Data analytics and artificial intelligence (AI) have become increasingly prevalent in various fields, including Scanning Electron Microscopy (SEM). The integration of these technologies in SEM will automate the process of segmenting SEM images of sandstone rocks.

The use of data analytics and AI in SEM will improve the speed and accuracy of the segmentation process. In this study, a large dataset of SEM images was trained using Convolutional Neural Network (CNN) machine learning algorithm. This allowed the CNNs to learn the patterns and features that distinguished different regions including detrital quartz grains (cores), diagenetic overgrowths (rims), other minerals, and pore space. enabling them to automatically segment new SEM images without manual intervention.

The automation of the segmentation process through data analytics and AI not only reduced time and effort but also ensured consistent and accurate results. The information obtained from the segmented SEM images provided insights into the geology and mineralogy of the rocks, and helped understand their formation, evolution, and structure of the porous rocks which are essential for the success of geothermal energy production.

In conclusion, the integration of data analytics and AI in SEM revolutionized the segmentation process of SEM images of sandstone rocks. This enabled geoscientist to obtain valuable information about the microstructures and mineralogist of rocks and advance their understanding of the processes involved in rock formation and evolution for successful production of energy stored in these rocks.