

## Review of the dissertation thesis submitted by PAVOL HARÁR

### Audio Classification with Deep Learning on Limited Data Sets

The thesis, in the form of the commented set of publications, is focused on the classification of audio records, mainly for medical purposes using the neural networks, deep neural networks, and machine learning algorithms. The thesis consists of two parts, where the first is the summary of the work with the definition of the basic terms in a very readable form, and the second is a set of five papers that were published in conferences and journals.

The language and structure of the thesis are on a perfect level. The text is well written, English quality is excellent, and I did not find any mistakes or typos.

The scientific impact and results by the author consist mainly of the definition of the new architecture for medical signal analysis using deep neural networks. The first paper described a heterogenous model that utilizes convolution layers together with LSTM recurrent layer with dense classification part. The proposed results show the ability of the model to classify data correctly. The following paper is an in-depth investigation of the methods that may be or was used for pathology detection in the voice. The second scientific result of the thesis is the design of the new method for dimensionality reduction based on orthogonal projection. The presented results demonstrate the ability of the dimension reduction to improve classification precision. The last fundamental result is the usage of the Gabor filters and transforms, and Deep Scattering networks on signals.

When I take into account all aspects of the presented work, achieved results, and the publications, I think that the work done by the students is very interesting and promising for future research and

**I recommend the thesis for defense.**

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