



# AI Analyzer

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# **Project Overview:**

AI Analyzer is a real-time customer analytics system that uses artificial intelligence to detect and track people in video streams. The application provides valuable insights for businesses by monitoring customer presence through various video sources.

# **Key Features**

## **1. Multi-Source Video Processing**

- Supports multiple video inputs simultaneously:
  - Webcam integration
  - IP camera streams
  - Video file uploads
- Real-time video processing with dynamic stream management

## **2. AI-Powered Detection**

- Uses TensorFlow.js and COCO-SSD model for person detection
- Real-time object detection with confidence threshold of 0.5
- Efficient tracking algorithm with position-based customer identification
- Low-latency processing with 100ms detection interval

## **3. Analytics Dashboard**

- Real-time statistics:
  - Current customer count
  - Total customers detected
  - Average time spent
- Detailed customer tracking:
  - Individual customer IDs
  - Entry/exit timestamps
  - Duration of presence
  - Active/inactive status

## **4. Data Export**

- CSV export functionality

- Includes comprehensive customer data:
  - Customer IDs
  - First seen timestamp
  - Last seen timestamp
  - Time spent
  - Status

## **Technical Architecture**

### Frontend Stack

- React 18.3.1
- TypeScript
- Vite for build tooling
- Tailwind CSS for styling
- Lucide React for icons

### **State Management**

- Zustand for state management
- Two main stores:
  1. CameraStore: Manages video streams
  2. AnalyticsStore: Handles customer tracking and analytics

### **AI Implementation**

- TensorFlow.js for AI processing
- COCO-SSD model for person detection
- Custom tracking algorithm features:
  - Position-based tracking
  - Customer timeout after 2 seconds

- Distance threshold of 100 pixels
- Confidence threshold of 0.5

## **Performance Optimizations**

- WebGL backend for TensorFlow.js
- Chunked build output for better loading:
  - Separate chunks for TensorFlow
  - Separate chunks for COCO-SSD model
- Efficient canvas rendering
- Request animation frame for smooth performance

## **Security Features**

- Secure video stream handling
- Safe data export implementation

## **Code Organization**

**src/**

```
|— components/
| |— Analytics.tsx    # Analytics dashboard
| |— Camera.tsx      # Video processing
| |— ExportData.tsx   # CSV export
| |— VideoSource.tsx  # Stream management
|— store/
|   — index.ts        # State management
|— types/
|   — index.ts         # TypeScript definitions
|— App.tsx            # Main application
```

## Deployment

- Deployed on Netlify
- Demo version URL: <https://zesty-creponne-bfc1f3.netlify.app>
- Build optimizations:
  - ESNext target
  - Manual chunk splitting
  - Dependency optimization

This project demonstrates a production-ready implementation of AI-powered customer analytics, combining modern web technologies with machine learning capabilities in a user-friendly interface.