ABSTRACT

Fetal count detection in cats plays a crucial role in supporting animal reproductive health. However, conventional methods, such as palpation and ultrasonography, still have limitations in terms of cost, accuracy, and operator expertise. This study aims to develop a method for predicting the number of fetuses in cats based on Fetal Doppler audio signal analysis using the Short-Time Fourier Transform (STFT) approach. The research process involves collecting Doppler signal data from pregnant cats, followed by a pre-processing stage including resampling, normalization, filtering, and denoising using EMD and BandLab. The signal is then analyzed using STFT to produce a spectrogram as a time-frequency representation. The estimated number of fetuses is obtained based on the number of dominant frequency bands detected. Data processing is carried out using two experiments. The first processing is carried out through preprocessing, followed by EMD denoising, and then continued with STFT processing. The second processing is carried out using BandLab as a denoising step, followed by preprocessing. After preprocessing, the STFT process. Test results showed that this method achieved a classification accuracy of 66,67%, but with an average quantitative estimation accuracy of 66,67% in the first scenario and 33,33% in the second scenario. The main weakness lies in the occurrence of false predictions in cases without fetuses, which is suspected to be due to signal artifacts and environmental or maternal tissue noise. This study demonstrates the potential of STFT analysis as a non-invasive method for fetal count estimation. However, further optimization of the signal filtration process and the development of a machine learning-based classification model are necessary to improve estimation accuracy.

Keywords: *Fetal Doppler*, pregnant cat, audio signal, STFT, fetal count estimation, biomedical signal processing.