Waste Sorter Demo

February 9, 2020

0.1 Waste Classification using Image Processing

Recycling contamination occurs when waste is incorrectly disposed of-like recycling a pizza box with oil on it (compost). Not only does this waste potentially useful natural resources, it can also cause untold damage to the environment. Our project aims to use a convolutional neural network to determine whether a piece of rubbish in a photo is one of cardboard, glass, metal, paper, plastic, or trash. This is achieved through use of the fastai library (built on PyTorch).

Our model has already been trained on an extensive set of images. In testing we measured its accuracy at identifying unseen images to be ~94%.

[2]:
```
%reload_ext autoreload
%autoreload 2
%matplotlib inline

%config InlineBackend.figure_format = 'retina'

from fastai.vision import *
from fastai.metrics import error_rate
from pathlib import Path
from glob2 import glob
from sklearn.metrics import confusion_matrix

import pandas as pd
import numpy as np
import os
import zipfile as zf
import shutil
import re
import seaborn as sns
```

[3]:
```
def display_image(il):
    il[-1].show()

def make_prediction(il):
    max = np.max(s.predict(il[-1])[2].tolist())
    print("Waste Classification:", s.predict(il[-1])[0], "\nConfidence =",␣
 ↪max*100, "%")
```

[15]:
```
## Get a path to the folder with trained model
path = Path(os.getcwd())/"data"

## Load the trained model 's.pkl'
s = load_learner(path, 's.pkl')

## Get a path to the folder with images
path = Path(os.getcwd())/"demo"

il = ImageList.from_folder(path)
display_image(il)
```

[16]:
```
## Use the model to predict the classification of the image
make_prediction(il)
```

```
Waste Classification: metal
Confidence = 98.51073622703552 %
```

[ ]:
```

```