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In [53]: ## Importing Libraries
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In [51]: from ultralytics import YOLO
from PIL import Image
import requests
from bs4 import BeautifulSoup
```

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In [5]: ## BASIC OBJECT RECOGNITION USING PRE-TRAINED MODEL YOLO
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```
In [50]: def object_recognition(img):
    model = YOLO("yolov8l.pt")
    allowed_objects = [24,25,26,28,29,39,40,41,42,67]

    results = model.predict(source=img, conf=0.8, max_det=3, classes= allowed_objects, s

    objects = []
    for r in results:

        boxes = r.boxes
        for box in boxes:

            c = box.cls
            #         print(model.names[int(c)])
            objects.append(model.names[int(c)])

    objects = set(objects)
    #     print("objects detected in the image are:", objects)

    return list(objects)
```

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In [7]: ## WEB SCAPPER TO GET THE PRICES OF THESE OBJECTS FROM DIFFEREN ONLINE RETAILERS:
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```
In [40]: def get_google_shopping_prices(query):
    url = f"https://www.google.com/search?q={query}&tbm=shop"
    headers = {'User-Agent': 'Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.
    response = requests.get(url, headers=headers)
    soup = BeautifulSoup(response.text, 'html.parser')

    items = soup.find_all('div', class_='P8xhZc')
    products = []
    for item in items:
        name = item.find('a').text
        price = item.find('span', class_='HRLxBb').text
        url = item.find('a')['href'][9:]
        try:
            website = item.find('div', class_='dD8iuc').contents[-1].split()[1]
        except:
            website = url

        article = {'PRODUCT NAME': name.strip(), 'PRICE': price, 'WEBSITE/URL': website}
        products.append(article)

    #         print("name:", name.strip())
    #         print("price:", price)
    #         print("URL:", website)
    #         print()

    return products
```

```
In [9]: ## ALGORITHM TO COMPARE PRICES AND LIST THEM FROM LOWER TO HIGHER
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```
In [43]: def sort_items_by_price(items, order='ascending'):

    # Define a lambda function to extract the price from each item
    get_price = lambda item: float(item['PRICE'].replace('$', '').replace('+', '').repla

    # Sort the items based on price
    sorted_items = sorted(items, key=get_price, reverse=(order == 'descending'))

    return sorted_items
```

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In [11]: ## EXAMPLE USAGE
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```
In [54]: """
1. Image upload and storage

currently we are providing the sample images manually, it will be replaced later by a UI
select and upload images or click and upload real-time images.
Images with object detections are stored in local storage, it will be replaced by a secu
"""
img = Image.open("../Downloads/sample_image.png")

"""
2. Object Recognition
"""
objects = object_recognition(img)
print("\nItems detected:", objects)

"""
3. WEB SCRAPPING
"""
all_products = []
for item_name in objects:
    product = get_google_shopping_prices(item_name)
    all_products.append(product)

"""
4. SORTING PRICES FROM LOW TO HIGH
"""
for product in all_products:
    sorted_items_asc = sort_items_by_price(product, order='ascending')
    print("\nItems sorted by price(LOW TO HIGH) from different retailers:\n")
    for item in sorted_items_asc:
        for key, value in item.items():
            print(key, ": ", value)
    print()
```

0: 448x640 1 bottle, 2087.8ms

Speed: 11.0ms preprocess, 2087.8ms inference, 2.2ms postprocess per image at shape (1, 3, 448, 640)

Results saved to **runs/detect/predict31**

Items detected: ['bottle']

Items sorted by price(LOW TO HIGH) from different retailers:

PRODUCT NAME : Mainstays Blue Plastic Water Bottle - 650 ml

PRICE : \$3.21

WEBSITE/URL : https://www.instacart.ca/products/24839853-mainstays-blue-plastic-water-bottle-650-ml%3Fretailer_id%3D462%26utm_term%3Dpbi-0%26utm_campaign%3Dmainstays--blue-plastic-water-bottle---650-ml_walmart-canada%26utm_source%3Dinstacart_google%26utm_medium%3

Dshopping_free_utm_content%3Dproductid-24839853_retailerid%3D462%26region_id%3D9192093002&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIkQE&usg=AOvVaw1Acc7ZukH53MWHZD0dIqrE

PRODUCT NAME : 1 Litre Glass Bottle with Cork | Princess Auto
PRICE : \$3.99
WEBSITE/URL : Princess

PRODUCT NAME : Ardene Tropical Reusable Bottle in Medium Green
PRICE : \$9.90
WEBSITE/URL : Ardene

PRODUCT NAME : Sully Tritan Water Bottle - 900ml - Blue
PRICE : \$9.97
WEBSITE/URL : Staples

PRODUCT NAME : Drink Up Gradient Water Bottle, French, Black | Stokes
PRICE : \$9.98
WEBSITE/URL : https://www.stokesstores.com/drink-up-gradient-water-bottle-french-black.html&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIgwE&usg=AOvVaw2ky3ZLyO2snLk1Wt3p6ykc

PRODUCT NAME : Essential Water Bottle, Oatmeal, 750 ml | Stokes
PRICE : \$9.98
WEBSITE/URL : https://www.stokesstores.com/essential-water-bottle-oatmeal-750-ml.html&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIqAE&usg=AOvVaw1OgggmbJ63SLIfOBn6sD8f

PRODUCT NAME : KSP Quench 'Marble' 500ml Double-Wall Water Bottle (Black)
PRICE : \$9.99
WEBSITE/URL : Kitchen

PRODUCT NAME : Anko 650ml Glass Drink Bottle with Silicone Wrap - Green
PRICE : \$12.00
WEBSITE/URL : Hudson's

PRODUCT NAME : Auria Soft Touch Water Bottle, 500ml in Green, Stainless Steel
PRICE : \$14.99
WEBSITE/URL : Indigo

PRODUCT NAME : 1 Litre Air Water Bottle With 7 Flavour pods, Sports Starter Up Set BPA Free Drinking Bottles with Straw, Tritan Drinking Bottle Scented 0 Sugar 0
PRICE : \$15.00
WEBSITE/URL : Amazon

PRODUCT NAME : Orgonite Air Water Bottle Starter Set, 650ml Sports Alr Water Up Bottle BPA Free With Straw, Drinking Bottles with 1 Peach Flavour Pods Scented 0
PRICE : \$17.99
WEBSITE/URL : Amazon

PRODUCT NAME : MUJI Stylish Water Bottle
PRICE : \$18.81
WEBSITE/URL : https://www.ebay.com/itm/335170305638%3Fchn%3Dps%26mkevt%3D1%26mkcid%3D28&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIfw&usg=AOvVaw2Y2Fml12n03jQgqzUDNIZG

PRODUCT NAME : Bambaw Reusable Stainless Steel Water Bottle - 1000 ml
PRICE : \$24.97
WEBSITE/URL : https://www.naturitas.ca/p/home/home-and-kitchen/bottles-cups-and-shakers/stainless-steel-bottle-1-l-bambaw&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIjQE&usg=AOvVaw38WohUdpNrbt2tzoUu2sgL

PRODUCT NAME : KIVY Lightweight Tritan Water Bottle 32oz [Leakproof & Shatterproof] Dishwasher Safe Water Bottle screw top - Reusable water bottle no straw -
PRICE : \$25.61
WEBSITE/URL : Amazon

PRODUCT NAME : Urban Outfitters Owala UO Exclusive FreeSip 24 oz Water Bottle in Electric Violet

PRICE : \$39.00

WEBSITE/URL : https://www.urbanoutfitters.com/en-ca/shop/owala-uo-exclusive-free-sip-24-oz-water-bottle%3FinventoryCountry%3DCA%26color%3D050%26size%3DALL%26type%3DSTANDARD&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIlgE&usg=AOvVaw0X9A2gowBl6wJhSLJDv7SC

PRODUCT NAME : SoHo Bullet Water Bottle Gift for Dad - Hot/Cold Insulated Stainless Steel 24oz Travel Bottle with Locking Lid High Caliber Dad (Gift Boxed)

PRICE : \$40.59

WEBSITE/URL : Encased

PRODUCT NAME : lululemon Back To Life Sport Bottle 18Oz Straw Lid - Blue

PRICE : \$44.00

WEBSITE/URL : lululemon

PRODUCT NAME : Bink Day Bottle Clay

PRICE : \$49.99

WEBSITE/URL : https://well.ca/products/bink-day-bottle-clay_218664.html%3Fsrsltid%3DAfmBOoo_uFFA_-vHqatRsl_HZcH7yMb41vm0mxYW5vpBo5iTRceH_xjTxhc&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIrgE&usg=AOvVaw2yVJy2DVU10bDh3KVAhoiK

PRODUCT NAME : LARQ Filter Water Bottle in Obsidian Black, 500 ml | Stainless Steel

PRICE : \$50.95

WEBSITE/URL : https://www.livelarq.com/purification/larq-bottle-filtered-obsidian-black%3Fregion%3Dca%26size%3D500ml%26srsltid%3DAfmBOooGCs2PAOESruAxKamm0wvoWpfJ0iaeZuu4e9NgK2XS7Et_CWCwpkA&rct=j&q=&esrc=s&opi=95576897&sa=U&ved=0ahUKEwilwoyg3cyEAXdQ_EDHd7RD-sQsDwIhgE&usg=AOvVaw3hy_Pz87U7s-rKpR_xSCDu