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Musical instrument identification by the selection of predominant features

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Selection of predominant features is an emerging field in the machine learning approach. In this research study, we present the effort of three feature selection methods; ranking selection, random selection, and sequential forward feature selection (SFFS). Firstly, we extract 44 features for 20 musical instruments with three musical families by the Audio Content Analysis tool. However, not all features are necessarily used to identify the musical instrument. Therefore, the predominant features are to be selected for each musical instrument. The ranking method finds the highest rank feature in order. The random selection does the random order and the sequential forward feature selection method selects the optimal best set of features. Overview of the feature selection order is dependent on the musical instrument. Despite that, the number of predominant features detected by the other two selection methods is taken to be equal to the number of predominant features to be detected in the SFFS method. Using them in the support vector machine (SVM) classifier, the musical instruments were identified and the accuracy values were recorded. The accuracy of the SFFS method from the response received is greater than the other two methods. Therefore, we decided to choose the predominant feature that was detected from the SFFS method. The automated musical instrument identification system was developed with 21 SVM classifiers with predominant features. It is classified as polyphonic music. The selection of the set of predominant features differed from one musical instrument to another and spectral features have been more influential than other features.

Keywords: Predominant features, feature selection, musical instrument, identification, method

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