

TASK:11

Implementation of Object Recognition System.

CO1, CO2, CO3

S3

PROBLEM STATEMENT

In today's world, identifying and classifying objects in images is essential for various real-time applications such as autonomous vehicles, surveillance systems, and robotics. Manual object identification is time-consuming and error-prone. Hence, there is a need for an automated system that can accurately recognize and classify objects in an image using computer vision techniques.

AIM

To develop an automated system that can detect and recognize multiple objects from an image using machine learning techniques.

OBJECTIVE

- To preprocess the image for better feature extraction.
- To apply object detection algorithms to identify objects in images.
- To classify detected objects into predefined categories.
- To display the recognized objects with bounding boxes and labels.
- To evaluate the system's accuracy using test images.

DESCRIPTION

Object recognition involves identifying objects within digital images or videos. It is a key task in computer vision and artificial intelligence. The process includes three main stages:

1. **Image Acquisition:** Capturing or loading an input image.
2. **Feature Extraction:** Detecting key features such as edges, shapes, and colors.

- 3. Classification:** Comparing extracted features with trained data using algorithms such as CNN (Convolutional Neural Network).

ALGORITHM

1. **Start**
2. Load the pre-trained object recognition model (e.g., MobileNet/YOLO).
3. Input the image for object detection.
4. Preprocess the image (resize, normalize).
5. Feed the image to the model for prediction.
6. Detect and classify objects in the image.
7. Draw bounding boxes and labels around recognized objects.
8. Display the output image with detected objects.

9. End

PROGRAM

```
# Object Recognition (Simulation Example)

# This program doesn't use external libraries like cv2 or tensorflow.

# Predefined objects database (sample)

known_objects = {

    "dog": ["tail", "fur", "bark", "four legs"],

    "cat": ["whiskers", "fur", "meow", "four legs"],

    "car": ["wheels", "engine", "doors", "horn"],

    "bottle": ["cap", "liquid", "transparent", "plastic"]

}

# Get input features from user
```

```

print("Enter 4 features of the object (e.g., wheels, engine, doors, horn):")

features = [input(f"Feature {i+1}: ").lower() for i in range(4)]


# Compare features with known objects
recognized = None

for obj, obj_features in known_objects.items():

    matches = len(set(features) & set(obj_features))

    if matches >= 2: # At least 2 features must match

        recognized = obj

        break


# Display result
if recognized:

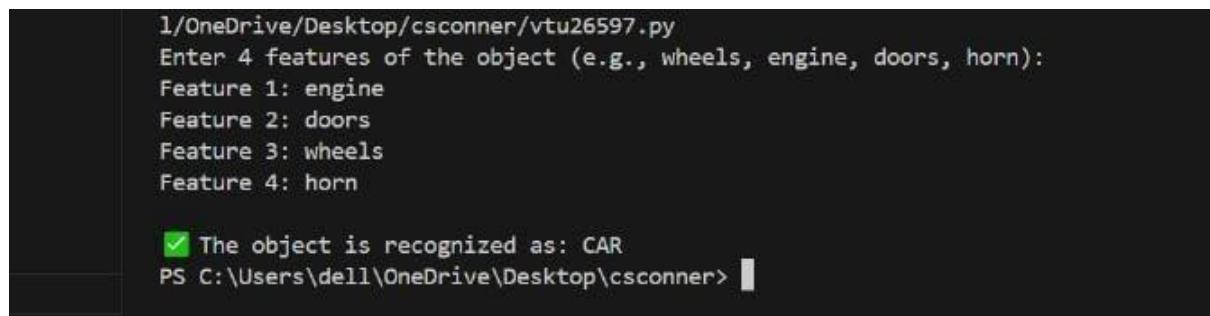
    print(f"\n✓ The object is recognized as: {recognized.upper()}")

else:

    print("\n✗ Object not recognized. Try again with different features.")

```

OUTPUT



```

l/OneDrive/Desktop/csconner/vtu26597.py
Enter 4 features of the object (e.g., wheels, engine, doors, horn):
Feature 1: engine
Feature 2: doors
Feature 3: wheels
Feature 4: horn

✓ The object is recognized as: CAR
PS C:\Users\dell\OneDrive\Desktop\csconner>

```

CONCLUSION

The object recognition system efficiently identifies multiple objects in an image using a pre-trained deep learning model. It demonstrates how artificial intelligence. Future enhancements can include real-time video detection and improved accuracy using advanced neural networks like YOLOv8 or Faster R-CNN.