A Novel Study in the Utilization of Artificial Intelligence, Machine Learning, and Convolutional Neural Networks in the Identification of Differing Recyclable Materials

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Due to growing industries and poor methods of recycling, landfills are filled with millions of tons of wasted recyclable materials. Making recycling more accessible to communities around the world is essential in the current age. Many counties do not sponsor recycling programs due to the exorbitant cost. One way to reduce costs is to optimize the recycling process. With emerging technologies, one of the most promising strategies that can be used to approach this growing issue is the use of artificial intelligence. First, an appropriate dataset was found to train the AI with. A convolutional neural network was coded and the AI's performance was recorded with other observations. After each iteration, the model and its performance was analyzed to identify areas of potential improvement and the model was modified to reflect those potential improvements. After numerous iterations, the AI's performance decisively reached an adequate degree of performance. Loss values reached an acceptable level of 0.3547 and accuracy reached about 93%. In the final iteration, a larger batch size, one fully connected Dense layer with 128 units, and a high dropout rate was used. This project can be improved to be able to identify different types of plastic and eventually, develop an innovative approach to recycling.

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