Tower Surveillance

Introduction

Telecom towers form an essential part of the communication ecosystem as they are the access points through which a subscriber's Subscriber Identity Module (SIM) Card is connected to the network. Each tower has certain capacity to serve a certain number of subscribers in the defined telecom area. A Telecommunications tower is a first touch point for service and information (signals, calls, data for browsing, etc.) for getting a Mobile service. It sends and receives information to and from **cell** phones.


These towers are electrical as these are needed electricity for broadcasting signals in surrounding area. Therefore, many instruments, gadgets, and devices i.e. batteries are installed always for backup in case of main power shut down. Most of the times, dry batteries are installed and these are very expensive. These batteries and other devices are frequently stolen from tower center where these are installed even in the presence of a security guard. So, telecommunication companies needs an automatic surveillance system which can generate an alarm whenever anyone tries to steel any instrument from tower center.

Solution

We have proposed a solution to this problem using video surveillance system which in turn uses image processing techniques for detection of a person who is steeling an instrument or device from tower center. A video camera will be embedded/installed at each of the tower center and video of each second will be processed by the proposed system and whenever system detects a theft being stealing a device, it generates an alarm. Moreover, it will save images of that specific time of theft

activity in cloud database which can be accessed anytime from anywhere. Our system will be trained to identify between normal activity and stealing activity. This system will be trained using state of the art and well known machine learning techniques and algorithms.
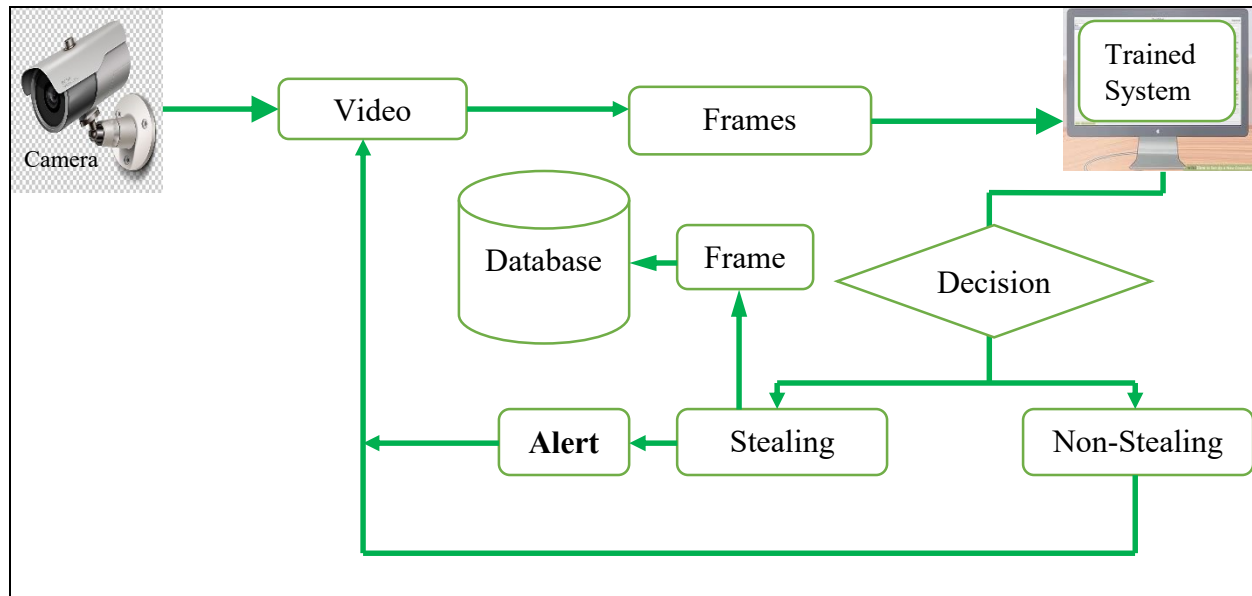
Video taken by the surveillance camera will be processed and each frame of this video will be processed to identify whether there is any unauthentic activity. If any of the frame contains such unauthentic activity, system will generate an alert, so that security personals can take necessary measurements to avoid any loss to tower center.

Working of System

1. In a larger geographical area, there could be many tower stations. On each of the station, we will configure/install a surveillance camera focusing on all the devices, gadgets, and instruments i.e. batteries, signal boosters etc. On each of the station, there will be an intelligent system which will continuously observe and monitor the activities in the station using video taken by surveillance camera using Artificial intelligence.

2. These systems installed at each station will be connected and communicate to main server in case of any abnormal activity. Each frame of video will be processed by the system to check if there is any abnormal activity. In case of finding any abnormal i.e. theft/stealing activity, system at that specific station will generate an alarm and will also communicate this alert to main server. Administration personals i.e. are manager will be connected to

this central server system using mobile app and ultimately he/she will get an alarm on their mobile device about this abnormal activity at any station in area so that, an action can be taken immediately to avoid loss to the station.

3. Each camera will have a unique ID which will be used to get location and other information related to that specific station where the activity has been detected. Moreover, the person who has been involved in malicious activity can immediately be pointed out using images stored in our central cloud database. Relevant security guard will be informed immediately by the system and higher management people as well to keep away from the loss.

Tools and Technology

- **Python** (A Computer language for development of any system)
- **Tensorflow** (A Python library for training of the systems)
- **Keras** (A high level Python library for writing models)
- **OpenCV** (A Python library for processing videos/images)
- **Django** (Python package for web service/app)
- **Java (**For android application development)
- **MySQL** (For databases)