SDU-Haier-ND: A Dataset for Noise Detection

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Abstract:

SDU-Haier-ND (Shandong University-Haier-Noise Detection) is a sound dataset jointly constructed by Shandong University and Haier, which contains the operating sound of the internal air conditioner collected during the product quality inspection. Sound detection of the air conditioner's internal unit is an important quality inspection link before the air conditioner leaves the factory. It can detect whether the air conditioner components are qualified and whether the air conditioner can operate normally. However, most manufacturers currently use manual detection methods for air-conditioning sound detection, which has problems such as low efficiency, low accuracy, and high cost. If an algorithm can be designed to automatically detect the operating sound of the air conditioner to determine whether the air conditioner is abnormal, the above problems can be solved and the degree of automation and intelligence of the air conditioner manufacturing industry can be increased. The design and training of the algorithm need to be based on the actual air conditioner operating sound, but the dataset in this area is currently almost blank. Therefore, we collected and marked a batch of quality inspection sounds of air conditioners in real production environments to form this data set, including normal sound samples and abnormal sound samples. The data set contains a variety of abnormal sounds, covering a variety of common failures of air conditioners, such as abnormalities caused by bearings or guide plates. This dataset will be useful for researchers in sound signal processing, manufacturing automation, artificial intelligence algorithm design, etc.

Dataset Description

SDU-Haier-ND dataset contains a total of 536 sound samples and the specific information is shown in Table 1.

Table 1 SDU-Haier-ND dataset information

Sample type	Number of samples	File size
Normal	275	1.23
Abnormal	261	1.22
All	536	2.45

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The sound samples in the dataset are saved as wav file, and the sampling frequency of the sound signal is 48kHz. The sound samples are collected manually, so the sound duration is not the same. The valid sound signal, that is, the operating sound of the air conditioner, is collected in a confined space called the sound room to isolate other sounds in the production workshop. The doors of the sound room are open before and after the air conditioning detection. At this time, the radio equipment in the noise room will collect various sounds from the production workshop, so the sound samples in this dataset contain some invalid noise. The sound samples in the dataset are shown in Figure 1.

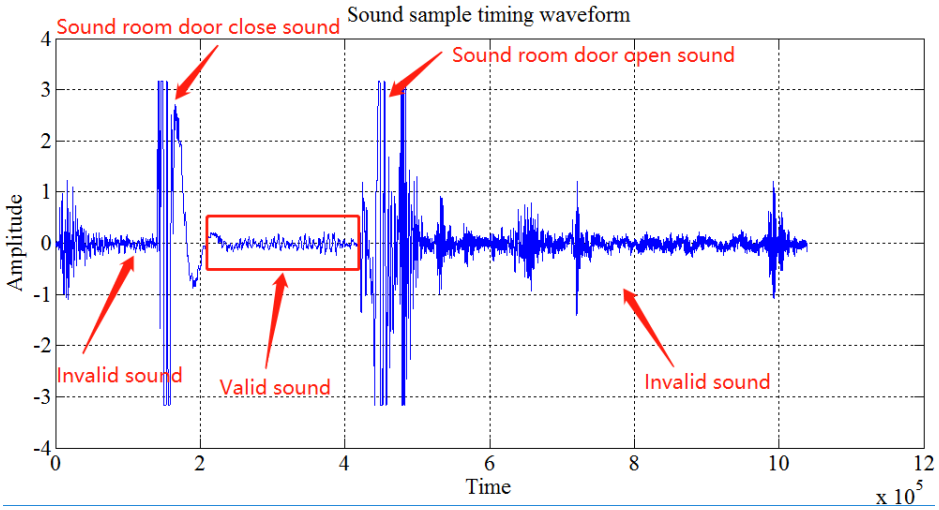

Figure 1 Sound sample timing waveform

It can be seen from Figure 1 that the valid sound in the sound sample is the sound after the sound room door is closed and before it is opened. When using this dataset for related research, the sound samples should be preprocessed first to extract useful parts. But it is worth noting that not all sound samples regularly record the sound of closing and opening the sound room. Some samples do not record the sound of closing and some do not record the sound of opening.

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If you have any questions or suggestions, do not hesitate to contact the corresponding author: Prof. Dongfeng Yuan, dfyuan@sdu.edu.cn.

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