NIRF-2024
Engineering Rank Band (151-200)
Pharmacy Rank - 77
Innovation Rank Band (11-50)

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AI-I (AI101B)

Even Semester

Session 2024-25

OBJECT DETECTION IN IMAGES

Submitted By:

Pragya Tiwari	202410116100144
Saurabh Kumar Singh	202410116100189
Rishabh Singh Bhadauriya	202410116100166
Nitin Gangwar	202410116100136

Project Supervisor:

Mrs. Komal Salgotra

INTRODUCTION

AI Object Detection: Unveiling Visual Intelligence

Discover how Python and Google Colab empower object detection.

Explore AI transforming image analysis with machine learning.

IMPORTANCE

Why Object Detection Matters

Industry Impact

Essential for automation in many fields.

Visual Understanding

Enables smart analysis of images and videos.

Growing Market

Projected $38.9B market by 2025.

PROBLEM DEFINITION

Problem Definition

Core Challenge

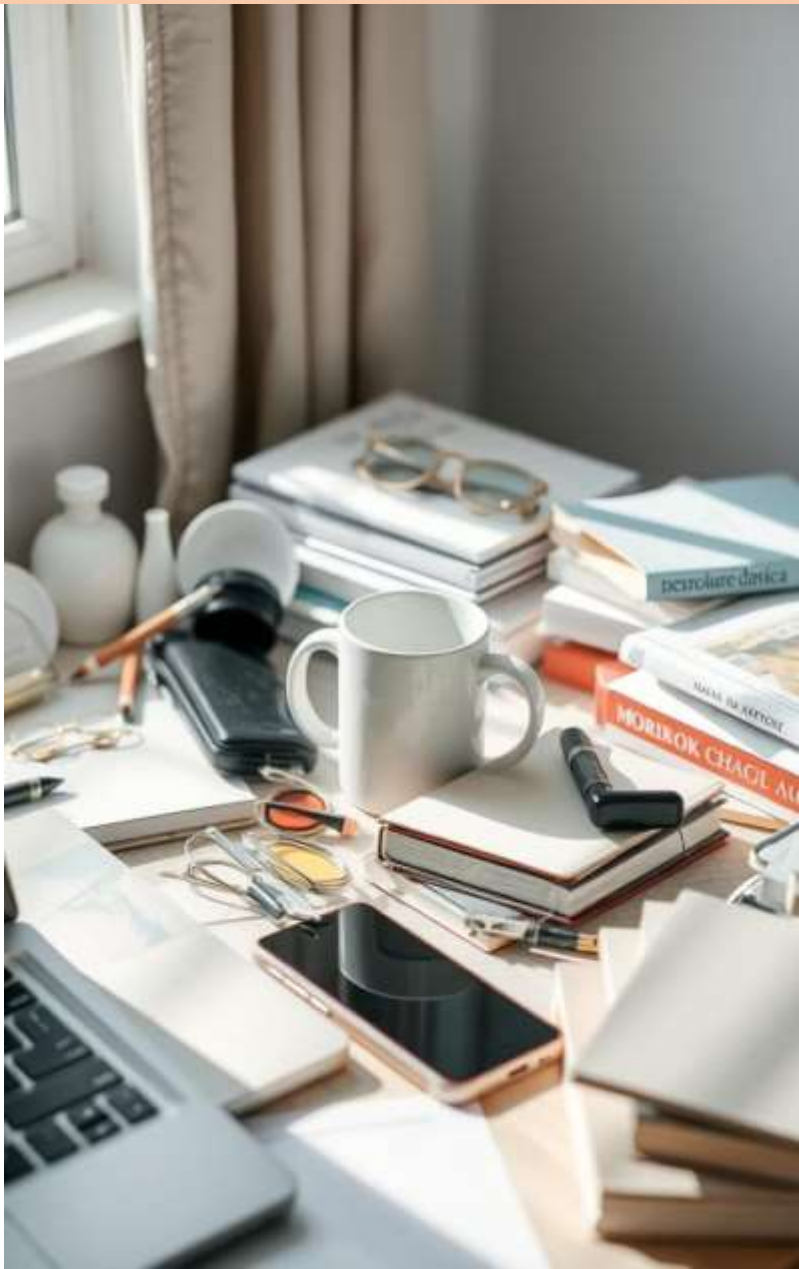
Locate and identify many objects accurately.

Detection Issues

Objects vary in size and blend into backgrounds.

Performance Needs

Real-time and precise detection required.



APPROACH

Algorithmic Approach

1. **Image Preprocessing**
   Prepare images for analysis.
2. **Feature Extraction**
   Identify important patterns and edges.
3. **Region Proposal**
   Suggest areas likely containing objects.
4. **Classification & Refinement**
   Label objects and refine their locations.
5. **Transfer Learning**
   Use pre-trained knowledge to improve accuracy.

CODE IMPLEMENTATION

Implementation Strategy

Development Platform

Google Colab enables easy, online coding.

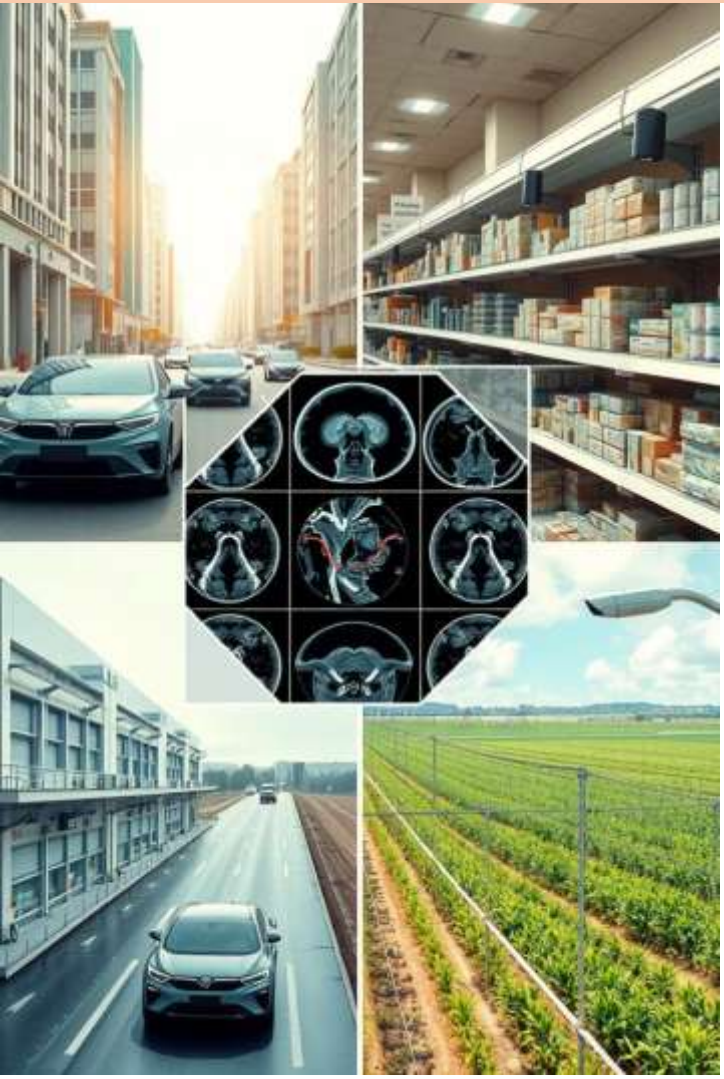
Key Libraries

- TensorFlow
- OpenCV
- NumPy

Models Used

- YOLO
- SSD
- Faster R-CNN

REAL WORLD APPLICATION



Real-World Applications

- Autonomous Vehicles
- Medical Imaging
- Retail Management
- Security Surveillance
- Surveillance & Security
- Smartphones & Apps

CHALLENGES

Challenges and Limitations

Occlusion

Objects may be partially hidden.

Resource Needs

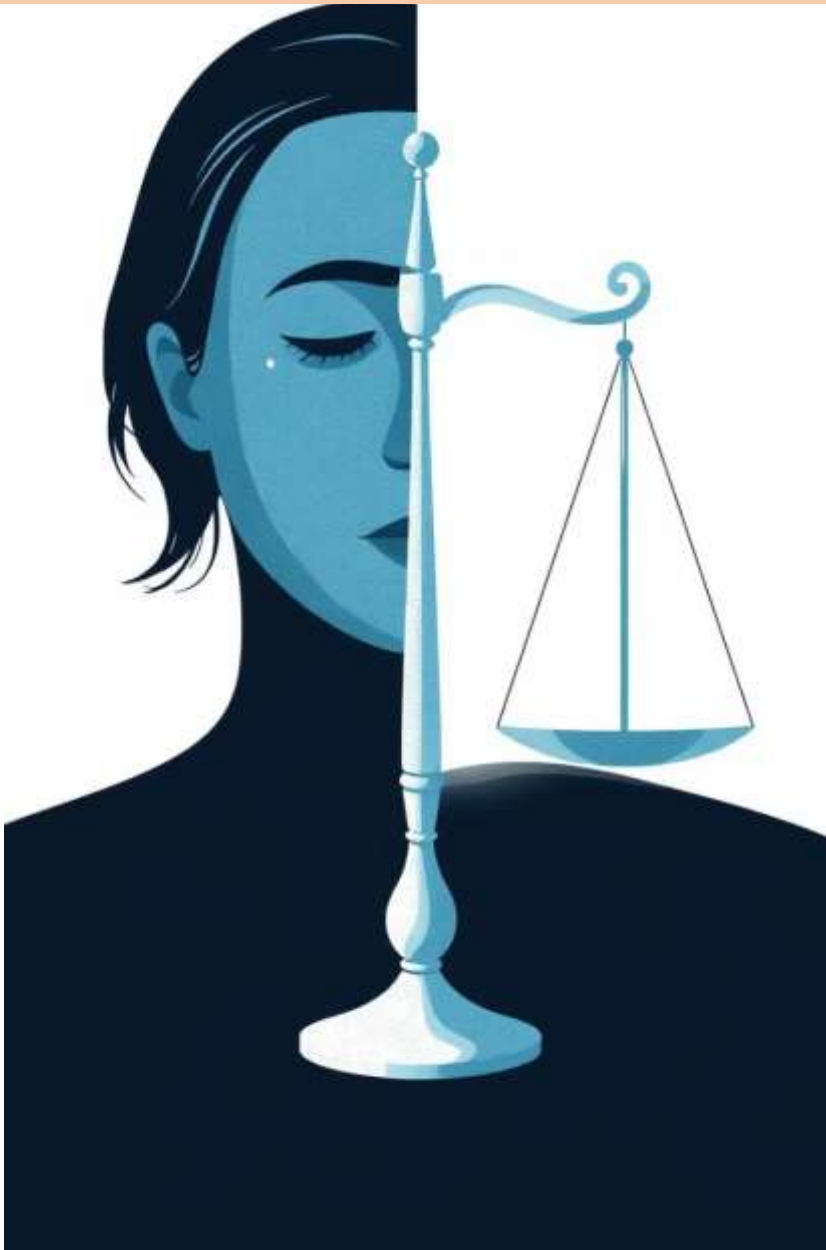
High computing power required.

Data Bias

Training data can be unbalanced.

Variable Performance

Accuracy changes with environment.



CONCLUSION

Future Scope and Conclusion

Advanced Models

More precise and efficient AI systems.

Edge Computing

Perform detection locally on devices.

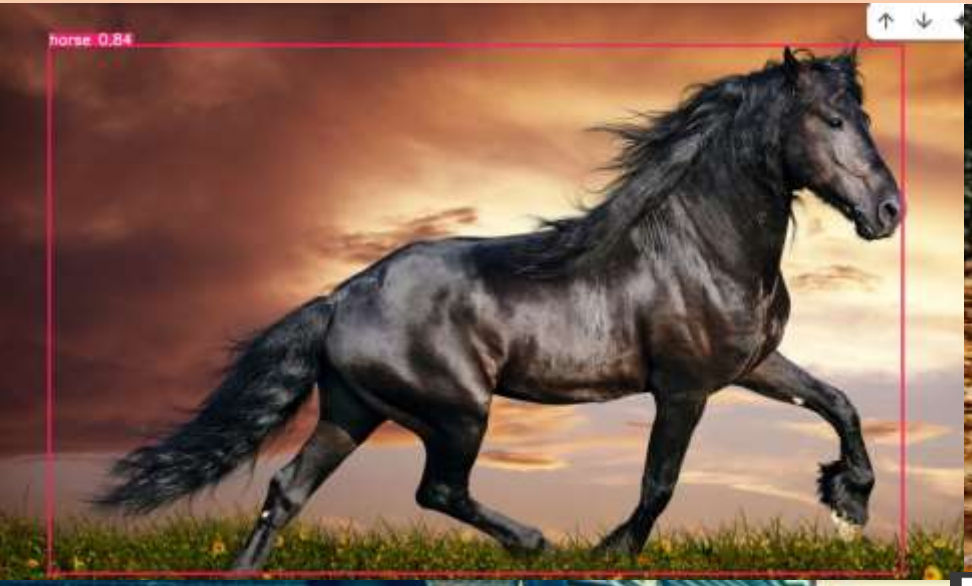
Wider Applications

Adopt AI across new industries.

Continuous Learning

AI models improving over time.

RESULTS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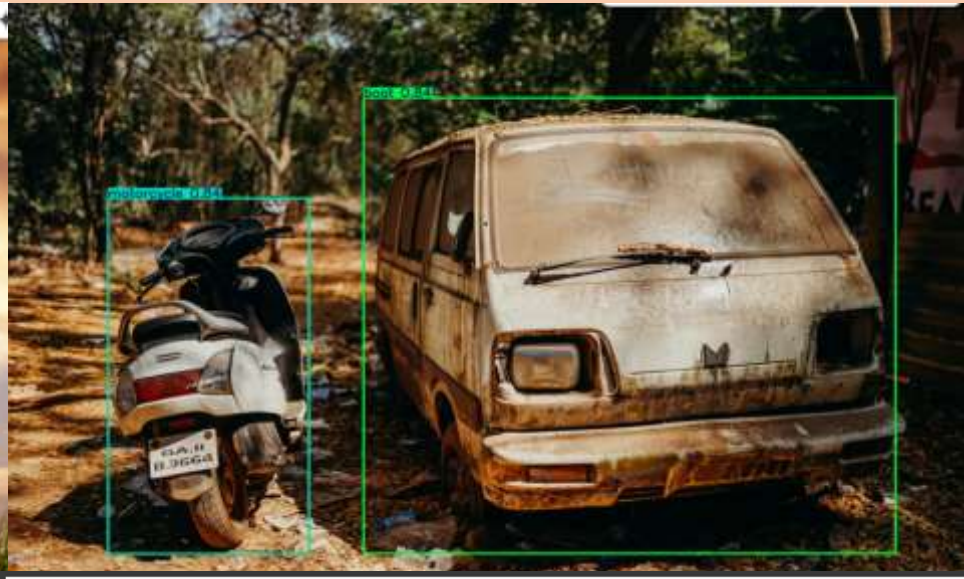

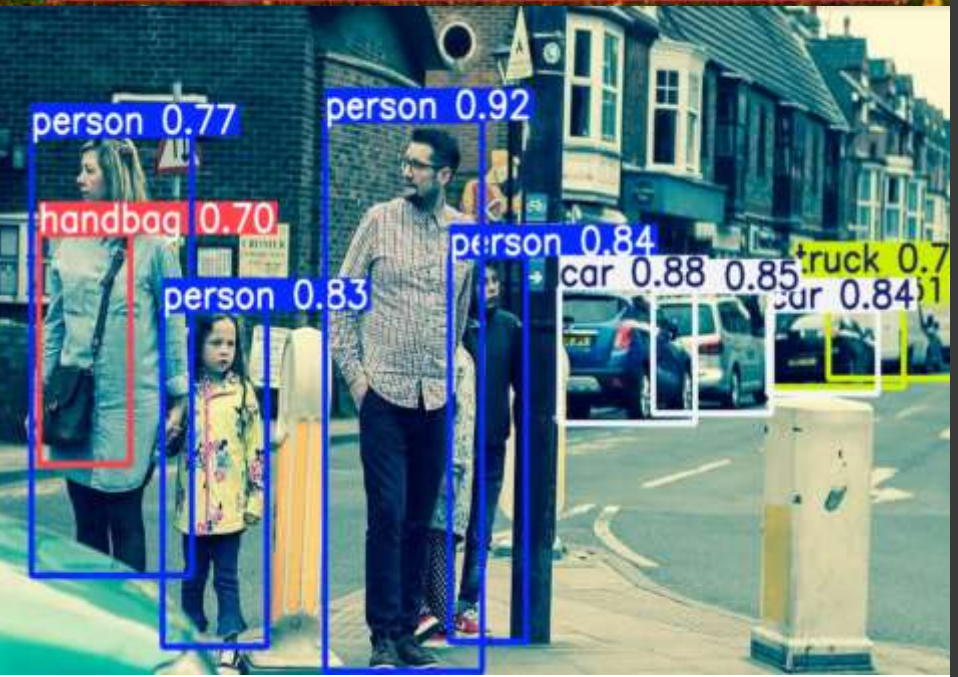
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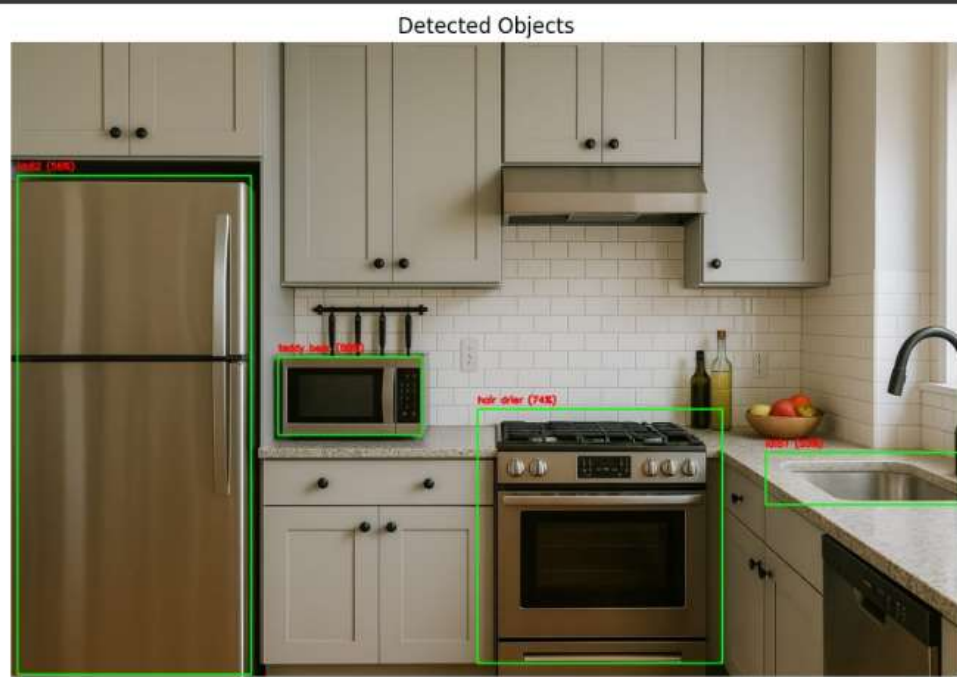
person 0.83
person 0.92
person 0.84
car 0.88 0.85
truck 0.7


Detected Objects

Thank You

Appreciate your time and interest in AI object detection.