**POLITECHNIKA ŚLĄSKA**
**WYDZIAŁ: Mechaniczny Technologiczny**
**DYSCYPLINA NAUKOWA: Inżynieria Mechaniczna**

**ROZPRAWA DOKTORSKA**

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# METODA OKREŚLANIA SYSTEMU IDENTYFIKACJI WĘGIEL-SKAŁA

**Promotor:**

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# Streszczenie rozprawy doktorskiej w języku angielskim:

**Tytuł rozprawy doktorskiej w języku angielskim:**

## Method for determining the coal-rock identification system.

The research presents the use of a sound sensor to recognize the sounds of coal or rock extraction by a longwall shearer in the mining wall of a hard coal mine. In order to collect samples necessary for analyses, a measurement station was built consisting of devices recording sound in longwall workings during the operation of the shearer. The recorded sound samples were analyzed based on the short-time Fourier transform. The result of this analysis was the determination of characteristic frequencies of coal and rock mining, which were used in classification methods. The work uses selected classification methods such as: k-nearest neighbors (k-NN), random forest, support vector machines (SVM), multi-layer percepton (MLP). The experimental results were in the range of approximately 79-83% classification efficiency. In the next stage of the research, the validity of the hypothesis that there is no statistically significant relationship between the variables for the sound of coal and rock mining was verified using the chi-square test, confirming the results of the classification analysis.