World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:11, No:02, 2017

A Study on the Performance of 2-PC-D Classification Model

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Abstract : There are many applications of principle component method for reducing the large set of variables in various fields. Fisher's Discriminant function is also a popular tool for classification. In this research, the researcher focuses on studying the performance of Principle Component-Fisher's Discriminant function in helping to classify rice kernels to their defined classes. The data were collected on the smells or odour of the rice kernel using odour-detection sensor, Cyranose. 32 variables were captured by this electronic nose (e-nose). The objective of this research is to measure how well a combination model, between principle component and linear discriminant, to be as a classification model. Principle component method was used to reduce all 32 variables to a smaller and manageable set of components. Then, the reduced components were used to develop the Fisher's Discriminant function. In this research, there are 4 defined classes of rice kernel which are Aromatic, Brown, Ordinary and Others. Based on the output from principle component method, the 32 variables were reduced to only 2 components. Based on the output of classification table from the discriminant analysis, 40.76% from the total observations were correctly classified into their classes by the PC-Discriminant function. Indirectly, it gives an idea that the classification model developed has committed to more than 50% of misclassifying the observations. As a conclusion, the Fisher's Discriminant function that was built on a 2-component from PCA (2-PC-D) is not satisfying to classify the rice kernels into its defined classes.

Keywords : classification model, discriminant function, principle component analysis, variable reduction
Conference Title : ICMCSSE 2017 : International Conference on Mathematical, Computational and Statistical Sciences and Engineering
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 12-13, 2017