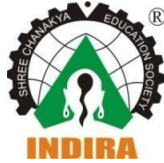# INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Approved By AICTE New Delhi, DTE (MS) and Affiliated to Pune University ( Id-No. PU/PN/Engg/282/2007)



## PROJECT SYNOPSIS

## ON

## Suspicious Activity Detection in Hospital

Submitted

BY

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B.E

IN

COMPUTER ENGINEERING

Project Guide                                      HOD (Comp Engg Dept)

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# 1 AIM

To Enhance Security in the hospital by detecting suspicious activities using IOT and also alert & report authorized personnel about the same .

# 2 INTRODUCTION

Detection of suspicious human activities in automated video surveillance applications is of great practical importance. Trusted classification of suspicious human movements can be very difficult due to the random nature of human movements. The Manual surveillance system is very much dependent on human. It requires manual labor to analyze behavior or to make difference between abnormal and normal behavior. The Semi-automatic system required less human intervention while fully automatic are intelligent and smart video surveillance system which doesn't require human intervention and burden of analyzing the footage to detect unusual activities in a huge set of surveillance footage and make a decision. An automated system is needed which can classify each frame of the video as normal or abnormal and provide the results with the best accuracy. Surveillance cameras have been installed everywhere today. Even though we are able to monitor the activities of the people through those cameras, we may not find the unusual activities directly by looking at them. Hence, we propose an automated system that can detect any unusual activities that happen at any point of time in the surveillance footage. The basic approach of this project is to create a machine learning model which gets trained with the pictures of suspicious activities like people carrying guns or wearing masks, etc. After the model has been properly trained, the video which is to be analyzed is given as the input. The video will get divided into a number of images called frames and these frames will now be analyzed to decide which image contains unusual activities.

# 3 LITERATURE REVIEW

| Sr. No. | Title of Paper | Year | Author | Key Points | Gap Identified |
|---------|---------------|------|--------|-----------|----------------|
| 1 | Suspicious Activity Detection in Surveillance Footage | 2019 | S. Loganathan G.Kariyawasam P. Sumathipala | Real-time abandoned and stolen object detection based on spatio-temporal features in crowded scenes | Rather than safety it was more focused on finding abandoned objects and people with Firearms |
| 2 | Trans Circuit System Video Technology | 2015 | Dimitropoulos K, Barmpoutis P, Grammalidis N | Proposed a method for real time fire detection to model behaviour of fire by using spatio-temporal features like color probability, spatio temporal energy, flickering. | User Have Knowledge About languages and hardware ,Software |
| 3 | Robust abnormal event recognition via motion and shape analysis at ATM installations | 2015 | Tripathi V, Gangodkar D, Latta V, Mittal A | For reducing dimensions PCA was used and for classification SVM was used. | It is more likely that the previous activity pattern ishindered by subsequent activity pattern when the motion is frequent thus causing a |

| | | | | | distorted pattern in low recognition rate. |
|---|---|---|---|---|---|
| 4 | Computer Vision and Image Understanding | 2012 | Wiliem A, Madasu V, Boles W, Yarlagadda P | A suspicious behaviour detection using a context space model for smart surveillance systems. | Time Consuming |
| 5 | Smart Security System for Suspicious Activity Detection in Volatile Areas | 2020 | Joy Iong Zong Chen | Smart Security, Suspicious Activity, Volatile Areas, Motion Sensors, Facial Identification | Device Using High Internet. It is not Live recording utilizing |
| 6 | Sensor-Based Abnormal Human-Activity Detection | 2008 | Jie Yin, Qiang Yang | Activity recognition, outlier detection, sensor networks, data mining. | Cost Sensitive In Nature , Data are inherently unbalanced |
| 7 | SUSPICIOUS ACTIVITIES DETECTION USING VIDEO ANALYSIS | 2021 | 1P. Rajasekhar Reddy,2B. Nirupa, 3Preetham Kumar, 4S. Vaishnavi | Security, automate, machine learning, deep learning. | All Particular Versions Installation Required Need High Internet Connection |
| 8 | Suspicious human | 2018 | Rajesh Kumar | Abandoned object ·Theft detection ·Fall | To develop an intelligent video |

| | | | | detection · Accidents · Violence · Fire detection | surveillance system for the automatic recognition of suspi- cious human activities; there are various issues |
|---|---|---|---|---|---|
| | activity recognition: a review | | | | |
| 9 | IoT based Remote Patient Health Monitoring System | 2010 | Narasimha Rao Jasti Madhu | Remote , Health Monitoring | The scope of the project was limited to ECG, fall, temperature, humidity, pressure, toxic gas, air quality and SPO2 detection and remote viewing of the collected data for a single patient. |
| 10 | Vision-Based Detection of Unusual Patient Activity | | Paulo Vinicius Koerich Borges | Patient Monitoring, Computer Vision | dataset such that a more thorough statistical |
| 11 | Activity Monitoring and Unusual Activity Detection for Elderly | 2020 | Liz George M | Activities of Daily Living (ADL), Support Vector Machine (SVM), Red Green Blue (RGB), Hidden Markov Models (HMM), Sensor of | Many improvements of this new approach are possible. Anomaly detection is an active area of |

| | | | | | |
|---|---|---|---|---|---|
| | Homes | | | Movements (SoM), | current machine learning and data mining research. A |
| 12 | Human Activity Recognition using Computer Vision based Approach – Various Techniques | 2020 | Prarthana T V1, Dr. B G Prasad2 | Human Activity Recognition, HAR, Deep learning, Computer vision | Concurrent activities are activities Not performed by one or multiple individuals at the same time. |
| 13 | A Vision-Based System for In-Bed Posture Tracking | 2015 | Shuangjun Liu and Sarah Ostadabbas | Vrsion Based System,Bed Posture Traking | Need to video capturing devices and under different lighting |
| 14 | Suspicious human activity recognition and alarming system using cnn and lstm algorithm | 2012 | Dr. Keerthika V[1],A Abhiram[2], | Activity Recognition , Deep Learnign | Its not real-time automated machine |
| 15 | Vision-based patient wellness monitoring | 2017 | Sathyanarayana, Supriya | Engineering::Computer science and engineering::Computing methodologies::Image | Some viewing angles may be more or less useful than others depending |

| | | | | |
|---|---|---|---|---|
| using facial cues | | | processing and computer vision | on the captured images. |

# 4 WHY IS THIS PARTICULAR TOPIC IS CHOSEN ?

We believe that this Project will be very helpful in hospital system. It is useful for patients care . An activity is a series of steps taken to achieve a purpose. An individual's "activity" might be a series of subsequent actions or tasks they complete. actions like getting up, looking, and sitting In the past ten years, automated patient monitoring in healthcare settings has drawn more attention. Behavior analysis of psychiatric patients is a significant issue, where good supervision can reduce the risk of injury to hospital personnel, property, and patients themselves. We do a preliminary analysis on visual patient monitoring utilizing security cameras for this assignment. The suggested method identifies risky behavior using statistics of optical flow vectors that were collected from patient motions. To extract the shape and temporal features of blobs, the approach additionally carries out foreground segmentation followed by blob tracking. Self-harm, fighting, and attempting to escape safe rooms are all examples of dangerous behavior.

# 5 OBJECTIVES AND SCOPE OF PROJECT

1. Enhancing the Security at Hospital by detecting any suspicious person while he is doing any suspicious activity like destroying anything or injure someone .

2. Inform the Doctors or nurses that any harm has happened to the patient like if a patient wants to wake and there is no one around and he fells down .

3. During accidental emergency the security is at its lowest at that unauthorized people can also sneak into the hospital with malicious intent so we can detect such people easily .

4. If the patient is alone in his room and any person tries to harm the patient the authorized personal can be alerted .

5. If there is any fight is going on in the hospital it can easily be detected and alert can be sent to security team of hospital .

6. Upgrading the already available security & safety activities by adding IOT to them.

# 6 METHODOLOGY

1. Video recording - Depending on the difficulty of identification of an activity, the availability of resources, and The video is recorded using a camera with the proper resolution for later processing.

2. Segmenting the video so that the region of interest or the presence of people can be seen.

3. Feature extraction is a process in which the necessary features are retrieved from images of people depending on their movement or poses.

4. The retrieved features are represented in this step using feature vectors or feature descriptors.

The phase known as "Feature Extraction" entails the extraction of

characteristics like shape, silhouette, motion data, etc.

Something can be expressed in order to apply the classification algorithm on it. Feature extraction differs depending on the kind of activity recognition method utilized. Two methods can be used to recognize activities:

1. Approach based on motion or trajectory, in which the characteristics represent the motion data of people or things. This strategy was applied in certain research .

2. Pose-based approaches use the human's position as the input for identifying the activity. I applied this strategy in the studies.
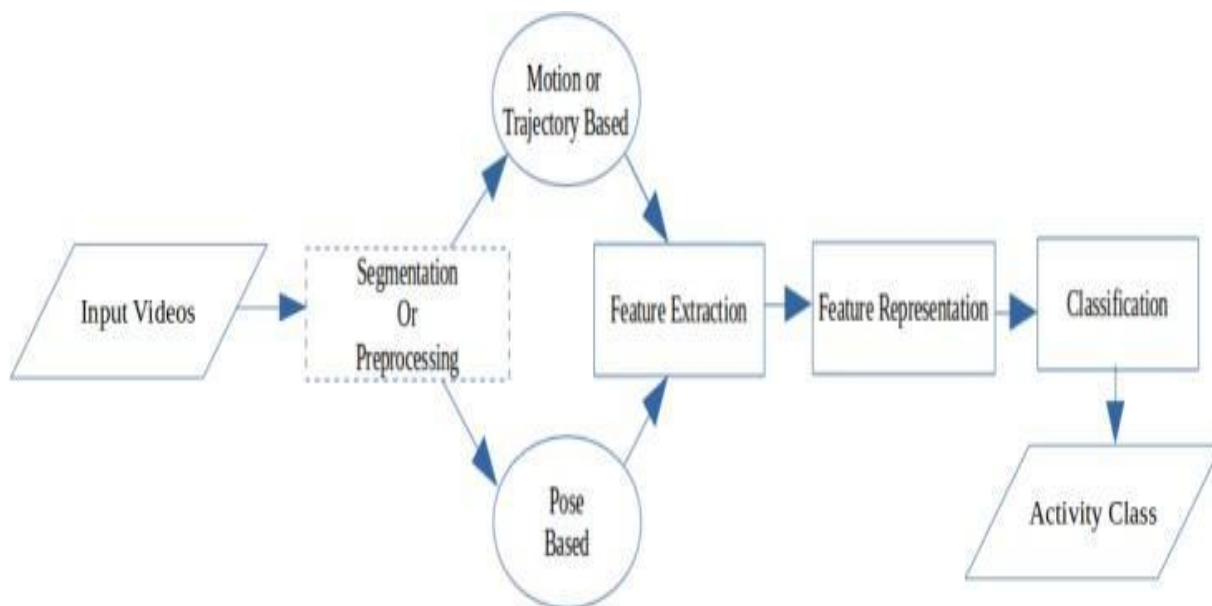
**Block Diagram**



Fig. 1 : flow of activity recognition

# 7 SOFTWARE AND HARDWARE REQUIREMENT

## 7.1 Software requirement:-

| Sr.No. | Software Component | Details(Technical details with Purpose) |
|---|---|---|
| 1 | Operating System | Windows 7 and above |
| 2 | Technology | ML |
| 3 | Tool | PyCharm Community |
| 4 | Database | MySQL |
| 5 | Programming Language | Python |

## 7.2 Hardware requirement:-

| Sr.No. | Component | Details(Technical details with Purpose) |
|---|---|---|
| 1 | Processor | Pentium IV , 2.4 GHZ |
| 2 | Memory | 220 GB |
| 3 | Network Interface | Standard Ethernet |
| 4 | Other (If Required) | 4 GB RAM |

# 8 WHAT THE CONTRIBUTION WOULD THE PROJECT MAKE?

Suspicious human activity recognition from surveillance video is an active research area of image processing and computer vision.

Through the visual surveillance, human activities can be monitored in sensitive and public areas as hospital to prevent terrorism, theft, accidents and fighting, fall detection and other suspicious activities and give patient full safety.

It is very difficult to watch public places continuously, therefore an intelligent video surveillance is required that can monitor the human activities in real-time and categorize them as usual and unusual activities; and can generate an alert.

# 9 LIMITATIONS

- It required internet connection must.
- User must have the knowledge of web based application.
- User must have all required software to run the application.
- Illumination changes : The moving object detection is difficult to process reliably due to dynamic variation in natural scenes such as gradual illumination changes caused by day–night change and sudden illumination variation caused by weather changes.
- Shadow : Shadow changes the appearance of an object, which creates problem to track and detect the particular object from the video. Some of the features such as shape,motion, and background are more sensitive for a shadow
- Noise in the images : Sometimes, waving tree branches creates noises that create the problemat the time of recognition of an object from the video
- Crowds : To detect the object from more crowded area is very challenging task.

# 10 SCHEDULE OF THE PROJECT
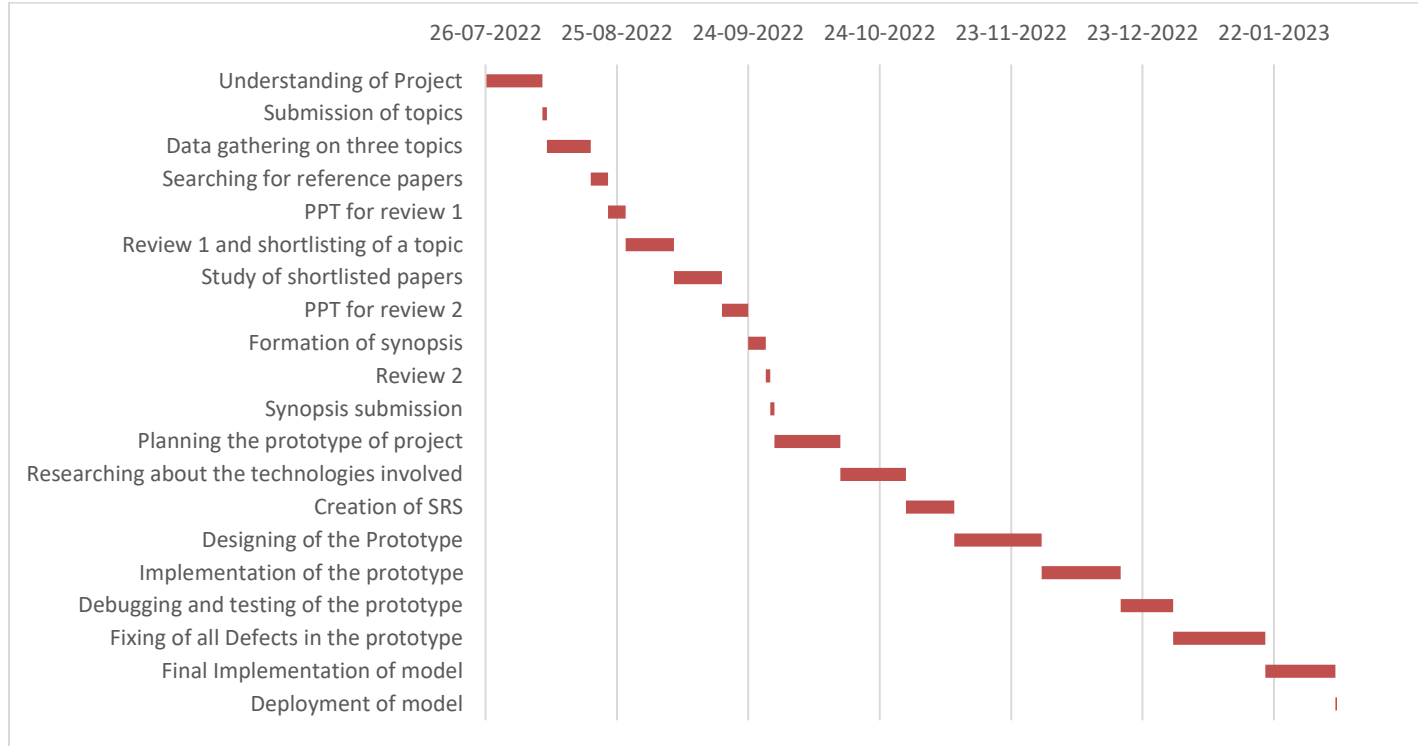


| Task | Start Date | Days to complete |
|---|---|---|
| Understanding of Project | 26-07-2022 | 13 |
| Submission of topics | 08-08-2022 | 1 |
| Data gathering on three topics | 09-08-2022 | 10 |
| Searching for reference papers | 19-08-2022 | 4 |
| PPT for review 1 | 23-08-2022 | 4 |
| Review 1 and shortlisting of a topic | 27-08-2022 | 11 |
| Study of shortlisted papers | 07-09-2022 | 11 |
| PPT for review 2 | 18-09-2022 | 6 |
| Formation of synopsis | 24-09-2022 | 4 |
| Review 2 | 28-09-2022 | 1 |
| Synopsis submission | 29-09-2022 | 1 |
| Planning the prototype of project | 30-09-2022 | 15 |
| Researching about the technologies involved | 15-10-2022 | 15 |
| Creation of SRS | 30-10-2022 | 11 |
| Designing of the Prototype | 10-11-2022 | 20 |
| Implementation of the prototype | 30-11-2022 | 18 |

| | | |
|---|---|---|
| Debugging and testing of the prototype | 18-12-2022 | 12 |
| Fixing of all Defects in the prototype | 30-12-2022 | 21 |
| Final Implementation of model | 20-01-2023 | 16 |
| Deployment of model | 05-02-2023 | 6 |

Our project was initiated on 26th July 2022. We began by performing initial activities of research for finalization of topics, data gathering and searching for reference papers. We then conducted a thorough study of our shortlisted papers in order to develop the Synopsis for our Project.

Subsequent activities will consist of the group members engaging in researching for the technologies required in our project and planning the initial prototype which will ultimately contribute to the creation of SRS [Software Requirements Specification.

After achieving this milestone, we will proceed with the implementation of our prototype. Activities like debugging and test-running of our prototype will be followed by Cross-verification with the existing gaps. These activities will lead us to the final implementation and deployment of our model.

# 11 CONCLUSION

Security could be a very serious concern nowadays and detecting unusual activities in public places in video surveillance requires the constant attention of some or the opposite person which is an impossible task. In the mentioned project, we have put forward a framework for a video analysis tool for suspicious event detection. This tool is designed to reduce the demanding task of manually sorting through hours of surveillance video sequentially to work out if suspicious activity has occurred. We discussed the ideas behind the assorted components of this framework in detail as well as a number of the implementation specifics. This project could help the authorities of surveillances in various fields to detect suspicious activities like robbery, people wearing masks and other people carrying guns; without using man force. Automation of such a task could be a huge savior of your time and may speed up the work of the authority's manifold.

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[3]    Tripathi V, Gangodkar D, Latta V, Mittal A, "Robust abnormal event recognition via motion and shape analysis at ATM installations"For reducing dimensions PCA was used and for classification SVM was used, pp. 20-34 June 2015

[4]    Wiliem A, Madasu V, Boles W, Yarlagadda P, "Computer Vision and Image Understanding", A suspicious behaviour detection using a context space model for smart surveillance systems, pp. 33-44 March 2012

[5]    Joy Iong Zong Chen"Smart Security System for Suspicious Activity Detection in Volatile Areas", Smart Security, Suspicious Activity, Volatile Areas, Motion Sensors, Facial Identification, pp. 21-33 March 2020

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[9]    Narasimha Rao Jasti Madhu, "IoT based Remote Patient Health Monitoring System" Remote , Health Monitoring, pp. 31-44 April 2010

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