Smart Trash In Smart City

To Keep our Saudi green and clean

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RASKALA

Table of Contents

Introduction

Recycling is important for the environment in today's world. Recycling means when we are using old and waste products that are of no use and then converting them back to the same new products. Since we are saving resources and are sending less trash to the landfills, it helps in reducing air and water pollution.

Recycling in Saudi Arabia

The total waste generated in KSA is approximately 15 million tons per year which is effectively harm the environment.

Recycling in Saudi Arabia

Based on article by the CEO of Saudi SIRC company

Project Goal

To increase the recycling rate using deep learning to build an automatic classification system for the waste item.

Data Description

Data provided by GitHub, it divided into six classes: glass, paper, cardboard, plastic, metal, and trash.

Train	Validation	Test
50%	25%	25%

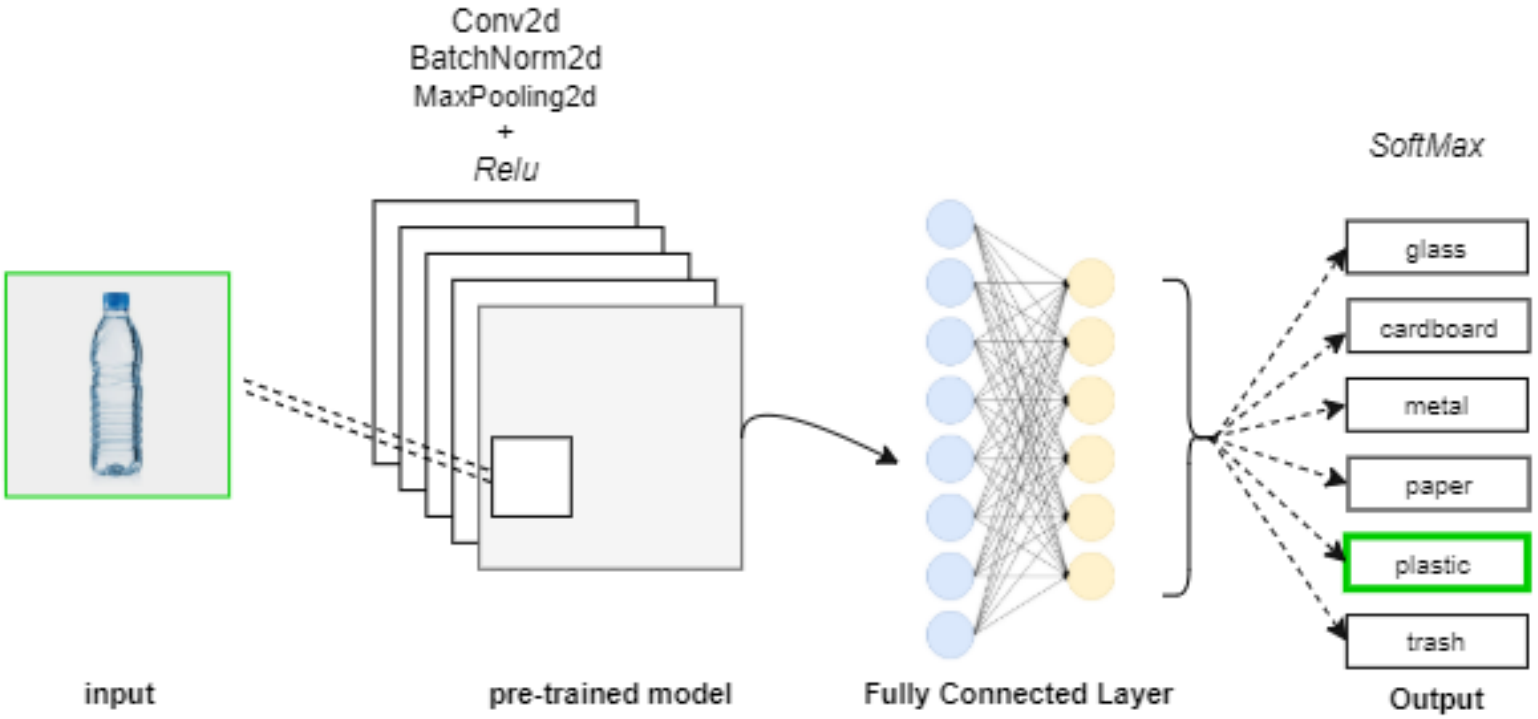
Experiments

Using Fastai (built on top of PyTorch) to build CNN model.

	Train Accuracy	Test Accuracy
ResNet18	93%	91%
ResNet34	93%	93%

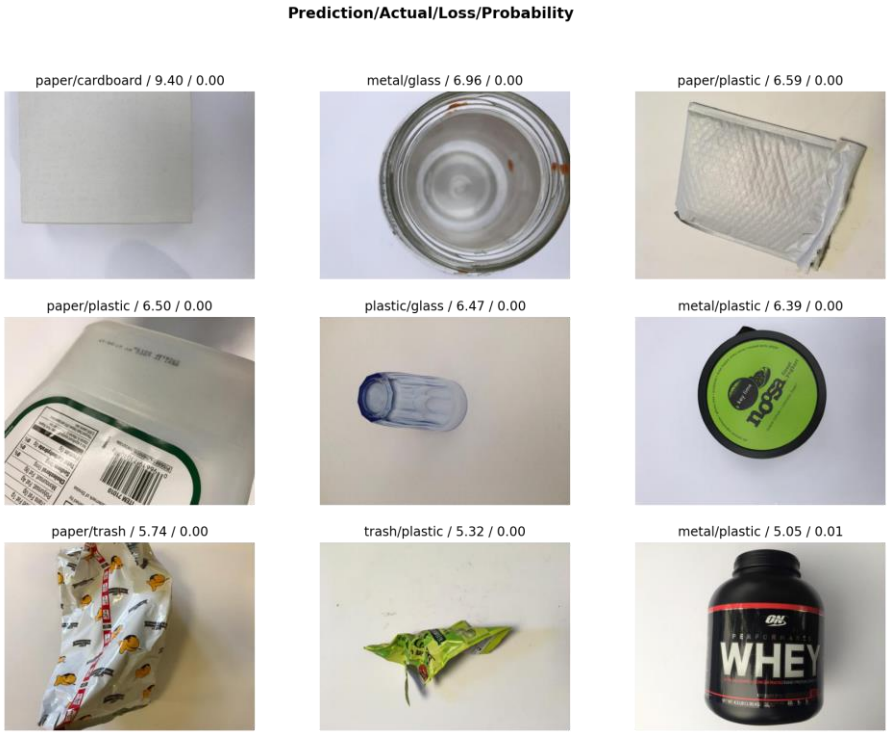
ResNet34

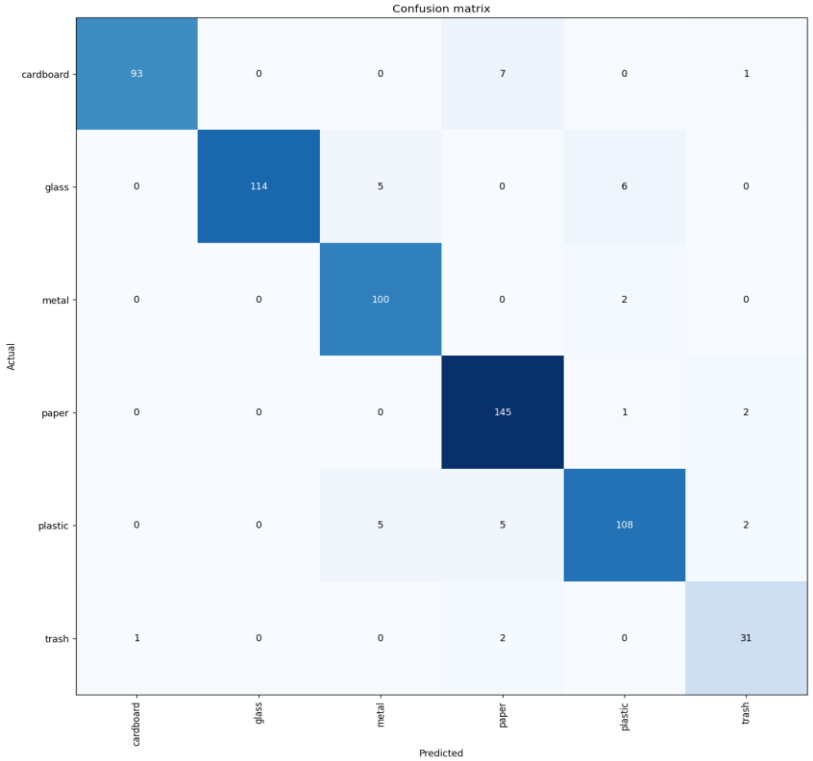
Best Model



Prediction Results

The model seems to have confused cardboard for paper and glass for plastic



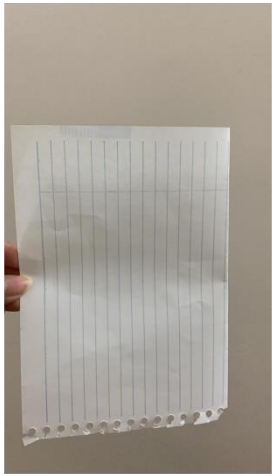


Test Result

We test our model on real-world images.

trash

paper



plastic

metal

cardboard

Deployment

Using Raspberry Pi

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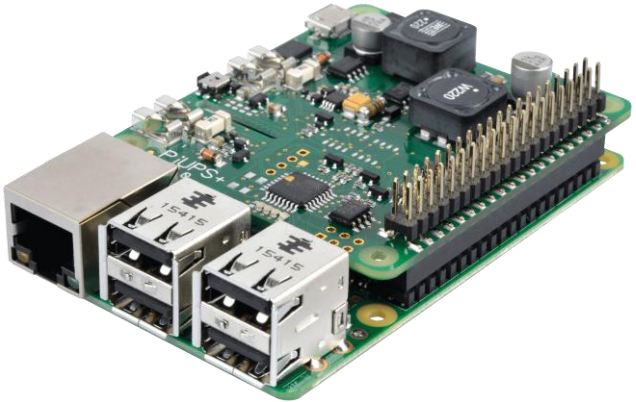
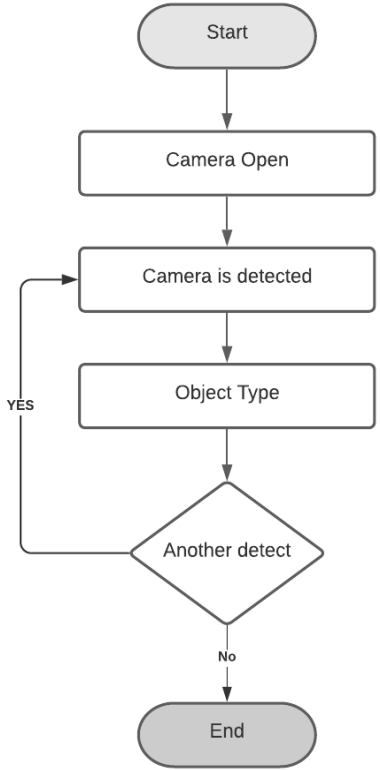
Deployment

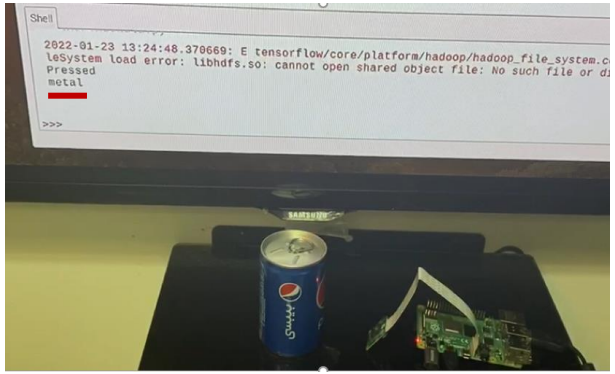
By using Raspberry Pi and Raspberry Pi camera V2 to detect type of trash.

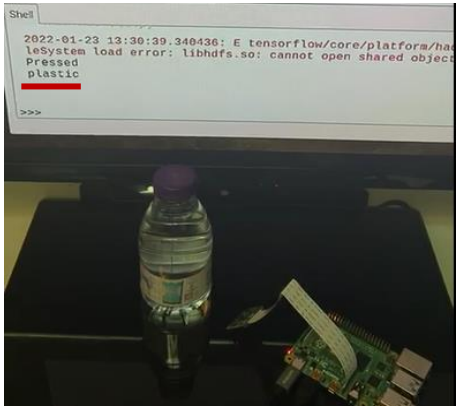


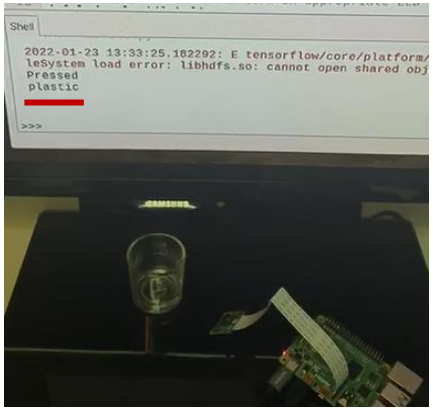
System Design (Flowchart)

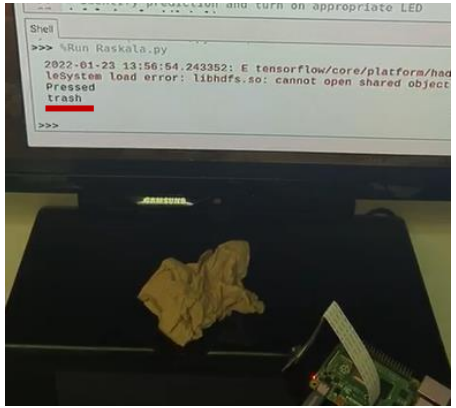


Raspberry Pi Predict Result









Did not predict glass correctly because accuracy of model not 100%

Challenges

Challenges in general :

- Lack of Data
- Huge project in limited time

Challenge in deployment (raspberry Pi):

- issue with fastai versions in Raspberry Pi.
- system crush.
- One of the cameras stopped working because it sensitive.

Feature Work

1

We want to increase accuracy and gathering more data to improve performance.

2

We want to send notification or email if the trash is full

Thank you