HE SOUND SIGNAL PROCESSING AND DEEP LEARNING NETWORK AS TOOLS FOR DETERMINING THE CIRCULAR SAW BLADE SPEED

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ABSTRACT

The rotation of a saw blade presents one of the most important cutting parameters, often regarded as cutting speed. The purpose of this paper was to determine the discrete values of the circular saw blade speed by means of a deep learning network. During idle rotation of the saw blade, certain sounds are produced, which are recorded and later processed in MatLab software, making them suitable for further analysis and training the deep learning network. For the chosen values of the circular saw blade rotational speed, set at 2000, 3000, and 4000 rpm, a total of 600 recordings were made (200 for each speed) in the form of wave format. All of them were converted into a power spectrum by Fast Fourier Transformation (FFT) in order to determine the spectral areas of the most importance, and later the spectrograms were made using Short Time Fourier Transform (STFT) as the magnitude squared of STFT. The obtained spectrograms formed the data base for training and testing the deep learning network. A pre-trained network shows an accuracy of 100%.

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