

Abstract

Fruit is one of the foods that contain vitamins that are beneficial to human health. So many farmers are cultivating various kinds of fruit in accordance with the geographical climate and the target market of farmers. However, in the process of cultivation, fruit diseases are often encountered which is one of the serious problems faced by farmers because it can threaten their economic results. The main focus of this research object is the identification and classification of diseases in apples. Apples are very susceptible to disease, in general the diseases that usually attack apples are blotch apple, rot apple, and scab apple. From some of these diseases, the type of disease is still using the manual method with the help of human labor. This method certainly has many shortcomings and takes a long time. Meanwhile, proper and rapid disease sorting is needed to anticipate the occurrence of repeated disease attacks. The purpose of the system built by the researcher is to classify the types of apple diseases and healthy apples. This research utilizes computer vision and machine learning technology to solve classification problems. The developed system uses image processing such as augmentation, dimension reduction feature extraction with Principal Component Analysis (PCA). The classification algorithm used is the Support Vector Machine (SVM) combined with the Firefly optimization algorithm (FA). The system that has been built can classify the types of diseases of apples and normal apples with the highest accuracy results of 90% on the ordinary SVM algorithm and 97% on the FA-SVM algorithm.

Keywords: Apple, Classification, Disease, Computer vision, Machine learning, Support Vector Machine, Firefly Algorithm