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SEQUENTIAL PROCESS OF MEL FREQUENCY CEPSTRUM COEFFICIENT (MFCC) AND BINARY PARTICLE SWARM OPTIMIZATION (BPSO) TECHNIQUE FOR IMPROVING THE PERFORMANCE OF MULTI-LAYER PERCEPTRON (MLP) TO DETECT ASPHYXIA DISEASES THROUGH INFANT CRIES

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science

Faculty of Electrical Engineering

July 2012

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of University Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as reference work. This thesis has not been submit ted to any other academic institution or non –academic institution for any other degree or qualification.

I hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, University Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Infant asphyxia is a condition caused by inadequate intake of oxygen suffered by newborn babies. Early diagnosis of asphyxia is important to avoid complications such as damage to the brain, organ and tissue or even death. Asphyxia occurs in infants with neurological level disturbance, which is found to affect sound of cry produced by infants. The infant cry signals with asphyxia have distinct patterns which can be recognized with pattern classifiers such as Artificial Neural Network (ANN). This study investigates the performance of feature selection techniques namely F-Ratio, Orthogonal Lest Square (OLS) and Binary Particle Swarm Optimisation (BPSO) analysis in selecting optimal features extracted from feature extraction technique; Mel Frequency Cepstrum Coefficient (MFCC). Mel Frequency Cepstrum Coefficient (MFCC) was employed to extract the significant features from infant cry. The selected MFCC features were then used to train several ANN Multi Layer Perceptron (MLP). The simulation results showed each method is able to improve classifier performance. Among three method discusses, BPSO was the best feature selection method with 96.03% classification accuracy followed by OLS (94%) and F-Ratio (93.38%).

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