RecycloTrash: Barcodes v. CV

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In the RecycloTrash project, a trash can which sorts between recyclable and unrecyclable items that are thrown into it was designed and built. After the trash can was designed using the AutoDesk Inventor software, it was built using using a painter's bucket, servo, and Raspberry Pi, as well as many other items. The purpose of this was not only to solve a well-known problem involving the low percentage of recyclable items that are actually recycled but also to demonstrate which method of classifying trash is the most efficient and accurate: computer vision, barcode scanning, or QR Code scanning. It was hypothesized that computer vision would be the best of the three, and the hypothesis was supported. It was found that by using computer vision, the results for placing a piece of recyclable trash in the correct section is up to 94%, which, in most cases, is well above the national average (67% for aluminum cans) for recyclable items that are actually recycled. The rate for placing the unrecyclable items in the trash section was 100% for all the detection methods, which is required since trash must not mix with recyclable items under any circumstances. All of the results were based on a series of 700 tests using a variety of items including aluminum cans, water bottles, and several others. Each item was thrown into the trash can and if the item was sorted correctly, it was a success.