ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a disorder syndrome suffered by women in the reproductive system, a woman diagnosed to have Polycystic Ovary Syndrome (PCOS) if there are more than 12 follicles of 2-9 mm or increase in volume of follicles in the ovaries up to more than 10 cm^3[3]. Nowadays to detect Polycystic Ovary Syndrome (PCOS), the doctor should perform an ultrasound scan, and manually count the number of follicles marked with the black area in the image, the previous paper [1, 3, 5] only focused on improving image quality and the detection of the size and number of follicles to facilitate medical personnel to see the follicle and determine the patient's diagnosis. Otherwise doctors need a system that can help in diagnosing Polycystic Ovary Syndrome (PCOS) automatically based on ultrasound images for female fertility detection.

In this paper, we propose to build a classification system that help in diagnosing Polycystic Ovary Syndrome (PCOS) automatically based on ultrasound image, using a combination of Principal Component Analysis (PCA) method that serves as reduction dimension and Naïve Bayes which is one derivative of Bayesian Network as its classifier. Principal Component Analysis (PCA) is chosen because it reduces the dimensions of the data set without losing the information it contains, while Naïve Bayes is one of uncertainty reasoning methods that uses probabilistic model and Bayes' rule for inference[14]. This method is chosen because of its effectiveness in classification, although in theory it is assumed to be an independent feature (naïve).

From the test result using k-fold cross validation method with k=8 and 50x testing, showed that the system we build using Principal Component Analysis (PCA) and Naïve Bayes method was succesfully implemented with highest performance of Average F1 Score is 84.76%, with testing parameter: the data amount in each class on the training dataset is 40, and the number of principal component is 53 and the is normalized.

Keywords: Polycystic Ovary Syndrome, ovarium, citra USG, follicle, Naïve Bayes, Principal Component Analysis, Cross Validation, Imbalanced Data, Normalization.