MineCam: Application of Remote Sensing combined with Machine Learning for Mining Areas Monitoring

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Surface mining is a significant activity that results in substantial changes to the land. These changes involve deforestation, infrastructure construction, pits creation, and the disposal of waste, among other activities. Consequently, it is crucial to continuously monitor these transformations in mining areas. Our study addresses this challenge by introducing a novel solution that combines remote sensing and machine learning techniques. We have compiled a dataset consisting of more than 2000 satellite images, each labeled with 10 distinct categories that pertain to various components of mining areas (such as excavations, dumping grounds, or tailing storage facilities). To accomplish the classification task, we evaluated different deep learning algorithms using various combinations of training data, including different image band combinations and truncated datasets focused on specific types of surface mines. The resulting product is readily applicable for assessing the environmental impact of mining operations in terms of land use, identifying illegal mining activities, and tracking the progress of mining operations and subsequent reclamation efforts.