

Abstract of dissertation

“IoT and cloud computing data analysis methods for monitoring technological processes of copper ore extraction”

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The development of information technologies and its impact on a broad ranges of industry becomes a basis method for further growth nowadays. Some of them, such as Internet of Things and benefits coming from using Cloud Computing can enormously enrich also modern mining activities. These technologies help companies and organizations to make a data-driven decisions. This change is also evident in the mining industry, where the focus is on increasing process monitoring capabilities and making appropriate inferences based on the obtained measurement data.

In order to comply with the requirements of the mining industry, this work presents methods for analysing data from systems with an Internet of Things architecture and Cloud Computing for the purpose of monitoring technological processes of copper ore extraction. The thesis includes issues related to, among other things, the prototyping of measurement systems for use in the mining environment, as well as the processing and analysis of the collected signals to monitor the state of the environment, machinery and operating parameters of selected fragments of technological processes.

The proposal of new measurement methods, the adaptation of robotic technologies for the requirements of underground mining and the analysis of long-term data of processes related to the mining and copper ores extraction, among others, using Cloud Computing will not only enable a deeper understanding of the processes, but will also contribute to increasing the safety of underground workers. The results of the doctoral thesis allow for the development of modern methods for the acquisition and data processing from mining machinery and the underground mine environment including the risk analysis related to the implementation of new technologies. Appropriate analysis of these make it able to allow the development of specialized knowledge of some technological processes (e.g. drilling, bolting, monitoring of environmental hazards) in copper ore mines.

Keywords: Mining technological processes, Measurement systems prototyping, Data analysis, Signal processing, Condition monitoring, Internet of Things, Cloud Computing

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