Classifying Slate Tile Quality Using Automated Learning Techniques

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Abstract

Slate classification has typically been performed manually by an expert on the basis of an assessment of standard defects that characterize the quality of the slate.

We describe an innovative and objective approach to automated classification that eliminates subjectivity and human error. The slate is classified using machine learning techniques based on numeric variables obtained from 2D-3D images captured by a linear 2D camera and a 3D laser scanner, which provide the necessary information on the slate.

With a view to obtaining an optimally efficient classification model, we implemented a supervised machine learning technique (support vector machines) and a non-supervised technique (clustering).

The results obtained in our research demonstrate that the error for automated classification is lower than for manual classification. Automated classification also removes the subjectivity implied by manual quality control in the slate classification process.

Keywords: Slate Classification, Laser Scanner, Support Vector Machines, Cluster.