and their onboard satellite platforms. This study empirically combined the time series of images from both Landsat 7 ETM+ and 8 OLI to detect the changes in winter wheat phenology at a typical farm paddock in Western Australia. Results showed that: 1) the combined method for incorporating Landsat 7 and 8 imagery improves the data frequency, in terms of higher temporal resolution and less missing values; 2) phenological detections based on the combined dataset are more realistic than those based on either of the two series of data separately. This study provides a better understanding of the usefulness of Landsat imagery for identifying and mapping crop phenology at within-farm scale.

Title:

Study of short term rain forecasting using machine learning based approach

Abstract:

In this study, using machine learning it has been observed that forecast was able to achieve much better rainfall prediction comparative to statistical methods.

The model was deployed in a real time node set up using a Lora WAN and forecasting was done using Logistic Regression to find the probability of Rain. It also has minimal error as observed in RMSE calculation

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