

# Design and development of the real-time paddy quality identification and separation based on the acoustic vibration response and vibration resonance

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## Abstract

The aim of this research is to set up a suitable system, which could be used for real-time object identification, based on the acoustic vibration responds and vibration resonance. The system had to separate the paddy based on the paddy quality (good, medium, or bad quality). The identification capacity is about 500 kg per hour. In order to get the acoustic vibration response and vibration resonance of the object, two condenser microphones and the signal conditioning system have been set. The signals have been processed using a 24 bit sound-card imbedded in the system analyser based on Programmable System on Chip (PSoC). The vibration resonance base examination had been done. For the bad paddy quality examination, a dominant frequency spectrum was identified at frequency between 0 up to 9 kHz, but above 9 kHz a dominant frequency spectrum was not found. For the medium paddy quality examination, a different frequency spectrum from the bad paddy quality was found, and was identified at frequencies between 13.5 and 15 kHz (with the maximum amplitude being at a frequency of 14.65 kHz). For the good paddy quality examination, a different frequency spectrum from the bad paddy quality was found. It was different from that used to characterize the medium paddy quality, (found to be between 16.5 and 17.5 kHz, with a maximum amplitude at 16.97 kHz). For the good quality paddy, the optimum frequency was found to be between 18.5 and 19.5 kHz (with maximum amplitude at a frequency of 19.21 kHz). The proposed method had been examined in this research. It can be used for identification of the object character properly. This method is expected to provide important information for the researchers and engineers in the fields of agriculture, materials, constructions, and instrumentations.