Retraction

Retraction: BSO feature selection based machine learning solar radiation prediction (J. Phys.: Conf. Ser. 1916 012030)

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This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

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BSO feature selection based machine learning solar radiation prediction

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Abstract. Benefits of solar power production is constantly increasing to the electrical power grid. Renewable energy sources are becoming alternatives for energy resource around the world. In order to reduce environmental pollution and CO2 emissions, an ideal solution is provided to overcome the energy crisis. Renewable energy forecasting improves the accuracy and significantly improved by developing more solar forecasting models using numerical weather predictions. The solar radiation value reaching the system is very important in determining the energy production potential of the solar energy system. In this, we discuss the development of the project with machine learning combined with multiple metrological models to improve the accuracy of solar radiation forecasting. To implement combination of two models, Bird Swarm Optimization algorithm for select features and for classification Convolutional Neural Network is used. CNN is a system prediction which are including numerous atmospheric based on satellite images or several other weather prediction products.

Keywords: Bird Swarm Optimization, Convolutional neural network, Machine learning, Solar radiation renewable, forecasting.

1. INTRODUCTION

Forecasting the weather is a challenging challenge, but it still has significant social benefits. Solar energy is needed for proper energy management. Focus on the scope of the sun is very important for predicting solar radiation. The level of accuracy of the forecast, makes the grid operation more reliable at a reduced cost. Some of the major difficulties in better weather forecasting are maintained in combination with physical and mathematical modeling [1].

Cloud photography and mathematical models and machine learning models are the two most important phases of solar radiation worldwide. In this paper, solar radiation is a form of mechanical reading. In this paper we show the general method of multiple models and further progressive accuracy can be achieved by combining the prediction of each model using a machine-based study that looks more precisely by selecting additional country parameters [2].

Which means that different models offer different capabilities based on these additional parameters. Different parameters can create mixed weather conditions and indicate different errors. By combining individual models and modifying models at different stages using a machine learning algorithm, it is expected to achieve the most complete accuracy [3].
2. DATA SET DESCRIPTION

Dataset was collected from the Kaggle website. It contains features and label. Features like Temperature, wind, rain, past year, sun raise time. Label is solar radiation [4]. The given figure 1 refers the sample dataset.

![Sample Dataset](image)

Figure 1. Sample Dataset

3. PROPOSED SYSTEM

A Convolution Neural Network (CNN) is a Machine learning algorithm which can produce more accuracy. In CNN algorithm image classification and analysis process makes more accurate output for our system. CNN is able to use non-linear relationships between input and output of set of data. Proposed method was used to find solar radiations in various scenarios like temperature, wind, etc. below Figure 2 shows the flow of proposed method [5].

![Block Diagram of proposed method](image)

Figure 2. Block Diagram of proposed method
3.1 Data Collection Phase

Dataset for the solar radiation predication has been figured out by sunset and sun arriving time, wind, humidity and date/time. Temperature, pressure, speeds, direction of wind and radiations plays a major role in data collection. Data cleaning process takes place to remove the duplicate and irrelevant data [6].

3.2 Feature Extraction and Selection

Feature extraction starts from a set of measured data and builds derived values intended to be informative, non-redundant, facilitating, subsequent learning, generalized steps and some cases leads to better human interpretation [7-15].

It is done by creating new features from the existing ones. The new set of features should be able to give more information contained in the original set of features.

In feature selection Bird Swarm Optimization Algorithm played main role to select best and important features. BSOA mostly used to solve optimization problems, it closely related to meta-heuristic algorithm.

3.3 Training Phase

The organized and filtered data is trained by Convolutional Neural Network. We should prepare the training data to provide the network with clean and unambiguous images. We have to convert our training image into categorical data using one hot-encoding which creates binary columns with respect to each class.

Convolutional Neural network performs classification part. CNN is a Deep-Learning model used to differentiate images and data [16-18]. CNN network was created based on processing Data to tune the weight and hidden layers.
Figure 3. Flow chart of CNN

Above figure 3 shows the flow of CNN algorithm

Start the process, pass input like temp, climate, wind, humidity to the algorithm then extract the features to select best one of the features. Pass the features on Layers based on input and calculate the radiations to show the output.

Here apply the 4 hidden layers and 10 epoch’s batch size based on input size.
4. RESULT

Here, After Training the model using accuracy metrics, the trained CNN model gives 93% of accuracy. To pass the new input on web based interface using python flask framework, create local server and make API to select data file. It goes on process to predict solar radiation as an output for upcoming days.

Prediction was made by past analysis and verifications, as shown in figure 4 they are plotted on graph using mat plot library.

Graph1

![Graph1](image1.png)

**Figure 4.** Analysis of proposed system

Above graph represent the year based range of data flows rain, radiations, humidity and temperature.

Graph2

![Graph2](image2.png)

**Figure 5.** Past Result Analysis
Above graph figure 5 represents the comparison of various data from past year radiation range to present years radiation range (4.8 to 5.6) insight that range, we analysis humidity.

Output of the proposed system given in figure 6 shows head, tail and full description of our dataset.

5. CONCLUSION

After analysis, to make the prediction better compared to existing model, proposed system highlights the concept of BSO algorithm and CNN combination. SVM, Random Forest will give low accuracy when compared with CNN so we will finalize CNN for prediction.

Data was taken from Kaggle repository. The numerical type of data is better handling for CNN flask which helps in good representation of our proposed method. In future this method can be used to find all over cities solar radiation using current sensor values.

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