ABSTRACT

The influence of strong magnetic activity on sunspot may result solar flares that can endanger the existing technology on earth. Not all sunspot may result solar flares, there are types of sunspot potentially low to high that can cause solar flares. The importance of classifying sunspot to predict the occurance of solar flares.

This research resulted in a system for classifying sunspot based on image processing. Input the system is in the form of a sunspot image with the format .jpg obtained form the website solarmonitor.org. The best pre-processing is used in this research using a grayscale image. Furthermore, using feature matching with Speeded Up Robust Features (SURF), Scale Invariant Feature Transform (SIFT), and Oriented FAST and rotated BRIEF (ORB). These three algorithms will be tested which one has the best performance. The process classification of sunspot using K-Nearest Neighbor method.

The system is designed using 750 image data which is each class of sunspot types have 150 data. The best performance of the system is obtained based on the ratio of 120 training data and 30 test data which produces the highest accuracy of 89% and computation time of 0,0009 seconds by using SURF method. Meanwhile, SIFT and ORB method produce the same accuracy of 86%. But the average of computation time resulted from both methods is different which is ORB has a faster computation time by 0,0014 seconds and SIFT method for 0,0149 seconds.

Keywords: *Sunspot, Feature Matching, Speeded Up Robust Features (SURF), Scale Invariant Feature Transform (SIFT), Oriented FAST and rotated BRIEF (ORB), K-Nearest Neighbor (K-NN).*