

Determination of the Optimum Feature Extraction Technique Using Wavelet in Classification Phase of Growing Rice

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Abstract— The purpose of this study is to determine the optimal wavelet-based feature extraction technique based for rice growth stage classification. Data are obtained from the Badan Pengkajian dan Penerapan Teknologi (BPPT). We implemented two decomposition approach i.e. standard wavelet decomposition and wavelet packet analysis with *coif1*, *coif2*, *coif3*, *db2*, *db3* and *haar* as the wavelet basis. The level of decomposition on wavelet decomposition begins from 3 to 11, while on wavelet packet analysis starts from the decomposition level 3 to 6. From each subband we extracted the following features: mean, median, skewness, kurtosis, residual energy, energy, standard deviation, and variance. We used k-nearest-neighbor, naive bayes, support vector machine and decision tree as the classifier. The highest accuracy of the wavelet decomposition is 90.41% with *db2* as wavelet basis and 11 level of decomposition using support vector machine as the classifier. Wavelet packet analysis approach gives 80.17% accuracy on Haar wavelet basis and 3 level decomposition using decision tree as the classifier. Based on the experimental results, support vector machine and decision tree have better performance than k-nearest-neighbor and Naive Bayes on 77 of total 84 trials.

Keyword— feature extraction, decision tree, k-nearest-neighbour, naive bayes, support vector machine, wavelet



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