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Lin H., Zhao J., Chen Q., Cai J., Zhou P.:

Eggshell crack detection based on acoustic impulse response and supervised pattern recognition

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A system based on acoustic resonance was developed for eggshell crack detection. It was achieved by the analysis of the measured frequency response of eggshell excited with a light mechanism. The response signal was processed by recursive least squares adaptive filter, which resulted in the signal-to-noise ratio of the acoustic impulse response being remarkably enhanced. Five features variables were exacted from the response frequency signals. To develop a robust discrimination model, three pattern recognition algorithms (i.e. K-nearest neighbours, artificial neural network, and support vector machine) were examined comparatively in this work. Some parameters of the model were optimised by cross-validation in the building model,

The experimental results showed that the performance of the support vector machine model is the best in comparison to k-nearest neighbours and artificial neural network models. The optimal support vector machine model was obtained with the identification rates of 95.1% in the calibration set, and 97.1% in the prediction set, respectively. Based on