Amalgamate Classification Of Plant Using Deep Learning

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Abstract: Classification is mostly used in many applications. This is part of machine learning and now this comes under the deep learning. Plant species identification is most widely difficult task to predict the issues in plant leaf with the existing classification algorithms. Many existing classifiers are present to identify the plant species with the leafs. With the various drawbacks, the system will not reach that much. In this paper, the amalgamative classification (AC-DL) of plant which is adopted with deep learning (DL) algorithms is used to improve the accuracy in classifier. To improve the accuracy, the feature engineering system is adopted with AC-DL. The leaf dataset used in this paper was downloaded from UCI- Machine Learning Repository. Training and testing are provided for this dataset. The proposed system AC-DL shows the better performance based on accuracy.

Keywords: DL, ML, plant species.

I. INTRODUCTION

classification of plant is helped to find unidentified plants. classification of plant is important to agricultural enivirnment. Plants play an key role in environmental protection. There are three million types of plants in world.Many of the plants are still unidentified. It is hard to categorize all the plants physically. Therefore, there is a need to develop an computerized system to catagorized the plants. The procedure that classify the palnts is achieved using the plants leaves. Every plant has a unique leaf. The leaves of the plants bring a lot of data about the plants. This data is used to develop plant classification model. Deep learning is a subclass of machine learning. Deep learning methods can extract more detailed data as compared to the machine learning methods. The machine learning approaches are used to find and categorize plants with manually extracted features from leaf images. With the evolution of Information Technology, We can simply transfer the leaf image to a computer and then the computer can extract necessary features automatically using Deep learning approaches.

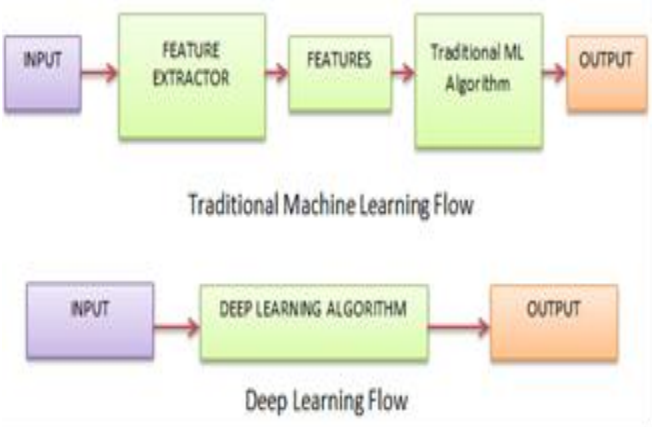

***Fig.1**: Machine Learning and Deep Learning work flow*

So, with deep learning workflow, applicable features are automatically extracted from leaf images.

II. RELATED WORK

Research Studies have been completed on the computerisation of plant classification. A huge part of Research Studies were based on the extraction of features from the leaf image. Several papers are published on classification of plant in Journals and conferences. Many researchers worked on neural networks and machine learning methods. Louxin Zhang et al., [1] proposed the following results: (a) The deep coalescence cost is equivalent to the number of gene losses is subtracted by twice the gene duplication cost in the reconciliation of a distinctively leaf labeled gene tree and a species tree. Zulkifli et al., [2]. There are two main phases involved in plant leaf recognition. The first phase is called as feature extraction method where moment invariant techniques are implemented. A technique used for feature extraction with leaf image is established through Prasad et al., [3] for computerized breathing plant species identification which can be co-operative for botanic learners to bring out their study for plant classes identification. A new resolution and directional Curvelet transform is achieved on leaf pictures to get leaf data, exactly that the direction of the object in the image does not taken into account and which also enhance the accuracy rate. These coefficients are given as the input to a trained SVM classifier to categorize the result. Main difficulty of wood species recognition system is the lack of discriminative features of the texture images. With the objective of overcoming this, Yusof et al., [4] exploited Gabor filter in the pre-processing stage of the wood texture image to improve the number of features for a exact image, as a outcome providing extra information for feature extractor to capture.

III. DRAWBACKS OF EXISTING SYSTEM

- No accuracy.
- No dataset compatibility.
- Static processing of dataset.

IV. FEATURE ENGINEERING

The way of retrive features from a dataset is called feature engineering. The distinction between conventional machine learning and deep learning algorithms is in the feature engineering.In conventional machine learning, we have to

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handmade the features. In deep learning methods, feature engineering is completed automatically. The guarantee of deep learning is progressively more accurate machine learning algorithms compared to traditional machine learning with no feature engineering. Feature engineering services to retrive additional data from current data. New data is mined in terms of original features. These features can have a advanced capability to explain the transformation in the training data. Feature engineering is extremely subjective by hypotheses generation. Hypothesis outcomes in good features. That's why, I continuously propose to participate quality time in hypothesis generation. Feature engineering system has two steps. These are

Feature transformation: There are three situations where feature transformation is mandatory:

i) Varying the measure of a variable from novel scale to scale among zero and one. This is identified as data normalization. For instance: If a data set takes first variable in meter, second in centi-meter and third in kilo-meter before applying some algorithm, we need normalize these variables in same measure.

ii) Certain algorithms work fine with generally spread data. So, we need remove skewness of variable(s). There are approaches like log, square root or inverse of the values to eliminate skewness.

iii) making bins of numeric facts works fine, meanwhile it handles the outlier values as well. Numeric information is made separate by grouping values into bins. This is known as data discretization.

Feature Creation: Exracting new variable(s) from present variables is recognised as feature creation. It supports to uncheck the unknown relationship of a data set. we want to expect the number of trades in a store based on transaction dates. transaction dates can not have straight association with number of transactions, but then if we look at the day of a week, it can have a higher correlation. In this situation, the data about day of a week is hidden. We must to mine it to mark the model better.

V. AMALGAMATE CLASSIFIER WITH DEEP LEARNING (AC-DL)

The term, accuracy typically displays the development of the proposed structure. DL can be used to enhance the accuracy in advanced ranks compared with the traditional algorithms. UCI datasets can used to process the leafs images with the proposed AC-DL algorithms.

***Fig.2**: Sample leaf images*

This will develop the accuracy of the proposed system. The following steps are used to demonstration the performance.

Step: 1 UCI dataset
Step: 2 Pre-processing
Step: 3 Feature Engineering
Step: 4 Accuracy calculations
Step: 5 Result

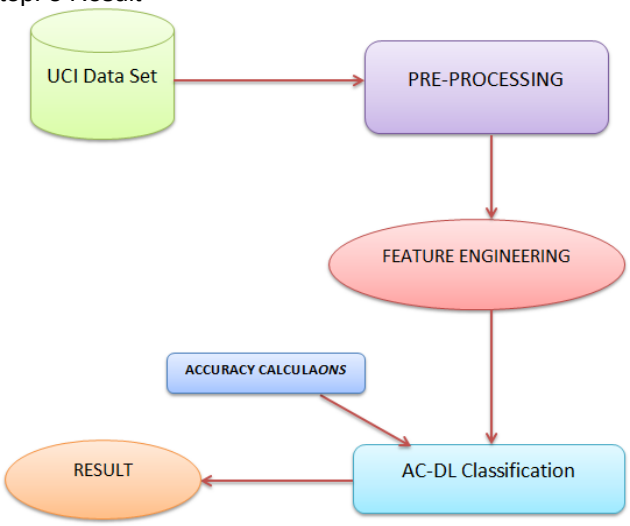

***Fig.3:** Proposed Architecture*

Advantages of propose system

- More accuracy
- Dynamic dataset selection.
- Compatible for any dataset.
- Fast processing.

VI. EVALUATION RESULTS

The development of this implementation is done with R-language and various packages are used to get the better results. For the research point of view, R-language is most widely used for many applications based on research.The results have proved a higher degree of accuracy and performance in the prediction compared to the existing

methods. The feature engineering plays a prominent role in the prediction

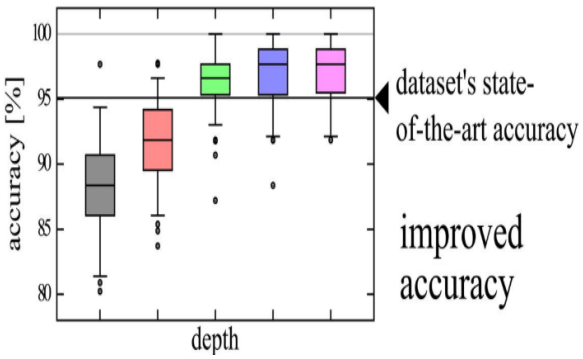

Fig. 4: *Accuracy growth*

This work provides better accurate solutions for plant classification using AC-DL algorithm and Feature Engeneering .

Performance based on Accuracy

Classifiers	Accuracy
CNN	80.03
AC-DL	97.54

Table:1 *Classifier and its Accuracy*

VII. CONCLUSION

In this paper, Plants are classified based on the the amalgamative classifier(AC) which is adopted with Deep Lerning(DL) method. AC-DL is used to improve the accuracy in classification of plants. The AC-DL is used with UCI dataset with 340 leaf images. The feature engineering is adopted with improved result. Plant species is mostly done with many algorithms from the past few years. Extraction of features from various feature engineering techniques that improve the result. Experimental result shows that AC-DL Algorithm is feasible with an accuracy greater than 97% on 53 types of plants. The experimental results indicate that the proposed approach is a valuable approach which can significantly support an accurate detection of plant in a little computational effort. Compared with existing methods, AC-DL Algorithm is fast in performance,efficient in recognition and easy in implementation.

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