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Generation of Contour for Tracking Surface to Manage Risk of any Injury

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***Abstract*-- Risk can be seen as the possibility of economic or financial losses or gains, as a consequence of the uncertainty associated with pursuing a course of action. Risk pervades all human actions (to varying degrees), all kinds of business and every area of management of a company. However, in many cases, risk can be predicted on the basis of experience, trying to better govern the disorder. Risk management (RM) has the task of identifying risks, measuring the probability and the possible impact of events, and treating risks, eliminating or reducing their effect with the minimum investment of resources. RM is being developed and adopted in a lot of fields, such as environment, healthcare, public safety, and within enterprise management. So we implement a model which manages risk for an organization. We measure performance of model on a sample of database. A model is based on any technique like clustering, linear equation, classification etc. We perform FCM, K mean and K-medoids algorithm to achieve results.**

***Keyword*-- Risk Management, Clustering, FCM, K mean, K-mediods,**

I. Risk Management

Risk is the possibility of suffering economic and financial losses or physical material damages, as a result of an inherent uncertainty associated with the action taken. The word enterprise for Enterprise Risk Management (ERM) itself shows a different meaning than Traditional Risk Management (TRM). Enterprise means to integrate or aggregate all types of risks; using integrated tools and techniques to mitigate the risks and to communicate across business lines or level compared to Traditional Risk Management. Integration refers to both combination of modifying the firm's operations, adjusting its capital structure and employing targeted financial instruments [1].

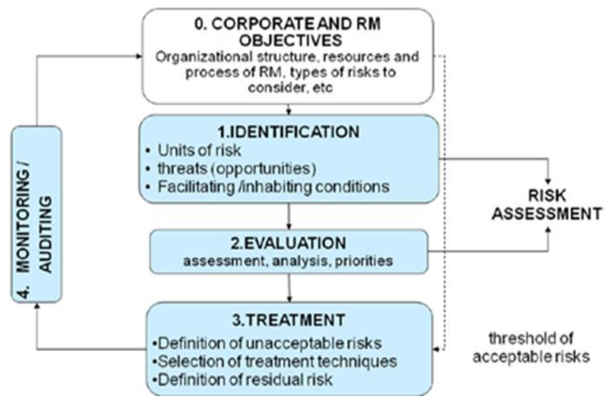

Figure 1 the Risk Management Process

II. Risk Mining

In order to utilize information about risk extracted from information systems, we propose risk mining which integrates the following three important processes: risk detection, risk clarification and risk utilization [9].

Risk Detection:

Patterns or information unexpected to domain experts may be important to detect the possibility of large scale accidents. So, first, mining patterns or other types of information which are unexpected to domain experts is one of the important processes in risk mining. We call this process risk detection, where acquired knowdedge is refered to as detected risk information.

Risk Clarification:

Focusing on detected risk information, domain experts and data miners can focus on clarification of modeling the hidden mechanism of risk.

If domain experts need more information with finer granularity, we should collect more data with detailed information, and apply data mining to newly collected data. We call this process risk clarification, where acquired knowledge is referred to as clarified risk information.

Risk Utilization:

We have to evaluate clarified risk information in a real world environment to prevent risk events. If risk information is not enough to prevention, then more analysis is required. Thus, additional data collection is evoked for a new cycle of risk mining process. We call this process risk utilization. Where acquired knowledge is referred to as clarified risk information.

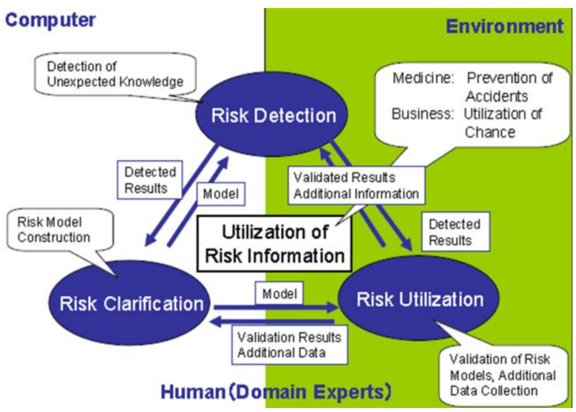

Figure 2 shows the overview of risk mining process

III. K-Mean Clustering

Clustering is the method of gathering the objects together in a block which have similar properties [3]. It can say it unsupervised learning. In many applications, the clustering algorithm plays a vital role. We can consider clustering as good one which satisfies following situation:

- (Intra-cluster distance) the distance between objects in same cluster should be minimum
- (Inter-cluster distance) while two clusters should be separated with maximum distance.
- Objective to minimize: F(Intra,Inter)

There are two measurements of clusters that are “internal” and “external”. Internal measures belong to measure distance in a cluster. Representation way of current cluster in whole network is external measures. There is k number of clusters or groups in k-means clustering (where k is the number of pre-chosen groups).

The base of grouping is on minimizing the sum of squared distances (Euclidean distances) between objects and that center point called centroid. It can define a centroid is "the center of mass of a geometric object of uniform density", so mean vectors are considered as center point.

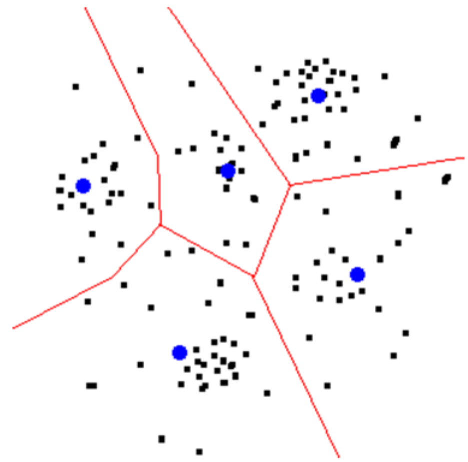

Figure 3 a clustered scatter plot

In the above figure data points are represented by black dots and blue point represent centroid of cluster. There value of k is 5 so whole data is classified in five parts. Red lines represent the boundary of each cluster that differentiates each other.

IV. Fuzzy C-Mean Clustering

The Fuzzy c-Means algorithm is a clustering algorithm where each item may belong to more than one group (hence the word `fuzzy'), where the degree of membership for each item is given by a probability distribution over the clusters. The fuzzy c-means (FCM) algorithm is a clustering algorithm developed by Dunn, and later on improved by Bezdek. It is useful when the required number of clusters is pre-determined; thus, the algorithm tries to put each of the data points to one of the clusters. What makes FCM different is that it does not decide the absolute membership of a data point to a given cluster; instead, it calculates the likelihood (the degree of membership) that a data point will belong to that cluster. Hence, depending on the accuracy of the clustering that is required in practice, appropriate tolerance measures can be put in place. Since the absolute membership is not calculated, FCM can be extremely fast because the number of iterations required to achieve a specific clustering exercise corresponds to the required accuracy.

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V. Problem Formulation

Displacement is the movement of surface material (soil, gravel, stones etc) as a result of use. Displacement of naturally occurring soils generally takes place on weak cohesive soils (soil where the particle size is smaller than sand). On stone aggregate tracks, moving feet kick stones from the track surface. Mountain bike tyre dislodges and move soil particles, gravel and even small rocks. Over time, the constant moving of particles starts to wear away the track surface causing it to change shape. So we generate a contour platform which helps us to make track in particular slope.

VI. Problem Solution

The risk generate during the making of track is about the level of surface. The level representation of surface is main problem which we face during that process. The following steps are used to solve this problem:

- *Step 1:* Taking dataset for a track from an organization which describes level of surface.
- *Step 2:* This contour surface is create by using concept of distance between similar contents that is known as clustering in technical form.
- *Step 3:* We perform techniques for making an integrated contour surface.
- *Step 4:* Performance of each technique on basis of different parameters is represented in integrated graphs.The main objective of work is to define a three stage model for wheat grain quality estimation.

VII. Implementation Steps

- Reduce the dimensionality of Dataset using PCA
- Fuzzy Sammon mapping
- Implement FCM
- Implement K mean
- Implement K centroid
- Plot Integrated Graph.

VIII. Result Analysis

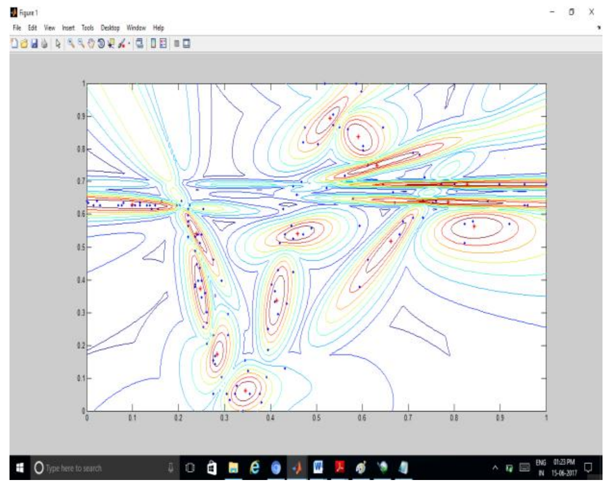

Figure 4 Contour of tracking surface

During the optimization parameters were fixed to the following values: m = 2, ε = 0:001, ρ = 1 for each cluster, c 2 [2 14]. The values of the validity measures depending from the number of cluster are plotted and embraced

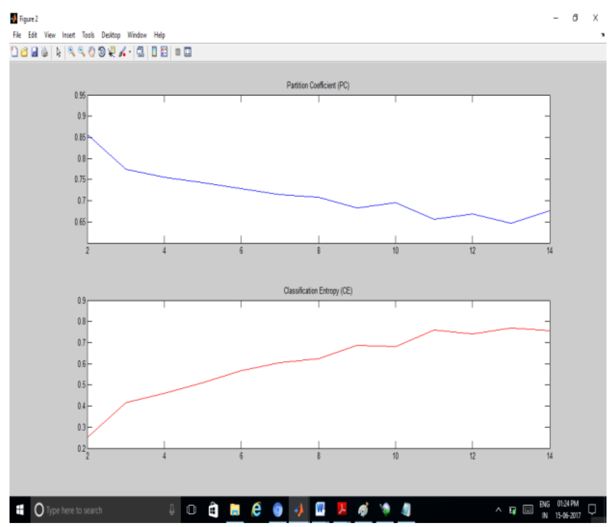

Figure 5 Graph of PC and CE

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We must mention again, that no validation index is reliable only by it, that is why all the programmed indexes are shown, and the optimum can be only detected with the comparison of all the results. We consider that partitions with fewer clusters are better, when the differences between the values of a validation index are minor.

The main drawback of PC is the monotonic decreasing with c and the lack of direct connection to the data. CE has the same problems: monotonic increasing with c and hardly detectable connection to the data structure. On the score of Fig. 5, the number of clusters can be only rated to 3. In Fig. 6 there are more informative diagrams are shown: SC and S hardly decreases at the c = 5 point. The XB index reaches this local minimum at c = 4. Considering that SC and S are more useful, when comparing different clustering methods with the same c, we chose the optimal number of clusters to 4, which is confirmed by the Dunn's index too in Fig. 7. (The Alternative Dunn Index is not tested enough to know how reliable its results are.)

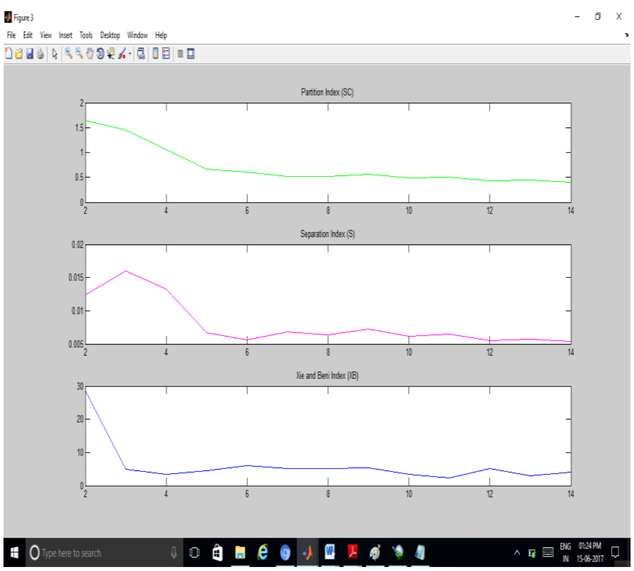

Figure 6Graph of SC, S and XB

If a data set contains well-separated clusters, the distances among the clusters are usually large and the diameters of the clusters are expected to be small. Therefore larger value means better cluster configuration. The main disadvantages of the Dunn index are the following: the calculation of the index is time consuming and this index is very sensitive to noise (as the maximum cluster diameter can be large in a noisy environment). Several Dunn-like indices have been proposed. These indices use different definition for cluster distance and cluster diameter.

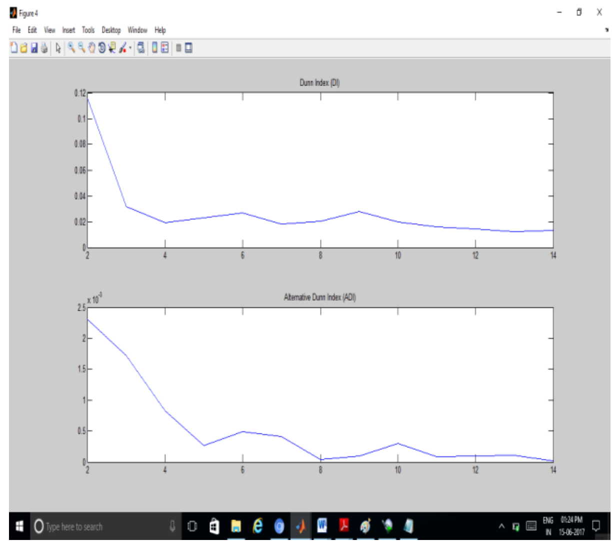

Figure 7 Values of DI and ADI

Table I
The numerical values of validity measures

C	2	4	6	8	10	12	14
PC	0.856 9	0.75 50	0.72 91	0.70 75	0.69 57	0.66 82	0.67 71
CE	0.253 1	0.45 88	0.56 79	0.62 46	0.68 20	0.74 04	0.75 72
SC	1.646 5	1.06 46	0.60 55	0.51 81	0.48 68	0.43 54	0.40 79
S	0.012 4	0.01 33	0.00 57	0.00 64	0.00 62	0.00 55	0.00 54
X B	28.52 71	3.35 45	6.09 29	5.16 88	3.45 07	5.08 79	3.94 92
DI	0.115 4	0.01 92	0.02 70	0.02 03	0.01 96	0.01 44	0.01 32
A DI	0.002 3	0.00 08	0.00 05	0.00 00	0.00 03	0.00 01	0.00 00

IX. Conclusion

Risk management is, at present, implemented in many large as well as small and medium sized industries.

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In it is outlined how a large company can handle its risks in practice and contains a computer based method for risk analysis that can generate basic data for decision-making in the present context. We have been chosen as an example to illustrate the difficulties that can be encountered concerning risk management in a large company with different business areas. One typical difficulty is reaching the personnel. Another typical weakness is a missing system for controlling and following up on the results of the risk analysis that has been performed. The Fuzzy C-means provides dependable results for all data sets. By far the best results are in the case of the Motorcycle data, where from 683, 9-dimensional points "only" 23 are mis-clustered, and the 96.6 % secure result is very reliable, considering that the clustering techniques do not use prior class identifiers, they are among the unsupervised methods.

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