

Remote Quality Control of Seismic Operations: Application-Driven Approach

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ABSTRACT

In the past few years, with the industry adoption of high-productivity methods of seismic acquisition leading to the generation of large volumes of data, the necessity of timely and effective quality control (QC) became even more critical. Ensuring correct and compliant procedures in a uniform and consistent manner is time-consuming and computationally demanding task. An application driven-approach was established to address these challenges and automate remotely checking the seismic acquisitions operations quality on a daily basis. This QC automated process takes as an input several data types collected during acquisition operations. Those data types have varying formats recorded by different acquisition systems. As an output, different types of tabular, spatial and visual analysis are generated to help on the decision-making. The system analyzes the health and performance of the different field equipment, checks the compliance of the acquisition operations with company design and specifications highlighting any deviations, and measures the crew's performance in nine key indicators. It applies uniform and consistent quality check operations regardless of the acquisition system. Many computational and technical challenges from size of the data, changing formats, data issues and visualization were encountered. To address the complex large datasets, non-conventional parallel parsing and loading techniques are applied. In addition, the QC process is enhanced with on-the-fly fixers to resolve data abnormalities. To permit better analysis and visualization, the non-structured data was transformed to relational databases. Moreover, handling the varying data formats is carried through configuration to ease future modifications. Capturing completed operations snapshot with daily summaries in a centralized database allow for comparative analysis and mining opportunities.