**Second Progress Report on**

**Real Time Anomaly Detection in CCTV Surveillance**

**Submitted in the partial fulfilment of the Degree of Bachelor of Technology**

**(Computer Science and Engineering)**

**Submitted by**

**Avdhesh Chaudhary (02315002719)**

**Amar Sinha (04415002719)**

**Chirag Aggarwal (04615002719)**

**Under the supervision of**

**Mr. Vikrant Shokeen**

**(Assistant Professor CSE)**



**Department of Computer Science and Engineering**

**Maharaja Surajmal Institute of Technology Janakpuri, New Delhi.**

**2019-23**

|  |  |  |
| --- | --- | --- |
|  | **INDEX** |  |
| **1. Project Overview** |  | **1** |
| **2. Objectives** |  | **2** |
| **3. Objective Completed** |  | **3** |
| **4. Next Steps** |  | **5** |
| **5. References** |  | **6** |

**Project Overview**

# Anomaly Detection System can be seen as a real time surveillance program designed to automatically detect and account for the signs of threatening activities immediately. We plan to use two Deep Learning models to detect and classify levels of high movement in a video frame. We plan to treat videos as segments and will define Anomalous(threatening) and Normal(safe) segments. From there, a detection alert can be raised in the case of a threat, indicating the suspicious activities at an instance of time. Further, we will recognize the following 12 anomalous activities - Abuse, Burglar, Explosion, Shooting, Fighting, Shoplifting, Road Accidents, Arson, Robbery, Stealing, Assault, and Vandalism. Detecting these anomalies would provide better security to the individuals.

# To solve the above-mentioned problem, we will apply deep learning techniques used which would create phenomenal results in the detection of the activities and their categorization. Here, two Different Neural Networks: CNN and RNN are proposed.

# Objective

# The main objective of our project is to develop real time Anomaly detection in CCTV surveillance.

# *Objectives Pointwise:*

# To reduce probability of error in anomaly detection in CCTV surveillance.

# To reduce time of finding the video segment in which anomalous activities happen by making the process real time.

# To increase accuracy of automatic threat detection in CCTV surveillance.

# To increase the reliability of the system by making it more generalized and training it on 12 anomalous activities videos data.

# To increase operational efficiency.

**Objectives Completed**

# The below Mentioned Objective has been completed:

1. To increase accuracy of automatic threat detection in CCTV surveillance.

The Following tasks are to make this objective completed:

1. **Feeding Feature Maps to Recurrent Neural Network:**

The input of the second neural network is the concatenated collection of highlevel

feature maps generated in the previous step. This network has an LSTM cell with

5,727 neurons in the primary layer. This layer is followed by 2 Hidden layers. The

first hidden layer contains 1,024 neurons with Relu as the activation function while

the following layer has 50 neurons with sigmoid as the activation function. The actual

probabilistic classification of the framework is produced the final layer having

thirteen neurons with softmax as the activation function.

**Next Steps**

The Following steps we are aiming to get Completed till second project Presentation:

1. 2. To create a demonstrable supporting project for the model.

**References**

1. Andrej Karpathy and Lei Fei-Fei. “*Deep Visual-Semantic Alignments for Generating Image Descriptions*”, Department of Computer Science, Stanford University, 2015.
2. Vipin Shukla, Gaurav Kumar Singh and Dr. Pratik Shah. “*Automatic Alert of Security Threat through Video Surveillance System*”, Department of Nuclear Engineering, Department of Electrical Engineering Pandit Deendayal Petroleum University, India, July 2013.
3. Utkarsh Contractor. “*Thread Detection in Surveillance Videos*”, SPARK-AI Summit 2019.
4. Atif Jan and Gul Muhammad Khan. “*Real World malicious event recognition in CCTV recording*”, January 2022.
5. Virender Singh, Swati Singh and Dr. Pooja Gupta. “*Real Time Anomaly Recognition Through CCTV Using Neural Networks*”, 2020.
6. Abdul Jaleel, Syed Khaldoon Khurshid, Rehman Mustafa, Khalid Mehmood Aamir, Madeeha Tahir and Ahmad Ziar. “*Towards Proactive Surveillance through CCTV Cameras under Edge-Computing and Deep Learning*”, March 2022.