

Damage detection on stones

Samirah Amadu

Javier Lara Juarez

1 Problem statement

In a common stone refinement pipeline, quality assurance is done by humans, causing a non-uniform selection in damaged stones. Furthermore, the most expensive component within a pipeline is human work. To save money and to optimize the pipeline a stone production company would like to automate the process of damage detection and the sorting of identified stones.

This project deals with the first step, the automated detection and localization of damage on stones.

2 Dataset

The dataset consists of 187 black and white images of different square shaped stones, with different levels of damage. As part of the preprocessing each of the images will be cropped and labelled as undamaged or damaged.

As of today it is uncertain if the amount of data available is sufficient as such it may be necessary to use data augmentation to artificially increase the size of the dataset.

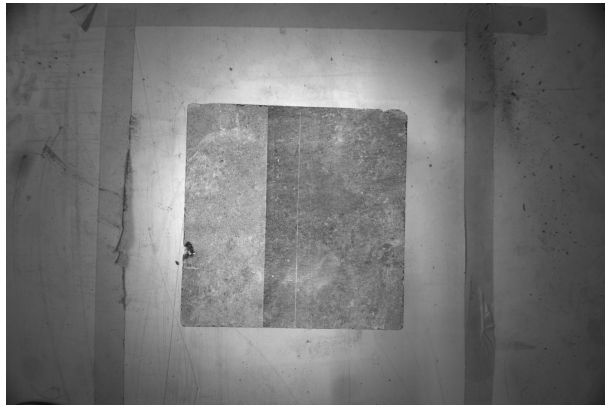


Figure 1: A picture of a damaged stone.

3 Solution

The main focus of this project is to train a neural network, such that damaged stones can be identified.

The CNN ResNet will be used to generate a model that can achieve classification. Once this step has been successful the localization part of the project is initiated using a region based CNN. The performance of the classification will be assessed using cross entropy and the localization performance using L_2 distance.

In terms of implementation set-up we will be using Keras and Tensorflow on an Anaconda environment.

4 Expected results

The result of this project will be a trained neural network model which is capable of identifying damaged stones and localizing the damaged area with high accuracy and efficiency.