# Lego Sorting Using Machine Learning

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## Abstract

The purpose of the project is to design and build a Lego sorting machine which is capable of sorting Legos by type.

## Results

Testing showed the sorting machine is capable of mechanically transporting Legos and recognizing Legos with varying accuracy and speed depending on what image classification model is used.

## Conclusion

The Lego sorting machine shows great promise in sorting Legos speedily with near 100% accuracy once certain image classification models become compatible with the Google Coral Accelerator

## Methods

The Lego sorting machine must be able to dump a consistent number of Legos (once manually loaded) onto the first conveyor belt at a time. The sorting machine must also be capable of aligning and individually separating each piece. The sorting machine must recognize an individual Lego type. Once a Lego type is determined the sorting machine must put the Lego into the proper container.

Step 1 is accomplished using a so-called inlet ramp which sports a platform connected to a cam which rotates to lift the platform dumping several Legos onto the first conveyor belt. In Step 2 the Legos are aligned and separated using aluminum rails. The Legos are properly space by the second conveyor belt which runs approximately 10x faster than the first. A single Lego will pass an IR trip beam which will tell the belt to stop when the Lego is in the area for recognition. The Lego will then be imaged and processed by the raspberry PI using TensorFlow (machine learning bases classification) a Coral Accelerator is attached to drastically speed up processing time—Step 3 has been satisfied. After the Lego has been sorted, the bin system will rotate to the correct bin, taking the most efficient path to the next bin, and a series of ramps will dump the Lego into it. Step 4 is done, and the process of sorting Legos automatically has been performed.