HYBRID METHOD FOR CROP SELECTION USING ED AND SVM

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ABSTRACT

Research on based decision making has received much attention in recent years. When the area based upon the various schedule, hence they adequate prior knowledge that can be need for the purpose of supervise the classification and the ground truth measurement of the fields that can be conduct at different country. In this paper proposed the Entropy decomposition and support vector machine. It can be represented as the EDSVM techniques. This technique is help to the Synthetic Aperture radar that can be used to classification of the images with the purpose of wheat monitoring. They can assess the purpose of the multi temporal data and helps to supervise the classification of the wheat planning. When the theoretical output of the radiative transfer based on the ground truth depending parameter are the purpose to determine the training set of the various kinds of wheat planting schemes in the feature space of the entropy decomposition. Then the support vector machine is attain for the space based on feature for the classifying the images. In this algorithm is to demonstrate by the use of multi temporal radarsat-1 data. They compare the result from the information based on the training set from the image by using EDSVM, maximum likely hood technique.

Keywords: crop cultivation technique, decision making, EDSVM, feature extraction, maximum likelihood technique, radarsat-1.

I. INTRODUCTION

In many country where variety of crops can be consider as the staple food for the people the monitoring the growth of the plant. The wheat crop is mostly cultivated in the good typical climates. The synthetic aperture radar based remote sense that can be providing the unique and the better capability. Hence the microwave can be penetrated through the clouds as well as weather capability.

SUPPORT VECTOR MACHINE

The support vector machine is consider as the another common as well as simple technique that can be every machine learning that can be expert shall have in his or her arsenal. When the support vector is to be a highly prefer for the many they also provide the significant accuracy. They have less computational power. The separator among the category is to be determined then the data can be transfer in some way. It should be separator can be drawn as a hyper plane.

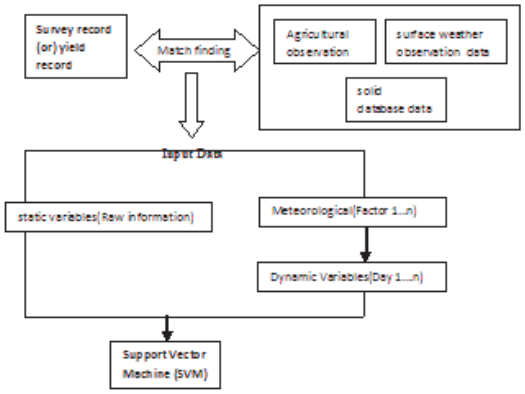

Fig. 1. Flow chart SVM algorithm

1.1 SYNTHETIC APERTURE RADAR

The synthetic aperture radar is the form of radar that can be used for the purpose to provide the two dimensional based images as well as three dimensional reconstructions of the objects such as landscapes. The fundamental goals to be accomplished by synthetic aperture radar in the field of farming are to evaluate the horticultural harvest rundown and creation, land spread and use, and soil dampness, the wellspring of dry season, floods, or more all, crop development. When the qualities of SAR and its parameters related with horticultural applications is given, and the systems for assessing development and arranging crops are then portrayed.

II. RELATED WORKS

This section focuses many different fields with great success in agriculture are summarized here.

(Guo, Li et al. 2020) The classification of crop in the agriculture has been considering as the one of the important purpose for the polarimetric based on the synthetic aperture radar [4]. The polarimetric synthetic aperture radar aperture radar (PolSAR) data.

(Liao, Wang et al. 2020) proposed the synergistic purpose of the multi temporal polarimetric based synthetic aperture radar when the available for the multispectral based on the remote based on the sensing data can be used for the reduction from the temporal gaps that can be provide the spectral and polarimetric based information based on the crops, when the crop classification of areas for the frequent based on the cloud based on the interferences[5].

(Ananthi 2020)proposed the main objective is consider as the segment nutrient of the deficiency in the crop base images for the purpose of the fuzzy sets based theory[1]. When the fuzziness can be exists in the images for the quantized level of the brightness can be considered in the each of the pixels. When the segmented images can be evaluated by the help of precision recall, measure for the structural similarity index, as well as ROC curves.

(Cui, Zhang et al. 2020) when the feature of the subset based on the selection method on the class aggregation among the class can be scatter (WA-BS) that can be proposed for they extract the optimal feature for the subset. The crop based on the types that can be monitor for produce from the algorithm based on the support vector machine classifier. That can be good when compare to the classification of the crop based result that can be determined from the synthetic aperture radar based on the image segmentation.

(Arii, Van Zyl et al. 2010) in this paper they extend the methods depend on the decomposition of the concept for they creating the adaptive model depend for the decomposition based technique. When there is no scattering based on the reflection of the symmetry for the assumption of the required for the determination of the volume contribution[2].

(Sher, Khan et al. 2018) The primary targets of the present investigation were (I to describe the impacts of expanded plant thickness on shelter morphology and stalk lodging and to investigate the

connections between organ morphology and stalk lodging[8].

(Chauhan, Darvishzadeh et al. 2019) Hypothetical foundation on crop dwelling was introduced, and the extent of RS in surveying plant attributes related with housing is evaluated and talked about. The audit centers around RS-based investigations, gathering them as per the stage conveyed[3].

III. METHODOLOGY

The proposed algorithm of cultivation based on the crops by using EDSVM for the optimization. The Questionnaires can be prepare that can be focus on the general characteristics of the cultivation based on the crop. The data can be obtaining for the purpose that can be further they analysis the data as well as the process in the research. The questionnaire based on the model of the various types of cultivation occurs in the crop that can be included in the following characteristics that can be tabulated. The questionnaire for the purpose for the select the information from the various framers can be suggested.

3.1 K MEANS ALGORITHM

Partition algorithms build partition of a record of N things into a deposit of k clusters. The necessary algorithm is given below

1.Selection k point as original centroid.

2.Again

3.For k clusters by transmission every part of point to the next centroid.

4.Recomputed the centroid of both cluster

5.In anticipation of the centroid don't change.

3.2 ENTROPY DECOMPOSITION TECHNIQUE

The proposed entropy decomposition can be famous for the purpose for they demonstrate that the fundamental ability of the polar metric of the distinguish the feature in an input. However they remain the curiosity based on the extend for the fundamental based classification philosophy for the purpose for the multi temporal inputs.

3.3 SUPPORT VECTOR MACHINE

The proposed support vector machine based algorithm is contribute the machine learning method depend on the statistical based theory. They also determined the ideal separating hyperplane in the higher dimensional feature based space.

When the given training sample based on the two various kinds of the classes. Then we determined the optimal separating based hyperplane that can be assume for the two classes then they distinguished as the linear based separable and they also denote the input space X to the input based vector, _x as well as the training set T_t={(x_1, y_1)…… (x_N, y_N)}

Where $x_i \in X$ and $y_i \in X$

Y= {1, -1} in practice it can be often

In the case when the data not be separate linearly in the mean of a hyperplane.

3.4 PROPOSED WORK (EDSVM)

The proposed technique based on the classification of the inputs that can be based on the questionnaire based result from the theoretical method for the purpose of the hybrid entropy decomposition and support vector machine can be presented. The flows of the present work are shown in the figure 2. The measurement of the ground truth can be conducted in the wheat filed for the various kind of planting that can be schedule on the obtained at the physical parameter for the wheat crops. This

technique can be produce the multi temporal alpha, αT and the entropy, HT. The information can be treated on the training the feature based vector.

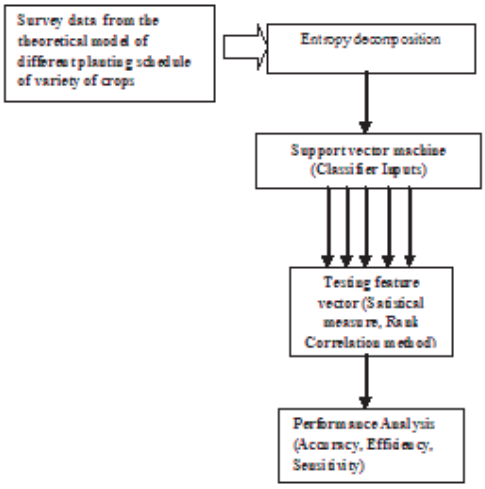

Fig. 2. flow of the proposed EDSVM technique

Similarly they testing the feature vector for they represent the entire study that can be obtained from the, αT and the entropy, HT. When we compare the classifier for the popularity as well as the robustness of the algorithm. The maximum likelihood classifier can be calculate the probability of the pixel that can be belong to the class occur in the digital based form. Then the pixels can be assigning for the class then the high probability. The maximum likelihood classifier at the function of the environment at the visualizing image based software for the purpose of the performance belongs to the classification.

IV. RESULT AND DISCUSSION

4.1 K-MEAN CLUSTER

In this analysis based on the variety of crops that can be cultivated for the farmer. The input of the tabulation can be providing from the farmers that can be shown in the table 2. Then they choose group of various crops that can be depending on the entire characteristic that can be apply in the K mean clustering.Cluster 1 = C1, C2, C3, C4.

Features/crops	Minimum Capital	Flexible Marketing	High Yields
	(f1)	(f2)	(f3)
Wheat(C1)	7	8	9
Rice(C2)	5	6	7
Maize(C3)	8	7	7
Millets(C4)	6	7	8
Pulses(C5)	8	8	8
Cotton(C6)	8	5	7
Sugarcane(C7)	8	7	8
Coconut(C8)	3	8	9

Table 2. Selected crop feature based information

The group of crops can be selected with the help of entire feature that can be attains in the K-mean algorithm. These are shown in the table 3.

Features/crops	Minimum Capital	Flexible Marketing	High Yields	Decision Value
	(f1)	(f2)	(f3)	
C1 (WHEAT)	7	8	9	C1
C2 (Rice)	5	6	7	C2
C3 (Maize)	8	7	7	C3
C4 (Millets)	6	7	8	C1
C5 (Pulses)	8	8	8	C1
C6 (Cotton)	8	5	7	C3
C7 (Sugarcane)	8	7	8	C1
C8 (Coconut)	3	8	9	C2

Table 3. Decision table

4.2 RANK CORRELATION METHOD

Apply rank correlation method for optimized the feature based selection. These are shown in the table 4.

$$Rank\ Correlation\ (Rs) = 1 - \frac{6\sum(Rf1 - Rf2)^2}{n(n^2-1)}$$

Features /crops	Minimum Capital (f1)	Flexible Marketing (f2)	Rank (f1)	Rank (f2)	R(f1)-R(f2)	(R(f1)-R(f2))^2
Wheat	7	8	2	1	1	1
Rice	5	6	4	3	1	1
Maize	8	7	1	2	-1	1
Millets	6	7	3	2	1	1
Pulses	8	8	1	1	0	0
Cotton	8	5	1	4	-3	9
Sugarcane	8	7	1	2	-1	1
Coconut	3	8	5	1	4	16
Total $\sum(R(f1) - R(f2))^2$						30

Table 4. Rank Correlation Method

4.3 ARITHMETIC MEAN METHOD

Apply AFMM as well RFMM in the particular selected crops that can be shown in the table 5.

$$The\ Mean\ Value\ of\ each\ Crop = \sum x_i/n$$

$$AFMM = f_1 + f_2 + f_3/n$$

$$RFMM = f_1 + f_2/n,$$

$$where\ n = No\ Of\ Features$$

Features/crops	Minimum Capital (f1)	Flexible Marketing (f2)	High Yields (f3)	AFMM (F1+F2+F3/N)	RFMM (F1+F2/N)
C1 (Wheat)	7	8	9	8	7.5
C2 (Rice)	5	6	7	6	5.5
C3 (Maize)	8	7	7	7.3	7.5
C4 (Millets)	6	7	8	7	6.5
C5 (Pulses)	8	8	8	8	8
C6 (Cotton)	8	5	7	6.6	6.5
C7 (Sugarcane)	8	7	8	7.6	7.5
C8 (Coconut)	3	8	9	6.6	5.5

Table 5. Arithmetic Mean method

4.4 PERFOMANCE ANALYSIS

The Performance analysis of EDSVM and maximum likely hood methods in the crop database is shown in the following figure 3,4 and 5.

4.4.1 ACCURACY

In the proposed technique (EDSVM) occurs the maximum accuracy when compared to the maximum likelihood method. The accuracy of both methods is shown below figure 3.

ACCURACY= (TP + TN)/(TP + TN + FP + FN)

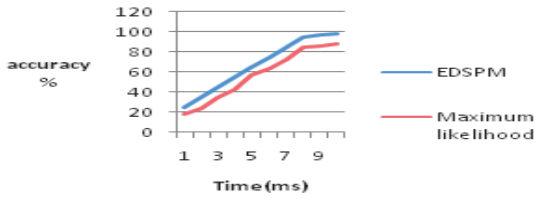

Fig. 3. Accuracy

4.4.2 EFFICIENCY

In the proposed technique(circular economic model) have better efficiency when compare to the

linear economic model is an existing technique. The effectiveness of both methods is shown below figure 4.

$$Efficiency = \frac{Total\ minutes\ produce * 100}{time * 60}$$

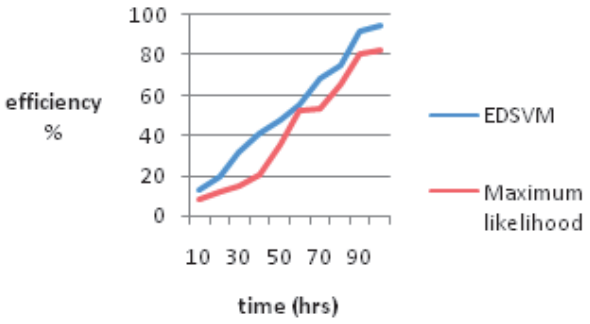

Fig. 4. Efficiency

4.4.3 SENSITIVITY

In the proposed technique occurs the high sensitivity when compared to the maximum likelihood method. The sensitivity of both methods is shown below figure 5.

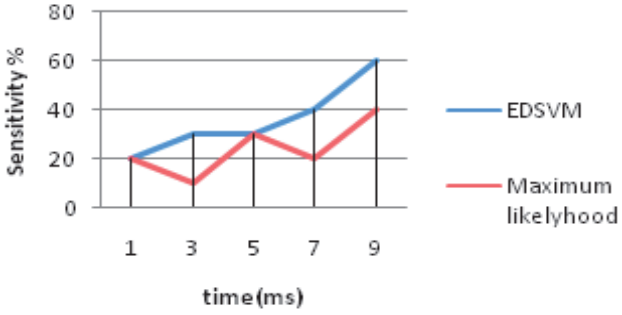

Fig. 5. sensitivity

V. CONCULSION

In this paper use a multi temporal based RADARSAT-1 based images that can be helps to classify the variety of crops based planting schedule. From this application, the proposed method EDSVM focus at the theoretical model that can be attain for the performance for a better separation among the various types of crops in the planting based schedule. It is not only better in classification. It also does best in extend the purpose of the entropy decomposition for they cover the multi temporal based data. When comparing the result of the existing technique, the proposed method has better sensitivity, accuracy, and efficiency.

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