

Durian species recognition based on Fast Discrete Curvelet Transform and K-Nearest Neighbour

ABSTRACT

Object recognition is an approach to identify objects in images or videos. It is the fundamental to voice recognition, handwriting recognition, and also agricultural plant and fruit-based recognitions. There are many works on fruit-based recognition but there is only a limited number for durian species. Durians are quite different physically compared to other fruits. However, all types of durian, be it of different species, have pretty many similar characteristics from one to another. This makes it very hard to differentiate them. Previous works either focused on text-based input or represented the features based on the seam of a durian which may not be suitable to characterise various durian species. There are many ways to differentiate the durian species and this proposed work focused on the curvilinear thorns of the durian as the main approach. Two-dimensional Fast Fourier Transform (2D FFT) with wedge wrapping is applied to the durian images to obtain the Fourier samples where it is then being normalised. Inverse 2D FFT is computed on the normalised Fourier samples to obtain the final Fast Discrete Curvelet Transform features. Through this proposed approach, the curvilinear details of the objects and its edges can be represented better. K-Nearest Neighbour is then trained to effectively classify the durian species. A total of 600 durian images are collected to act as the dataset. 10-fold cross validation is used for evaluation where 80% of the dataset is used for training and the remaining 20% is used for testing. We have conducted several experiments to evaluate various components of the proposed approach. This has resulted to a more effective durian species recognition approach in comparison to the benchmark methods.

Keyword: Durian recognition; Fast Discrete Curvelet Transform; K-Nearest Neighbour; 10-fold cross validation

