

# **Melody similarity and its recognition by the computer with the use of machine learning tools**

Tomasz Grębski

## **Abstract**

The problem of the automatic recognition of the similarity of melodies in a way that is done by humans is considered in this dissertation. A special data set was created with many different artificial modifications of the original melodies to test several classification algorithms. In addition, software Generator was created, with the help of which it was possible to generate various modifications of the original melody, as well as generate files for Weka or Orange software, in which a detailed data analysis and automatic learning process were performed. The best algorithm turned out to be the J48 algorithm and it was chosen for a broader analysis. The main purpose of the research was to teach the machine to recognize the similarity of melodies in a human-like manner. Thanks to initial research, which showed that melody recognition is not dependent on human factors, mathematical attributes were created with which, together with the use of machine learning and appropriate software, this goal was achieved. Its effectiveness, in the case of two similar melodies reaches almost 80% (division into two classes) and over 66% in the case of assessing the degree of similarity (division into five classes). This is a very satisfactory result and an important achievement, because human feelings are immeasurable, and the results of the research indicated that it was possible to describe mathematically the recognition of melody similarity and the degree of this similarity. In addition, the dissertation raised issues in the theory of knowledge, mind, the relationship between mathematics and music, aesthetics and order, perception, as well as machine learning and artificial intelligence.

The achieved results can contribute to the creation of an intelligent machine or artificial mind, which can be described as having feelings similar to human feelings. Recognition of the similarity of the melodies can also be used in case of suspected plagiarism in music.