

ABSTRACT

Biometric is a method used to identify individuals using their physical features. One of the physical features that can be used for biometric is the footprint. The footprint was chosen because of having a high level of uniqueness where it is almost impossible to find two individuals that have the same footprint.

Feature extraction methods such as Scale Invariant Feature Transform (SIFT) and Speed Up Robust Feature (SURF) are appropriate if used for footprint identification system. The steps used in obtaining descriptor start from scanning the footprint, pre-processing, feature extraction using SIFT and SURF and last the matching process. In general there are four important steps in SURF which are interest point detector, scale space representation, feature description and feature matching and recognition. While there are also four important steps in SIFT which are finding the extreme value, determining keypoints, determining the orientation and descriptor keypoint. The comparison between the two methods will be observed by their accuracy and computational time. The K-Nearest Neighbor (K-NN) algorithm will be used for the classification process.

The testing is done by using 200 images of the right footprint, with 20 classes resulting of 10 images of the right footprint for each class. The best accuracy obtained is 67.5% with the computation time of 0.5645 s using the SURF feature extraction method with 180 x 180 pixels as the size of ROI using the value of $k = 1$ and cityblock distance on the K-NN classification method. While using the SIFT feature extraction method the best accuracy obtained is 64.5% with the computation time of 4.955 s with 180 x 180 pixels as the size of ROI using the value of $k = 1$ and cosine distance. It can be seen that the SURF feature extraction method had an increase of accuracy of 4.65% and nine times faster computation time than the SIFT feature extraction method.

Keywords: *Biometric, Footprint, SIFT, SURF, K-NN*