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Application of feed-forward neural networks for classifying acoustics levels in vehicle cabin

Abstract

Vehicle acoustical comfort and vibration in a passenger car cabin are the main factors that attract a buyer in car purchase. Numerous studies have been carried out by automotive researchers to identify and classify the acoustics level in the vehicle cabin. The objective is to form a special benchmark for acoustics level that may be referred for any acoustics improvement purpose. This study is focused on the sound quality change over the engine speed [rp to recognize the noise pattern experienced in the vehicle cabin. Since it is difficult for a passenger to express, and to evaluate the noise experienced or heard in a numerical scale, a neural network optimization approach is used to classify the acoustics levels into groups of noise annoyance levels. A feed forward neural network technique is applied for classification algorithm, where it can be divided into two phases: Learning Phase and Classification Phase. The developed model is able to classify the acoustics level into numerical scales which are meaningful for evaluation purposes.

Keywords; Acoustics Level, Neural Network Optimization, Sound Quality