



# Item Recognition in Retail

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# Problem

## Barcode Scanner



## Item Lookup



## RFID



# Why Computer Vision in Retail

- Product Recognition
- Planogram Compliance
- Smart Self Checkout
- Autonomous Stores



# Challenge with Item Recognition #1

## *Similar Looking Items*



# Challenge with Item Recognition #2

## *Item Overlap and Occlusion*



# Challenge with Item Recognition #3

## *Same Item Different Size*





# Challenge with Item Recognition #4

## *Number of Items to Classify*



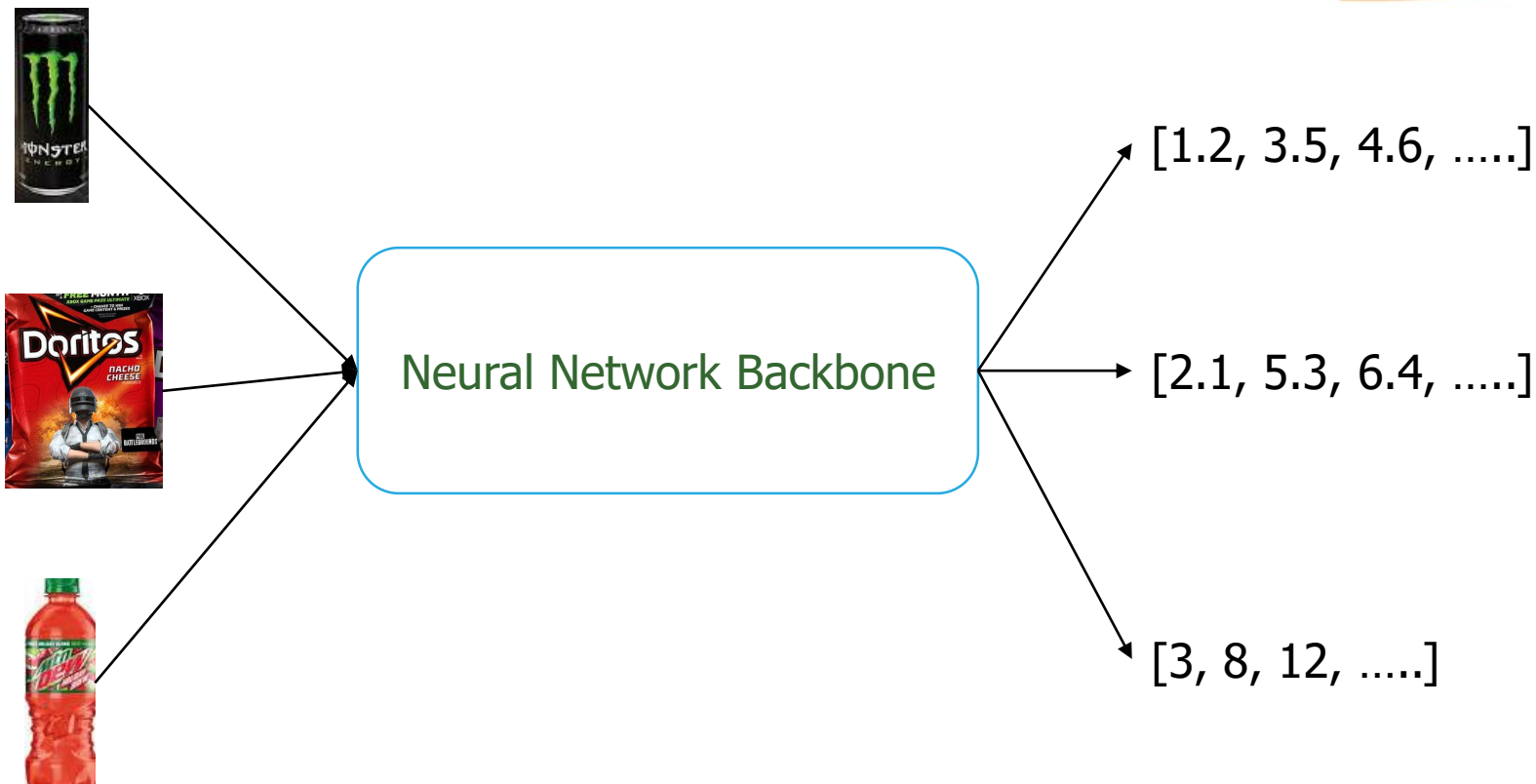
# Challenge with Item Recognition #5

## Packaging Changes

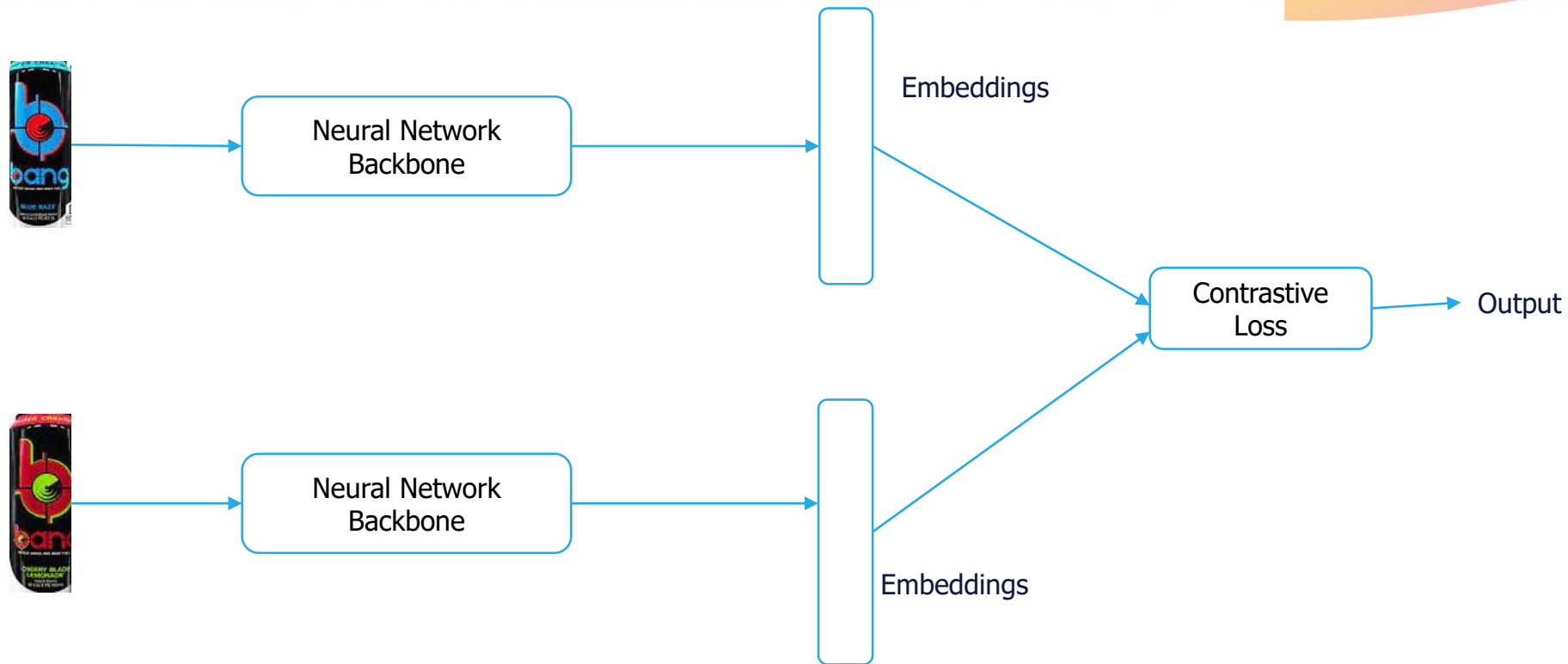




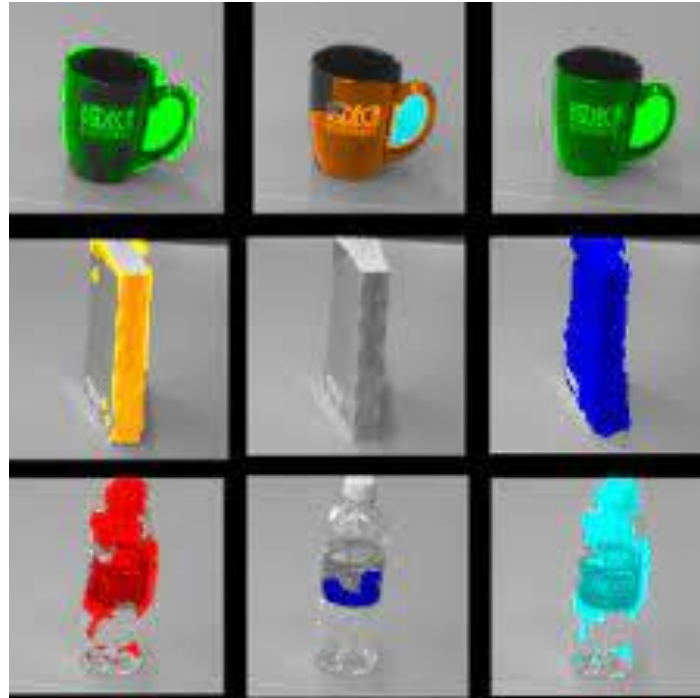
# Solution - Feature Encoding



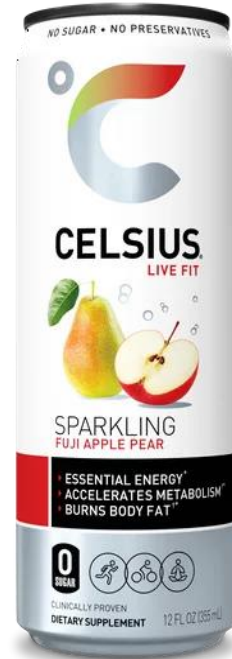
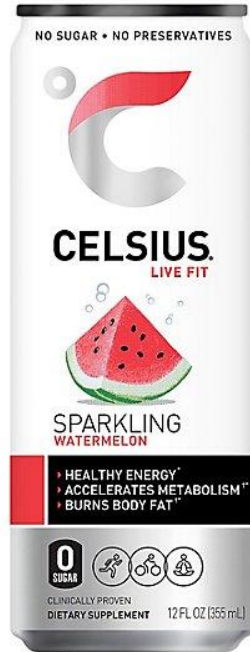
# Solution – Model Training



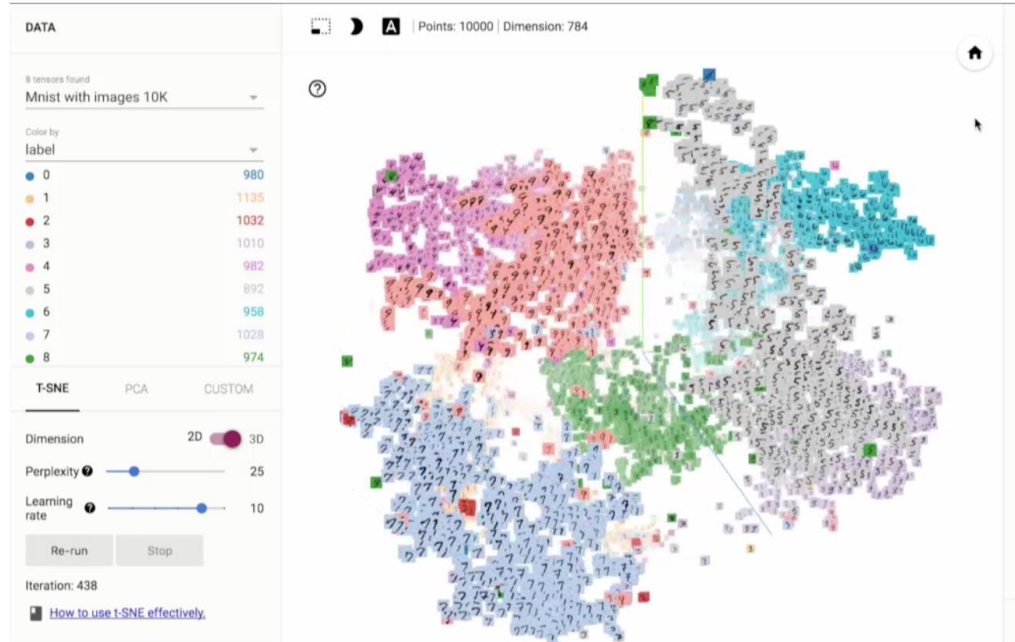
# Solution – *RGB D Detection*



# Solution – *Selective Creation of Data*



# Debugging Strategies – *Embedding Visualizer*

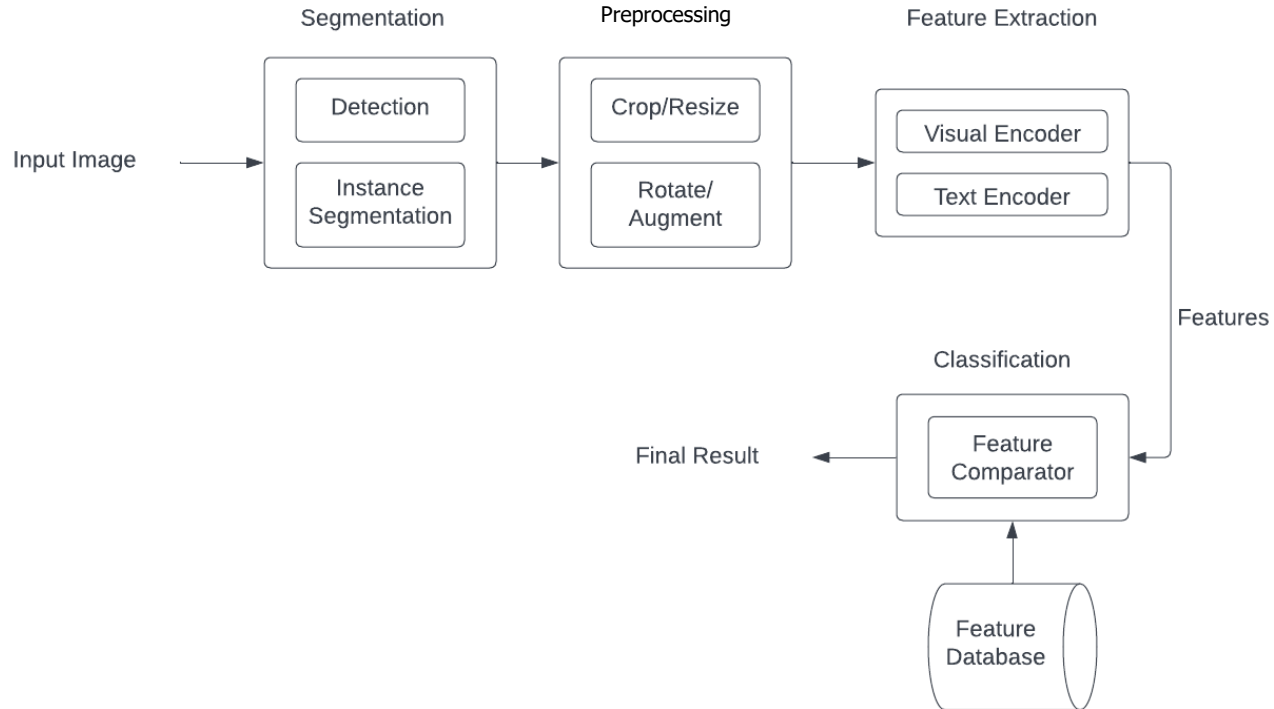




# Debugging Strategies – *Neural Activations*



# Product Recognition System - Architecture



# Segmentation



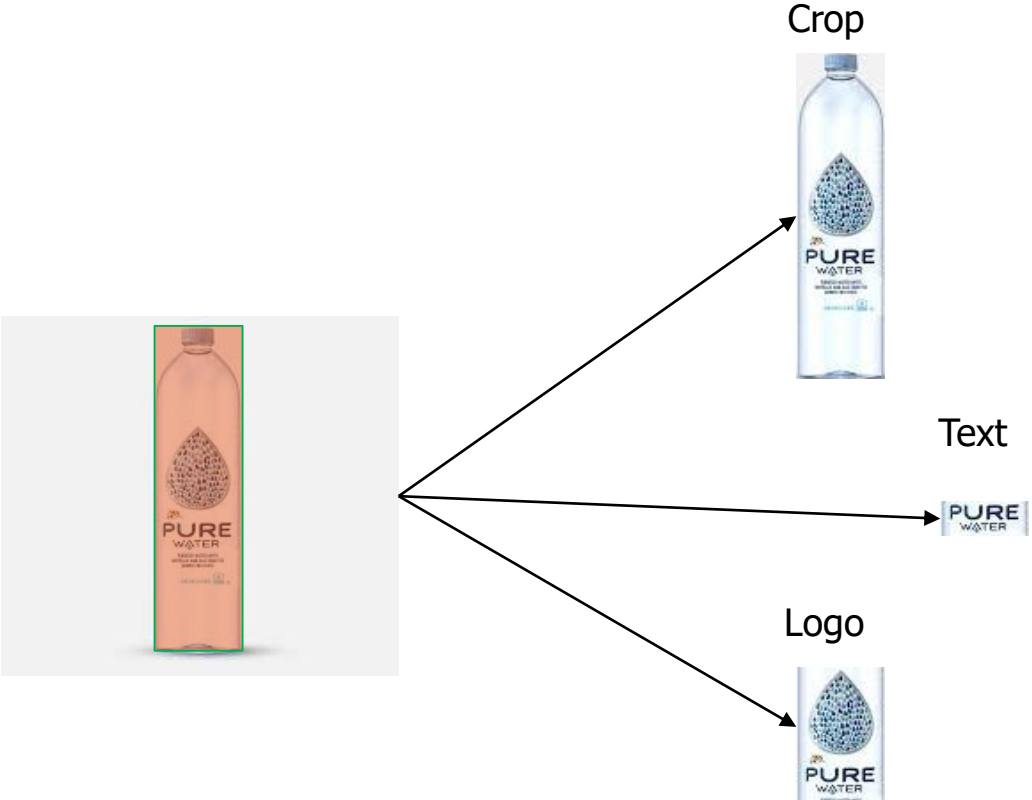
Detection box



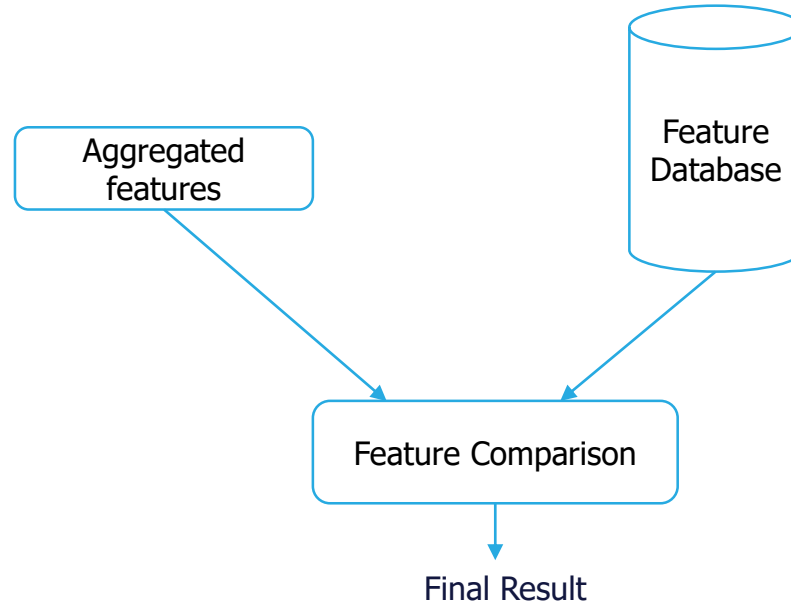
Instance segmentation



# Product Recognition System – Pre-Processing



# Product Recognition System – Recognition





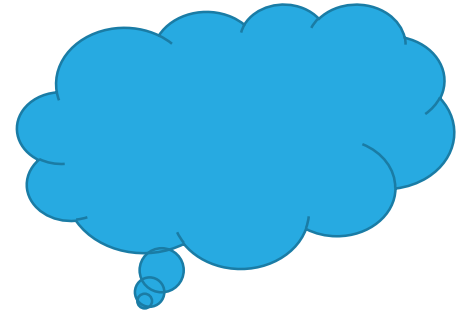
# Platform to Deploy CV Solutions



Low-cost edge solutions



GPUs



Cloud

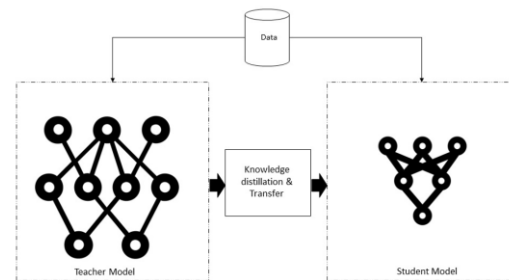
# Challenges in Deploying CV Solutions



Accuracy



Speed



Cost

# Our In-House Solution



# Conclusion

- Can revolutionize the retail industry
- Enhance shopping experience
- Improve inventory accuracy
- Run retail operations efficiently