Project 5: End-Semester Project

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Final Project Proposal: Plastic Classification in Grocery Store Sales

Introduction

Plastic waste is one of the biggest environmental challenges we face today. The goal of this project is to develop a model that can classify grocery store products based on the amount of plastic in them. This will help us understand the extent of plastic generation in grocery stores and inform efforts to reduce plastic waste. The project involves a dataset of 6k product images generated by Professor Amanda Wesh and team, classified into no-plastic, some-plastic, heavy-plastic, and no-image, as well as 350k unlabeled images of products in situ.

Methodology

We will begin by understanding and exploring the dataset and continue by developing a model to classify the 6k labeled images. We will explore various deep learning models such as convolutional neural networks (CNNs), Vision Transformers and apply various transfer learning techniques to identify the most effective model architecture. We will use common performance metrics such as accuracy, precision, and recall to evaluate our model's performance.

Once we have developed an effective model for the labeled images, we will expand our approach to the unlabeled in situ images. We will explore techniques such as self-supervised learning and active learning to classify these images. We will also consider using additional datasets to fine-tune our models, if the dataset is made available.

Results and Impact

The proposed model will provide an efficient and accurate method to classify plastic in grocery store products. This will be valuable to researchers, policymakers, and retailers looking to reduce plastic waste. The project will also provide an opportunity for students to gain hands-on experience with deep learning models and image classification.

Conclusion

This project aims to develop a model to classify plastic in grocery store products using a dataset of labeled and unlabeled images. We will explore various deep learning models and techniques to classify the images accurately. The proposed model will provide valuable insights into plastic waste generation in grocery stores and help inform efforts to reduce plastic waste.