CS-6470 Project Proposal

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1 Purpose

We propose a project for classifying the difference between recyclable and non-recyclable plastics. A common problem in recycling centers is that plastics must be resorted. Most people do not know which plastics are recyclable and which is not, so many times they will dump all their plastic in the recycle bin without checking. For example, people commonly mistake styrofoam as being recyclable, which it is not. Another common mistake is plastic laundry baskets. These might appear to be recyclable, but typically they are not.

We will use TensorFlow's image classification tools to train a model to recognize the difference between various plastics. We will take our own images, as well as finding images online, and use them to train our dataset. Finally, we'll use our model to create an Android app which can recognize whether a plastic is recyclable. This will allow individual consumers to easily detect whether a plastic should go in the recycle bin, or in the trash.

This project will not only serve an environmental purpose, but can teach us the value of proper recycling and help us gain a better respect for the process. Because we intend to publish the resulting application in the Android app store, we hope that this application will assist others in learning to properly sort recyclable plastics also.

2 Sources

https://www.tensorflow.org/lite/models/image_classification/overview

3 Timeline/Backlog

- Week 1: Collect Images of recyclable and non-recyclable plastics
- Week 2: Learn TensorFlow
- Week 3: Download example application and source code
- Weeks 4-5: Build and run on phones

- Weeks 6-7: Select and build the algorithm we want to use
- Weeks 8-9: Incorporate Learning algorithm into application
- Week 10: Sort and filter data
- Weeks 11-12: Teach and test algorithm with sorted data

References

[1] P. Dhulekar, S. T. Gandhe, and U. P. Mahajan. Development of bottle recycling machine using machine learning algorithm. In *2018 International Conference On Advances in Communication and Computing Technology (ICACCT)*, pages 515–519, 2018.

[2] Florian Gruber, Wulf Grählert, Philipp Wollmann, and Stefan Kaskel. Classification of black plastics waste using fluorescence imaging and machine learning. *Recycling*, 4(4):40, 2019.

[3] Dimitris Ziouzios, Dimitris Tsiktsiris, Nikolaos Baras, and Minas Dasygenis. A distributed architecture for smart recycling using machine learning. *Future Internet*, 12(9):141, 2020.