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**Recyclotron Readme**

Recyclotron solves the sorting problem in recycling using Machine Learning & computer vision to identify/classify recyclable items (i. e. various bottles, cans, carton etc). After months of researching open-source machine learning libraries (with the help of tensorflow) and writing our own proprietary algorithm, my team and I successfully built and demonstrated a fully operational hardware machine that uses computer vision to detect and place recyclable items in appropriate bins. Our working prototype with machine learning identifies, classifies and places items to the right recycle bin.

The machine learning task involved is supervised learning (inferring a function to map input to an output based on training example input-output pairs). The training data is collected by taking a large amount of photos of bottles, cans, carton bottles, and labeling them. The photos are scaled and are then represented as vectors, which go through the CNNs. Throughout the training, the loss function (mean square error) is involved. One of the most important files, recyclotron.py, contains the classification algorithm, and it is responsible for connecting the machine learning and computer vision parts to the hardware parts: controlling the motion of the hardware that comprises the Recyclotron machine, such as the servo (responsible for the dropping of the arm, i.e. when to drop a bottle into its corresponding bin) and the motor (responsible for the rotation of the arm, i.e. to which specific bin should the bottle be rotated to). Along with each .py file, there is also a corresponding .txt file that allows easier viewing of the code (instead of having to run the python files).

Recyclotron Quick Demo video: <https://youtu.be/xT_jd5vzd2M>