



# OmniDetect

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# Introduction

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OMNIDECT IS A REAL-TIME, AI-POWERED IMAGE DETECTION SYSTEM DESIGNED TO IDENTIFY AND CLASSIFY OBJECTS IN IMAGES, VIDEOS, AND LIVE CAMERA FEEDS WITH HIGH ACCURACY.

Built using YOLO (You Only Look Once) for fast deep learning-based detection and Streamlit, OmniDetect offers a visually attractive interface to enhance the user's experience.

This project serves as a versatile tool for developers in prototyping computer vision applications, researchers in testing object detection models, and businesses in automated visual analysis.

The key features of OmniDetect are: General-Purpose object detection (people, cars, animals, and everyday items). It also includes a multi-source input support, image upload and video processing. OmniDetect also includes data export and analytics, JSON/CSV reports Log detected objects with confidence scores. Visual annotations are also shown in results like, bounding boxes, labels, and confidence overlays.

# Benefits of OmniDetect

## HANDS-ON LEARNING PLATFORM

The modular design allows easy experimentation and learning object detection concepts.

## BUSINESSES AND ORGANIZATIONS

Optimal for retail: automated shelf inventory analysis.

Used in manufacturing to detect defects on production lines.

Detection of intruders and security precautions.

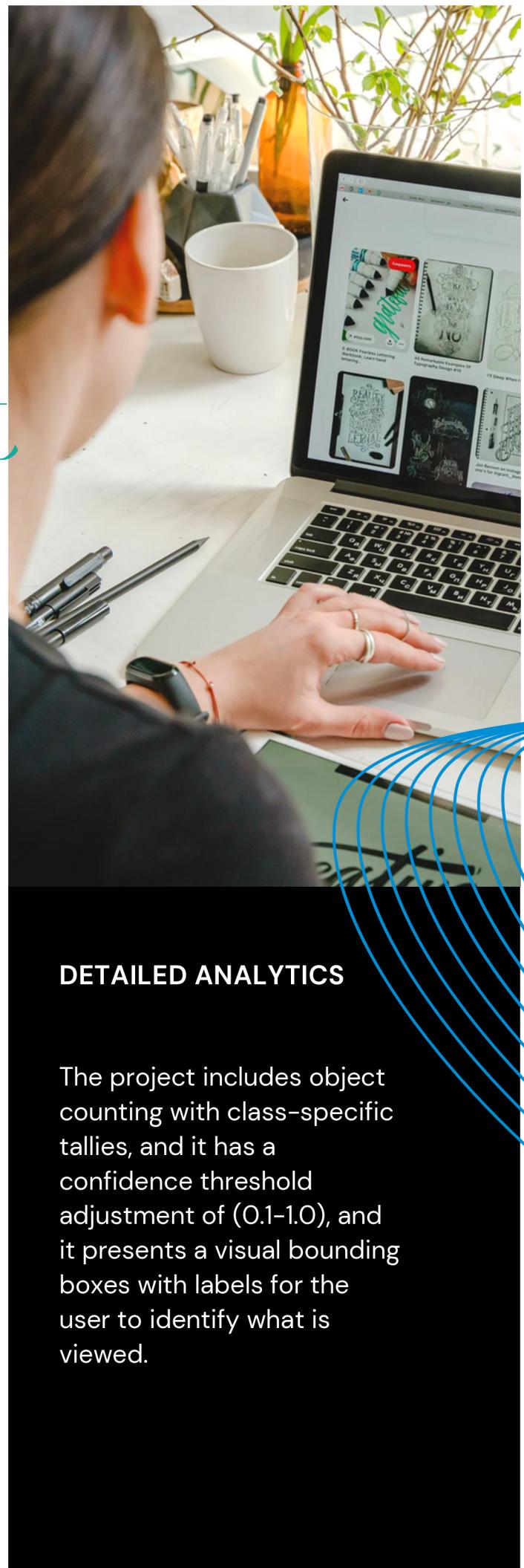
## UI DESIGN

Clean, professional UI with organized layout.

Responsive design that works on desktop and mobile.

DETAILED ANALYTICS

The project includes object counting with class-specific tallies, and it has a confidence threshold adjustment of (0.1-1.0), and it presents a visual bounding boxes with labels for the user to identify what is viewed.



# Code

## 01 Core Config

```
# Initialize YOLO model (Heart of the system)
model = YOLO("yolov8n.pt") # Using nano variant for speed

# Streamlit UI Configuration
st.set_page_config(page_title="YOLOv8 Object Detector", layout="wide")
confidence = st.slider("Confidence Threshold", 0.1, 1.0, 0.25, 0.05)
```

## 02 Image processing Pipeline

```
if uploaded_file:
    image = Image.open(uploaded_file)
    image_np = np.array(image) # Convert to OpenCV format

    # YOLO Detection + Annotation
    results = model(image_np, conf=confidence)
    annotated_rgb = cv2.cvtColor(results[0].plot(), cv2.COLOR_BGR2RGB)

    # Display logic
    col1, col2 = st.columns(2)
    with col1: st.image(image_np, caption="Original")
    with col2: st.image(annotated_rgb, caption="Detected Objects")
```

## 03 Video Processi ng

```
# Video handling with temp files (Robustness)
tfile = tempfile.NamedTemporaryFile(delete=False, suffix='.mp4')
tfile.write(uploaded_video.read())

# Frame-by-frame processing
while cap.isOpened():
    ret, frame = cap.read()
    if not ret: break
    annotated_frame = model(frame, conf=confidence)[0].plot()
    out.write(annotated_frame) # Save annotated frames
```

# Result

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```
# Object counting and classification
names = [model.names[int(cls_id)] for cls_id in boxes.cls.tolist()]
labels_count = {name: names.count(name) for name in set(names)}

# Dynamic reporting
st.success(f"Total Objects: {len(names)}")
for label, freq in labels_count.items():
    st.write(f"- {label.capitalize()}: {freq}x")
```

Demonstrates data extraction from YOLO results

```
# Custom CSS styling
st.markdown("""
<style>
    .title { font-size: 40px; font-weight: 700; }
    .subtitle { color: #6c757d; }
</style>
""", unsafe_allow_html=True)

# LinkedIn integration
st.markdown("""
- [Ibrahim Abou Zahr](linkedin.com/...)
- [Mohamad El Mawed](linkedin.com/...)
""")
```

Professional UI components

# Conclusion

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The OmniDetect project successfully bridges the gap between cutting-edge object detection technology and practical, user-friendly applications. By leveraging YOLOv8's real-time capabilities and Streamlit's intuitive interface, we've created a powerful yet accessible tool that demonstrates several key achievements

As computer vision becomes increasingly vital across industries, tools like OmniDetect play a crucial role in making AI accessible to all skill levels while maintaining professional-grade capabilities. The project serves as both a practical tool and an educational showcase for modern AI implementation best practices.