

# Child Safety Alert System

## User Guide

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## 1. Introduction

The **Child Safety Alert System** is a real-time computer vision application that detects children near potential hazards such as:

- Fire
- Pools
- Roads
- Weapons

Using a YOLO object detection model, it processes video streams and triggers visual alerts whenever a child is detected close to dangerous areas.

## 2. System Requirements

- Operating System: Windows, macOS, or Linux
- Python version: 3.8 or higher
- Recommended Hardware:
  - CPU with at least 4 cores
  - Discrete GPU (optional for faster detection)

## 3. Installation

### Clone the Repository

bash

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```
git clone https://github.com/nikhilnity/child-safety-alert.git  
cd child-safety-alert
```

### Install Dependencies

Install required Python packages:

bash

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```
pip install -r requirements.txt
```

## 4. Configuration

Open the file:

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`child_alert.py`

Edit these variables if needed:

Variable	Description	Default
<code>WEIGHTS</code>	Path to your YOLO model weights	besttop.p t
<code>SRC</code>	Video source: <code>0</code> = webcam, or path to video file	0
<code>IOU_THRESHOLD</code>	Minimum overlap between child and hazard for alert	0.01
<code>ALERT_DURATION</code>	How long to show the alert text (in seconds)	2.0

## 5. Running the Application

### Run with Default Settings

To start the system with your webcam:

```
bash
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python child_alert.py
```

### Run with a Video File

Replace `SRC` in the script:

```
python
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SRC = "your_video_file.mp4"
```

## 6. How It Works

- The application captures video frames.
- YOLO detects objects:
  - Children → Green bounding box
  - Hazards → Red bounding box
- Calculates IoU (Intersection over Union) to check overlap.
- Displays an alert if a child is too close to a hazard.
- Alerts appear as red warning text on the video.

## 7. Customizing Your Model

### Supported Classes

Class ID	Label
0	child
1	fire
2	pool
3	road
4	weapon

### Training a Custom YOLO Model

1. Prepare a dataset labeled with these classes.
2. Train your model:

python

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```
from ultralytics import YOLO
```

```
model = YOLO('yolov8n.pt')
```

```
model.train(data='data.yaml', epochs=100, imgsz=640)
```

```
model.export(format='pt')
```

3. Replace `besttop.pt` in the project with your trained weights.

## 8. File Structure

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```
child-safety-alert/  
├─ child_alert.py  
├─ besttop.pt  
├─ requirements.txt  
├─ README.md  
└─ .gitignore
```

## 9. Troubleshooting

✓ **Problem:** Webcam not working

- Check the value of `SRC` (should be `0` for webcam).
- Ensure your webcam drivers are installed.

✓ **Problem:** Model file too large

- Check if `besttop.pt` is under 100 MB (GitHub limit). Otherwise, use Git LFS or store externally.

✓ **Problem:** “Could not open video source”

- Ensure the video file path is correct.
- Test with your webcam to confirm the script works.

## 10. License

This project is licensed under the MIT License.

## 11. Contact

Created by [Nikhil Gupta](#)

For issues, please open an issue on the [GitHub repository](#).

**End of User Guide**