



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 4, April 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

 ijirset@gmail.com

 www.ijirset.com



Smart Video Surveillance System using YOLO Algorithm

Humera Girkar¹, Moiz Ahmed Khan², Sakshi Shinde³, Himanshi Singh⁴, Rahul Jiwane⁵

U.G. Student, Department of Information Technology, Rajiv Gandhi Institute of Technology (Mumbai University), Mumbai, Maharashtra, India^{1,2,3,4}

Asst. Professor, Department of Information Technology, Rajiv Gandhi Institute of Technology (Mumbai University), Mumbai, Maharashtra, India⁵

ABSTRACT: Smart video surveillance systems have been implemented in numerous settings, such as hospitals, elderly care facilities, and home nursing environments. These systems have the ability to improve situational awareness across various time and space scales. This project utilizes the OpenCV library to capture camera images and detect intrusion through image comparison. Upon detection of an intrusion, the system sends an alert to the administrator, empowering them to take necessary action. By incorporating automatic video analytics, smart surveillance systems can enhance the effectiveness of surveillance measures. This particular system adds automatic identification of person activity to improve the security of hospital surveillance. This feature supplements current video surveillance systems and generates relevant data that can be sent via email alert to the user. Additionally, the system maintains security in a multitude of locations by detecting falls, car crashes, and monitoring social distance.

KEYWORDS: Video Surveillance System, Yolo algorithm

I. INTRODUCTION

In video surveillance, a scene or scenes are observed in search of particular behaviors that are inappropriate or that may signal the onset or presence of improper conduct. Video surveillance is frequently used to keep an eye on people entering sporting events, travelling by public transportation (train stations, air-ports, etc.), and around the perimeter of secure buildings, particularly those that are directly surrounded by public areas.

The video surveillance process includes the identification of areas of concern and the identification of specific cameras or groups of cameras that may be able to view those areas. It is also beneficial to the process if it is possible to pinpoint times of day when security patterns have occurred or may be anticipated to occur. Then, it is feasible to ascertain whether improper conduct is taking place by watching the chosen photographs at the relevant periods.

A multiscale tracking system's purpose is to collect information about objects in the monitored space at multiple scales in a cohesive framework. Traditional video surveillance systems have only an on/off button, resulting in thousands of hours of grainy and usually useless footage. This complicates efficient monitoring, criminal identification, and surveillance.

Smart video can provide the following improvements on previous security monitoring services:

- Tracking a moving target
- Automated audio and visual detection of suspicious activities that can set off alarms and notify property owners of potential dangers.
- High-definition picture quality, as well as night vision technology activated by motion sensors, which means the system isn't functioning while nothing is going on at your site.
- Setting off of alarms, warnings, or other actions, including video recording
- Alerts notifying operators or field personnel



- Camera tampering detection
- Vehicle license plate recognition
- Users may quickly and precisely discover what happened while they were away thanks to enhanced searching, which only shows important events that happened within a certain time window.

In contrast, integrating video to a home security system that supports smartphone control enables homeowners to view real-time audio and visual feeds from within their house at any time.

You may instantly access live video and audio of your home or place of business with the potent mix of video and smartphone management. As criminals become more sophisticated it is important to stay one step ahead with the latest and most sophisticated security technology available.

Video surveillance is frequently used to monitor people entering sporting events, public transportation (train platforms, airports, etc.), and the perimeter of secure institutions, particularly those that are directly bounded by community spaces.

II. EXISTING SYSTEM

Video Surveillance is a very crucial part of our day-to-day life and that being said it is also a very common system that is available or is being used almost everywhere nowadays. There are many systems that include video surveillance with different features. It is used for object detection in live videos also for real time surveillance and monitoring of the surroundings. These systems are mostly used in banks in order to detect if there is any fraud happening within the bank, for safety and security purpose of the customers and the bank. It is also used in buildings, apartments and also roads, etc. to check if there is any crime or an accident that has occurred. There is camera installed in various locations for monitoring a scene for security reasons. These systems are also present in Airport, etc. These Video Surveillance systems are seemed beneficial in various areas and locations making it is a mandatory system to be installed in different places. There are various ways in which these systems are being achieved in real time such as through motion detection in real life, also using Artificial neural networks and also including different ways. Research has said that security can be achieved easily through these systems in real lives.

III. PROPOSED SYSTEM

One of the difficulties that many security systems face is the inability to enable the system to perform certain functions without an operator automatically monitoring the system's progress. People cannot function 24 hours a day. Human operators have a limited amount of time to operate while conscious. People will always require sleep, and even when awake, they cannot sit in one spot for an extended period of time without being distracted. As a result, there are distinct features in multi-camera video systems that can have a significant effect in the security industry. The technological element of the technology is exceptional, and it can help many people overcome security challenges in their everyday lives. It is critical to consider these factors when deciding which sort of security systems to implement. Our method could identify and recognize a human target in videos captured by cameras mounted on the wall to cover a specific region. The proposed method uses CCTV cameras to detect falls, vehicle crashes, and social distancing in real-time. We developed this system using the YOLO (You only look once) algorithm, which suggests the use of an end-to-end neural network that predicts bounding boxes and class probabilities all at once. In contrast to previous object detection algorithms, which repurposed classifiers to perform detection, YOLO suggests the use of an end-to-end neural network that predicts bounding boxes and class probabilities all at once.

Our system is using Two ways to perform detection on videos:
1. YouTube video

The input video is sourced and divided into multiple frames, which are subsequently transformed into black and white. each frame a person/car is detected using YOLO. If the fall is detected or car crash is detected in 20 frames of a video simultaneously then an alert is generated by sending an email to the required person. Then the alert message will be

sent to the authorized person through email.
 2. **Video from Mobile Camera (DroidCam)** - Install the DroidCam app on the mobile phone and connect it to the CCTV camera network. Capture the video footage from the DroidCam app and stream it to the video analytics software. Implement the YOLO algorithm for object detection and recognition on the video footage. If the fall is detected or car crash is detected the system can trigger an alert. Alert message will be sent to the authorized person through email.

IV. METHODOLOGY

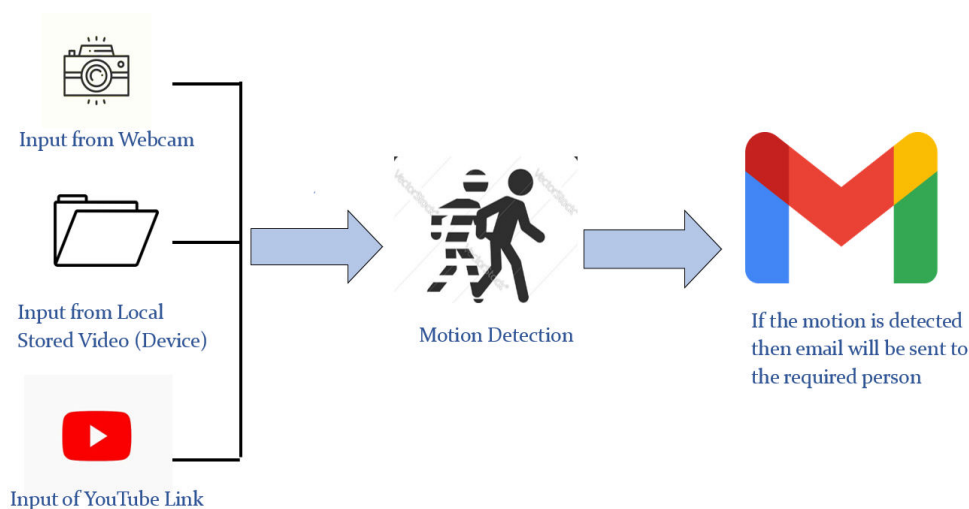


Figure 4.1: Working Model

A smart video surveillance system using YOLO (You Only Look Once) algorithm typically consists of the following components:

- **Video Input:** The system takes in video input from a camera or a pre-recorded video file.
- **Pre-processing:** The input video frames are pre-processed to reduce noise and enhance the quality of the images. This may involve resizing the images, converting to grayscale, or applying filters to remove noise.
- **Object Detection:** YOLO algorithm is used to detect objects in each video frame. YOLO is a real-time object detection system that is known for its speed and accuracy. It works by dividing the image into a grid and predicting the presence of objects within each grid cell. The algorithm outputs the coordinates of bounding boxes that contain the detected objects, as well as the probabilities that the objects belong to different classes.
- **Object Tracking:** The system tracks the detected objects across multiple frames to determine their trajectory and behavior. This is important for identifying suspicious activity.
- **Event Detection:** The system analyzes the object trajectories and behavior to detect events of interest, such as a person falling, a vehicle crash, or a person entering a restricted area.
- **Alert Generation:** When an event of interest is detected, the system generates an alert. This may involve sending an email or SMS message to a designated recipient, sounding an alarm, or triggering an automated response such as locking doors or activating security cameras.



|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204151 |

V. EXPERIMENTAL RESULTS

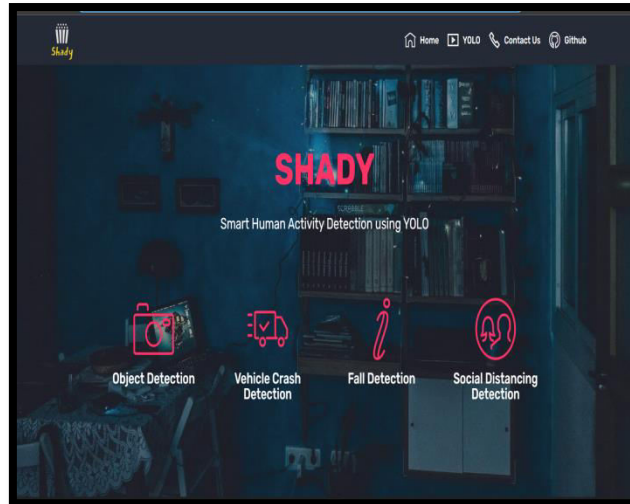


FIG. 5.1 - SHADY HOMEPAGE

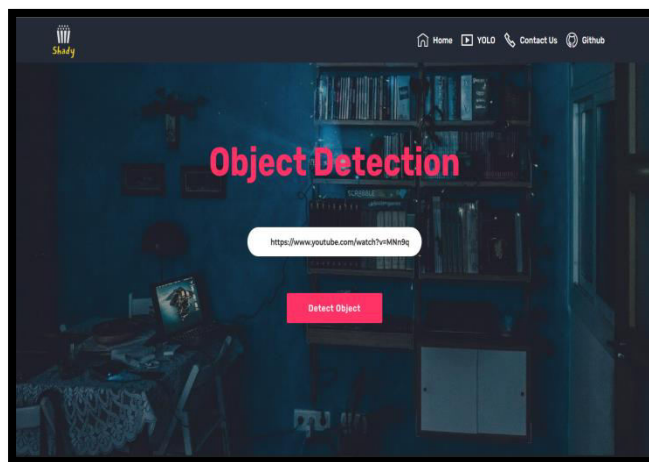


FIG. 5.2 - OBJECT DETECTION PAGE

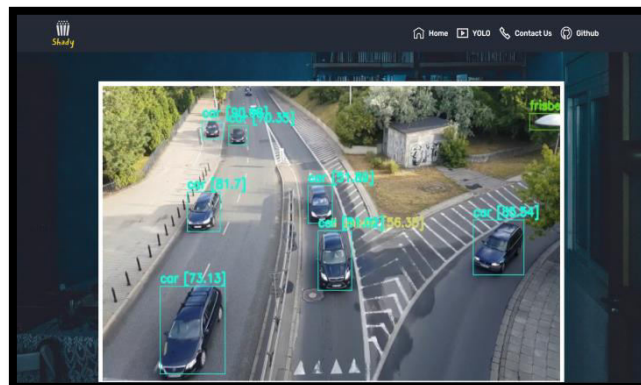


FIG. 5.3 - OBJECT DETECTION RESULT



|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204151 |

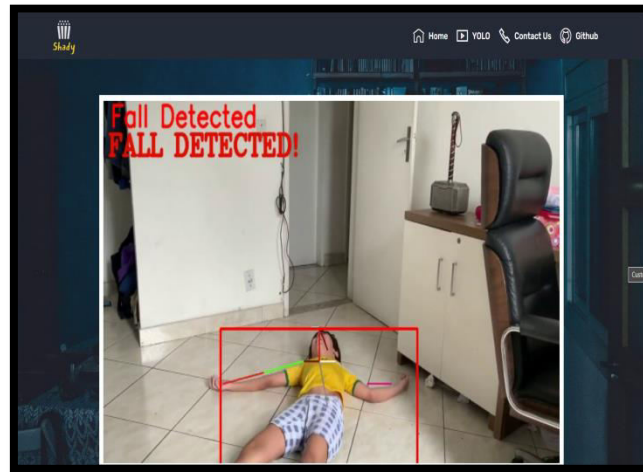


FIG. 5.5 - FALL DETECTION RESULT

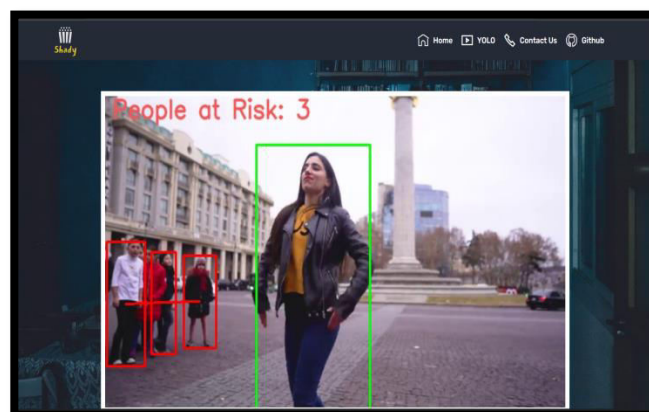


FIG. 5.4 - SOCIAL DISTANCING DETECTION RESULT

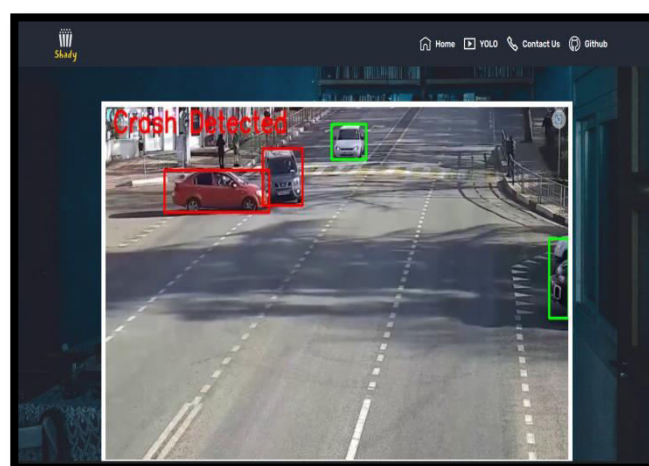


FIG. 5.6 - VEHICLE CRASH DETECTION RESULT



|| Volume 12, Issue 4, April 2023 ||

| DOI:10.15680/IJIRSET.2023.1204151 |

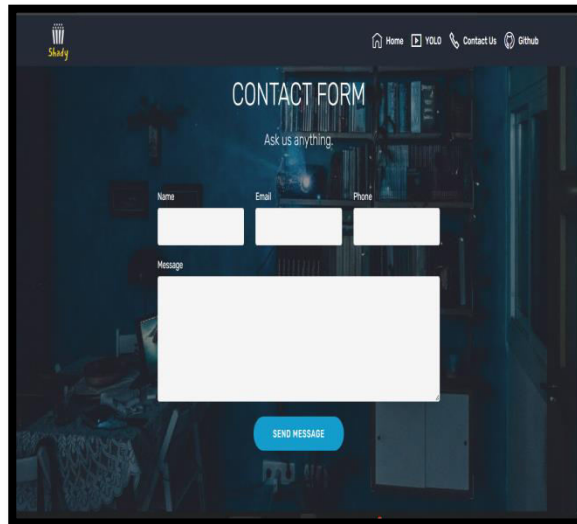


FIG. 5.7 - CONTACT US PAGE

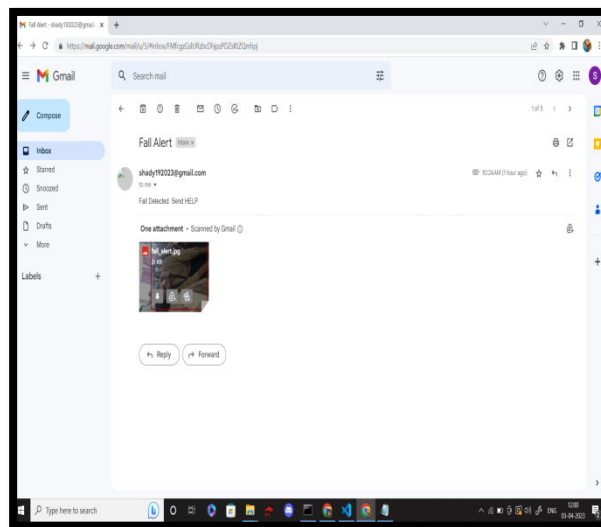


FIG. 5.7 - ALERT NOTIFICATION

VI. FUTURE SCOPE

1. Improve the vehicle crash detection model.
2. Currently the website is deployed locally using flask and uses our own computer's GPU. Using GPU incurs a cost for deploying our website on cloud servers such as Google Cloud and AWS. However, our future objective is to utilize Google cloud's GPUs to deploy our website globally.
3. Calling Notification.
4. Live Video recording.

VII. CONCLUSION

This system analyses the shortcomings of traditional video surveillance systems and designs and proposes a smart video surveillance according to the requirements of intelligence, embeds the smart module in the original system using YO-LO Machine Learning algorithm and improves video surveillance status recognition, defect recognition and



security through neural networks. It also covers various features such as Object Detection, Fall Detection, Car Crash Detection and Social Distancing

REFERENCES

- [1] Chuyuntar Shree, “Intelligent Video Surveillance System based on ANN”, 8, may 2022
- [2] Guru. Sreenal, “Intelligent Video Surveillance: deep learning techniques”, 6, September 2020
- [3] Varshil Shah, Jenil Singh, Farhan Khan, “Intelligent Video Surveillance System, 18, March 2019
- [4] Shahid K.,Krishjain, Deepika Singh, “Fall Detection System”, 31, March2017
- [5] Shubham Singh,Taksh K., Rahul G. “A Smart Surveillance System”, 25, November 2016
- [6] KalpeshL.“ Motion detection in video using surveillance system”,15, April 2020



Impact Factor: 8.423



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details