



Real Time Object Detection and Emotion Detection via Camera using React Native, Python Flask, Coco Dataset and OpenCV



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Abstract

This research project presents a real-time object detection and emotion recognition system implemented through React Native for mobile application development, Python Flask for backend support, and leveraging the Coco dataset and OpenCV for robust and accurate detection. The integration of these technologies enables seamless camera-based object recognition and emotion analysis, offering a versatile and responsive user experience

Introduction

In a world increasingly reliant on visual data, real-time object detection and emotion recognition hold immense potential across various domains, from security surveillance to human-computer interaction. This project harnesses the power of React Native for mobile application development, Python Flask for backend support, and utilizes the Coco dataset and OpenCV to create a robust system capable of accurately identifying objects and detecting emotions through live camera feed. This poster presentation introduces the key components and applications of our innovative system, showcasing its potential to enhance user experiences and provide valuable insights in real-time scenarios.



Future Enhancements

- Integrate AR technology to overlay information or annotations on detected objects, enhancing the user's understanding and interaction with the environment.
- Explore deploying object detection and emotion recognition models as cloud-based APIs for use in other applications, expanding the reach and utility of the technology.

Object and Emotion Detection

Object Detection:

- Coco Dataset:
 - The Coco dataset serves as a foundational element of our object detection system. This dataset is renowned for its rich diversity and contains over 200,000 images across 80 categories. Its extensive and varied content is crucial for training a robust object detection model capable of recognizing a wide range of objects in real-time scenarios.
- OpenCV Integration:
 - OpenCV, or Open Source Computer Vision Library, is a powerful tool that forms the backbone of our real-time object detection system. It provides a comprehensive set of functions for image processing and computer vision tasks.

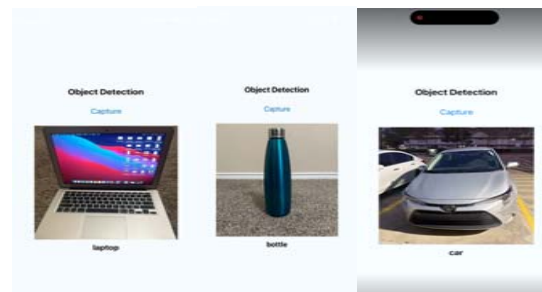
Emotion Detection:

- The core of our emotion detection system is a deep learning model trained to recognize human emotions from images and video frames. We employed a convolutional neural network (CNN) architecture for this purpose.
- The model was trained on a diverse dataset of labeled facial expressions, allowing it to identify a spectrum of emotions, including happiness, sadness, anger, and more.

Camera Integration:

- To capture and analyze user emotions in real-time, we seamlessly integrated the device's camera into our application. This feature enables users to interact naturally with our system without the need for additional sensors or hardware.
- Image frames from the camera are processed on the device, ensuring privacy and real-time responsiveness. Emotion predictions are then displayed to the user or transmitted to the backend for further analysis if needed.

Mobile application for Object detection



Challenges and Solution

- Challenge: Recognizing a wide range of emotions and objects accurately can be challenging due to the complexity of human emotions and the diversity of objects.
- Solution: Continuously expand and diversify the training dataset for emotion recognition. Explore multi-model approaches for object detection to cover a broader spectrum of objects.
- React Native is a popular open-source frontend framework which is used in our project for building cross-platform mobile applications for both iOS and Android platforms. Python Flask serves as the backend of the mobile application and MySQL for storing data in the database.

Conclusion

In conclusion, this project will successfully demonstrate the integration of cutting-edge technologies to create a powerful real-time object detection and emotion recognition system. Our object detection model is trained on the Coco Dataset and powered by OpenCV, showcases accurate and responsive detection capabilities. Additionally, our emotion recognition module will provide a seamless user experience, highlighting the project's potential in various practical applications. As we look ahead, there is immense scope for further enhancements and broader utilization of this technology in diverse domains.

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