### Abstract

Every time a Dr. Pepper product is stocked in a store, Dr. Pepper receives an image showing how those items were stocked. There will then be a human that checks and makes sure that bottles or boxes are placed correctly on the shelves. The problem is that there are too many images that are received daily and the company is the human resources that can review these images. Dr. Pepper is looking into how to automate and streamline this process as much as possible.

### Architecture

- **Programming Language**: Python
- **Annotation Tool**: VGG Image Annotator (VIA)
- **Object Detection**: Keras RetinaNet
- **TensorFlow, CUDA, cuDNN, Docker**

### Impact

Useful as a proof of concept, that shows how a task such as product identification might be accomplished. Many companies can find product identification useful as a way of improving their advertisement, distribution, planning, and training.

**Before:**
- Company has an immense amount of image data with no efficient way to make use of it.

**After:**
- Company has a way to categorize their images and can use it as they need.

### Performance

We are not getting great results as a result of a lack of data. Because as we discovered we need an immense amount of data in order to train our models. Unfortunately we are getting accuracy rates less than 50%. If you look at the picture in the results section our model has about a 40% confidence that it is correctly predicting those 12OZ 7UP. Additionally you will notice that it did not even detect a single 12OZ DT 7UP even though it is one of the classes it was trained on.

### Results

**Expectation from model:**

**Result from model:**

### Summary

- Annotated images so that the machine will recognize what a product is.
- Developed a model that will take these annotated images and process them.
- Train the model to detect products by passing to it as many annotated images as there are available.
- Model is still very much in its infancy and will require much more annotated images in order to have better accuracy.