Neural Networks-based Acoustic Annoyance Model for Laptop Hard Disk Drive

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Abstract : Since the last decade, there has been a rapid growth in digital multimedia, such as high-resolution media files and three-dimentional movies. Hence, there is a need for large digital storage such as Hard Disk Drive (HDD). As such, users expect to have a quieter HDD in their laptop. In this paper, a jury test has been conducted on a group of 34 people where 17 of them are students who is the potential consumer, and the remaining are engineers who know the HDD. A total 13 HDD sound samples have been selected from over hundred HDD noise recordings. These samples are selected based on an agreed subjective feeling. The samples are played to the participants using head acoustic playback system which enabled them to experience as similar as possible the same environment as have been recorded. Analysis has been conducted and the obtained results have indicated different group has different perception over the noises. Two neural network-based acoustic annoyance models are established based on back propagation neural network. Four psychoacoustic metrics, loudness, sharpness, roughness and fluctuation strength, are used as the input of the model, and the subjective evaluation results are taken as the output. The developed models are reasonably accurate in simulating both training and test samples.