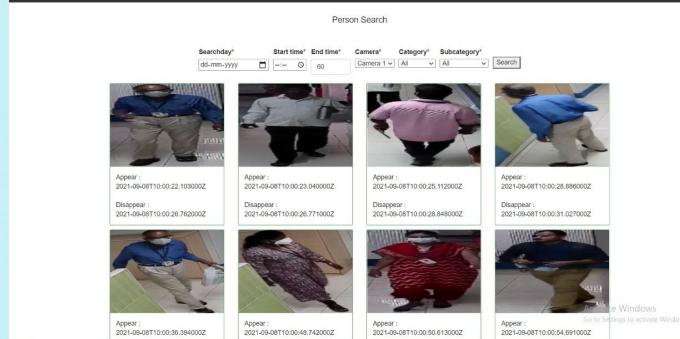




# INTELLIGENT VIDEO SURVEILLANCE AND ANALYTICS System



C-DAC's Intelligent Video Surveillance and Analytics Solution is a Digital Security Enhancer Application, available for monitoring and operating your surveillance system.



## PERSON SEARCH

## Features

- ✓ Face detection and recognition
- ✓ Person distress and theft activities detection from video
- ✓ Crowd abnormality and vehicle accident identification
- ✓ Fire and smoke detection
- ✓ Tracking objects (vehicle, person) in the area of surveillance.



## OBJECT DETECTION

Person/vehicle can be detected in live stream



## LIVE FACE SEARCH

Person can be identified in live stream/Video based on Facial Features



## OCEAN SURVEILLANCE

## FIRE DETECTION

## VEHICLE ACCIDENT DETECTION

## Highlights:

- ✓ 24 \* 7 remote monitoring and recording
- ✓ Cloud based and on-premise surveillance solution which is easily accessible and affordable
- ✓ Easily Scalable
- ✓ Alarm Generation Facility
- ✓ Multi-gpu support
- ✓ Apply video summarization and enhancement at your convenience
- ✓ CUDA/GPU configured video analytics
- ✓ Data is stored in cloud servers
- ✓ Real time analytics

## Prospective Users:

- ✓ Govt Organisations for surveillance purposes.
- ✓ Educational Institutions Museum.
- ✓ Banking And financial Institutions

## Contact US

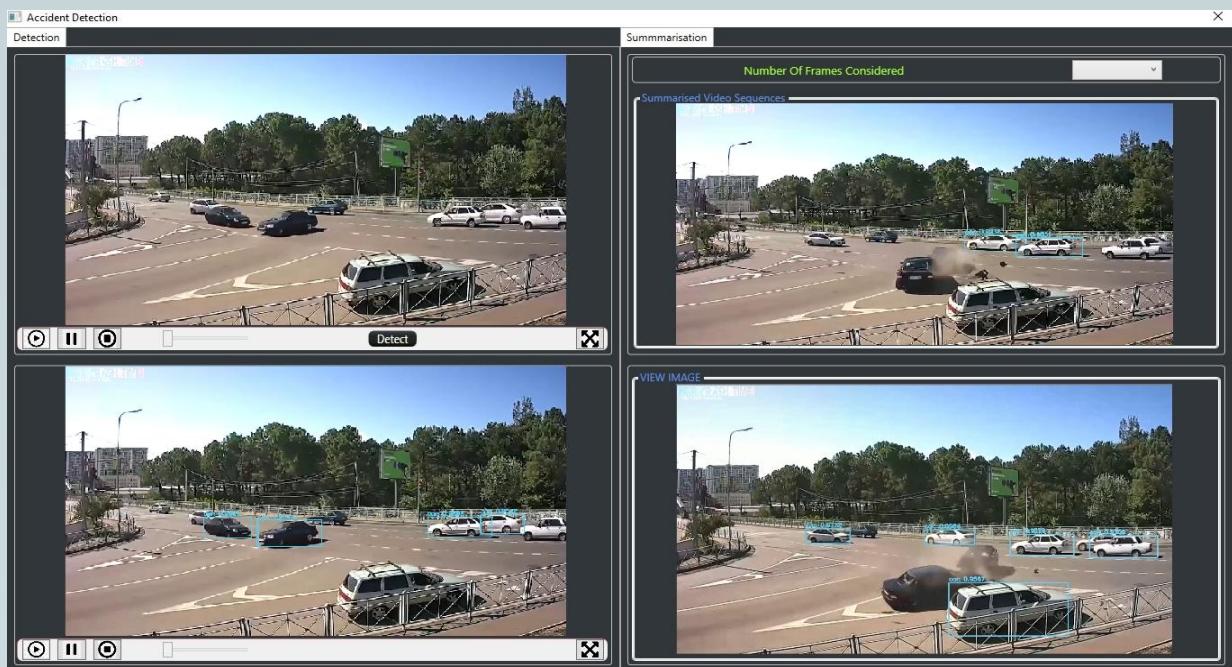
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# VIDEO SUMMARIZATION

## Sub-Module: Vehicle Accident Detection and Summarization

Due to the ever increasing number of vehicles, a significant rise in the number of road accidents has been observed. The video footages so captured are analyzed manually, after the occurrence of an event to get some clues for a case being analyzed. This inhuman effort reduces substantially with real time video summarization, where the supporting thumbnail of the original video replaces the raw data. The resultant video will be short and will contain only those salient frames in which an occurrence of a vehicle accident exists. This summarized short videos will be centrally saved with reduced sizes and can be retrieved in offline mode.



### Features:

- ❖ Vehicle Detection from road surveillance videos
- ❖ Accident Detection of vehicles
- ❖ Key frames generation for an accident event for displaying as multi-frame summary
- ❖ Contextual optimization framework for summarization model
- ❖ A cost function based video summarization of vehicle accidents on roads

### Application Areas:

- Road Surveillance to detect vehicle accidents and summarization
- Traffic management and analytics

### System Requirements:

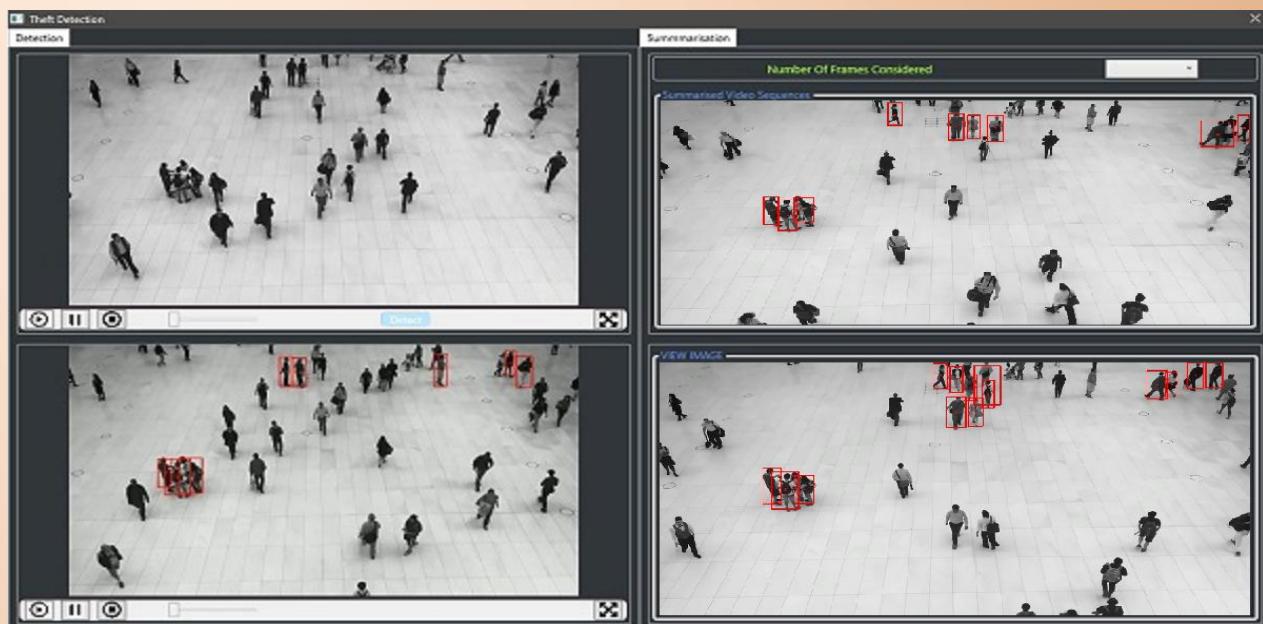
- RAM: Min. requirement is 8GB
- Min. requirement is 20 GB HDD
- Intel Core i5, 8<sup>th</sup> Generation equivalent or higher
- DVD ROM (Installation only).
- Aspect Ratio of Monitor - 16:9
- OS: Microsoft Windows 10

End Users: (a) Law Enforcement Agencies  
(b) Traffic Police

# VIDEO SUMMARIZATION

## *Sub-Module: Theft Detection and Summarization*

Theft is one of the most common and oldest criminal behaviors and it is increasing day by day. Theft/snatching in roads and in public places like shopping mall etc. has shown an increase trend in occurrence. These are analyzed manually, after the occurrence of a theft/snatch event to get some clues for a case being analyzed. This inhuman effort reduces substantially with real time video summarization, where the supporting thumbnail of the original video replaces the raw data. The resultant video will be short and will contain only those salient frames in which a predefined motion of human being will exist. This summarized short video will be centrally saved to be easily used for manual inspection and retrieved if needed by utilizing the time stamping, which can be performed in offline mode. Metadata of the videos will be used along with long-term trajectories as features, for generating summaries of video shots.



### Features:

- ❖ Human Detection from surveillance videos
- ❖ Social Distancing violation detection
- ❖ Theft/Snatch Detection
- ❖ Key frames generation for a theft event for displaying as multi-frame summary
- ❖ Automated site-wide tracking for each person via network of cameras
- ❖ Modeling person related theft and tracking for summarization from the action videos

### Application Areas:

- Video Surveillance of any individual performing theft/snatch activities
- Social Distancing Measure

### System Requirements:

- ✓ RAM: Min. requirement is 8GB
- ✓ Min. requirement is 20 GB HDD
- ✓ Intel Core i5, 8<sup>th</sup> Generation equivalent or higher
- ✓ DVD ROM (Installation only).
- ✓ Aspect Ratio of Monitor - 16:9
- ✓ OS: Microsoft Windows 10

**End Users:** (a) Law Enforcement Agencies  
(b) Shopping Malls/Retail Chains/Departmental Stores and any public places.

# VIDEO SUMMARIZATION

## Sub-Module: Person Satisfaction/Distress Detection

Access to technology, control of it and the ability to create and shape it, is a fundamental issue to enhancing the safety and security on roads especially of women in distress. Again evaluating customer satisfaction from the perspective of companies in comparison with the perspective of the customers themselves helps in the company's performance. For these missions centralized preservation and processing of CCTV footage leads to huge amounts of data being gathered. They are analyzed manually, after the occurrence of an event to get some clues for a case being analyzed or analysis to improve performance. This inhuman effort reduces substantially with real time video summarization, where the supporting thumbnail of the original video replaces the raw data. The resultant video will be short and will contain only those salient frames in which a predefined motion of the human being along with facial expression if it exists. This summarized short video will be centrally saved to be easily used for manual inspection and retrieved if needed by utilizing the time stamping, which can be performed in offline mode.



### Features:

- ❖ Person Detection from surveillance videos
- ❖ Face Detection with Mask and No-mask
- ❖ Emotion Detection(Satisfied/Distress) from faces having mask or no mask
- ❖ Key frames will be generated and displayed as multi-frame summary
- ❖ Facial expression recognition system for measuring customer satisfaction measurement
- ❖ Video summarization module based on pleasant/unpleasant experiences by customer

### Application Areas:

- Customer pleasant/unpleasant detection at Retail Store, shopping mall, supermarket. etc.
- Persons satisfaction/distress detection on road and other public places.

### System Requirements:

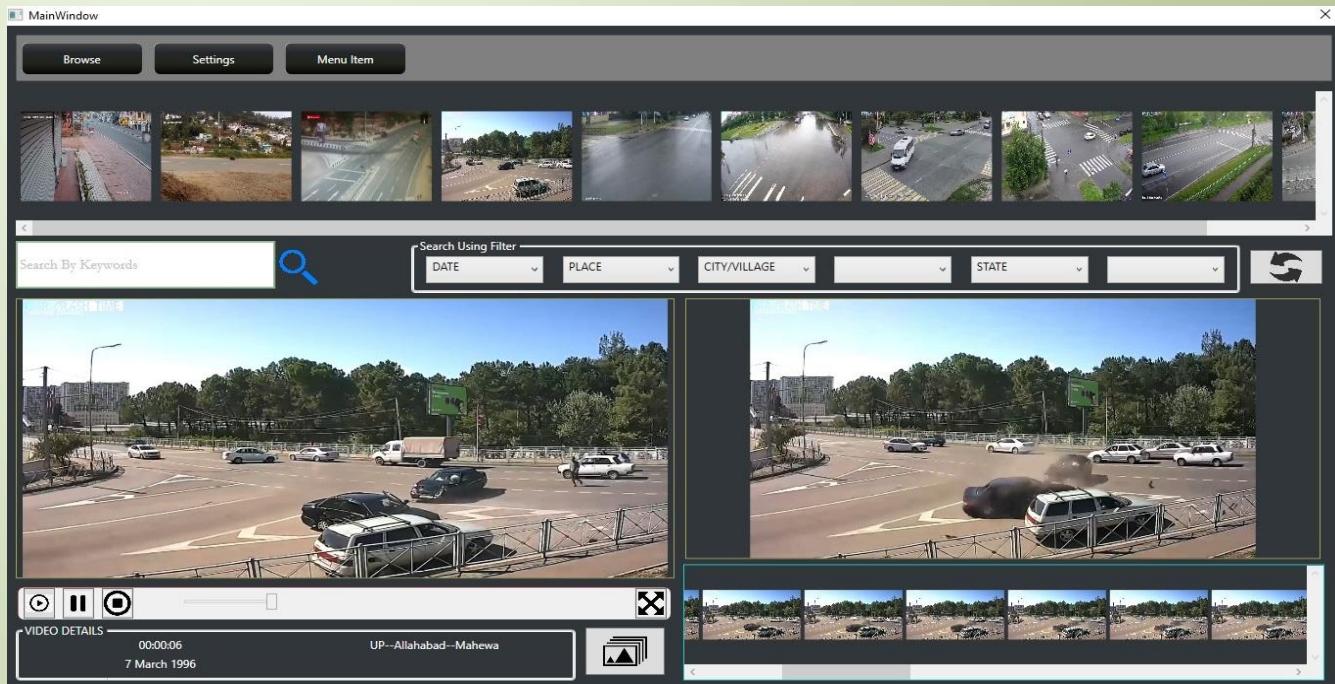
- RAM: Min. requirement is 8GB
- Min. requirement is 20 GB HDD
- Intel Core i5, 8<sup>th</sup> Generation equivalent or higher
- DVD ROM (Installation only).
- Aspect Ratio of Monitor - 16:9
- OS: Microsoft Windows 10

**End Users:** (a) Law Enforcement Agencies  
(b) Retail Stores, Shopping Malls, Supermarkets. etc  
(c) Public places

# VIDEO SUMMARIZATION

## Sub-Module: Hierarchical Search of the Summarized Videos

For security/surveillance missions, centralized preservation and processing of CCTV footage is undergone with huge amounts of data being gathered. These video footages occupies huge space in the DVR/NVR and are replaced every fortnight. Video Summarization leads to creation of short videos which will be centrally saved to be easily used for manual inspection and referred back to the original video if needed by utilizing the time stamping, which can be performed in offline mode. Also video summarization is a significant scheme to organize massive video data, and implement a meaningful rapid navigation of video. Here hierarchical video summarization strategy explores video content structure to provide the users with a scalable, multilevel video summary.



### Features:

- ❖ Search module for a part of video of interest from events (Vehicle Accident, Theft and Person satisfaction/Distress) Detection based on the meta information of the summarized video
- ❖ Video browsing technique much closer to what we experience with image browsing
- ❖ A hierarchical searching technique based on combination of metadata as well as salient visual features to enhance the accuracy
- ❖ Viewing frame by frame of the selected video for analysis

### Application Areas:

- Searching summarized videos quicker for events like (Vehicle Accident, Theft and Person satisfaction/Distress) Detection
- Browsing technique of the above events much closer to what we experience with image browsing.

### System Requirements:

- RAM: Min. requirement is 8GB
- Min. requirement is 20 GB HDD
- Intel Core i5, 8<sup>th</sup> Generation equivalent or higher
- DVD ROM (Installation only).
- Aspect Ratio of Monitor - 16:9
- OS: Microsoft Windows 10

- End Users: (a) Law Enforcement Agencies.  
(b) Traffic Police  
(c) Shopping Malls/Retail Chains/Departmental Stores and any public places

# OCEAN SURVEILLANCE SYSTEM



An Artificial Intelligence Engine that facilitates object detection and tracking in ocean surveillance videos from the cameras mounted on the buoys deployed in the ocean.

## FEATURES

- # Following objects can be detected:  
Boat, Buoy, Ship, Person, Shore port, Light spot, Fish and Birds.
- # Trajectory analysis for moving objects like boats and ships.
- # Gives the collective and the individual count for the objects under tracking.
- # Enables rapid object search along with the metadata information like first and last appearance time, buoy id, camera id and object name.



\* Video input courtesy: National Institute of Ocean Technology (NIOT)



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# NEXT GENERATION PERSON SEARCH

- # An analytical engine to perform rapid search of suspect/missing person of interest in surveillance videos.
- # The person is searched given the description like time, direction of movement, gender, age and the colour and type of their dress.

## Applications :

- # Faster post-event investigation
- # Enable missing person identification

## Targeted places for deployment :

Bus terminus, Malls, Railway stations, Airports, Museums, Temples, etc.

The screenshot shows a user interface for 'Next Generation Person Search'. At the top, there are navigation links for 'Home', 'irene', and 'Logout'. Below that is a search bar with fields for 'Searchday\*', 'Start time\*', 'Duration\*', 'Camera\*', 'Category\*', and 'Subcategoryvalue\*'. The search parameters shown are: Date: 2021-03-29, Start Time: 10:00, End Time: 11:00, Camera Source: cam\_1, Category: All, Subcategory: All. The search button is labeled 'QSearch'. Below the search bar is a grid of 30 small surveillance camera frames showing various people in different environments. To the right of the grid is a large orange icon containing a play button and a magnifying glass, representing the search function.

## KEY FEATURES

- # Real time analytics
- # Advanced deep learning technology
- # Product based or Service based
- # Privacy protection enabled
- # Seamless integration with third party devices
- # Supports surveillance on the go: anytime, anywhere access



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# Abnormal Crowd Detection

The purpose of this system is to perform abnormal crowd event detection in CCTV/video stream. The aim is to bring the intelligence of detecting and reporting any unusual crowd activity in near real time from video streams. This will help in faster detecting and reporting of unusual crowd activities happening in front of CCTV/video cameras. The system uses latest AI/ML algorithms for video processing.



## Features

- Processes CCTV/Video feeds and report any unusual crowd activity.
- Key frames having abnormal activity are saved for future reference.
- Multiple cameras processing supported in real time.
- Uses state of the art AI/ML algorithms for video processing.
- Web APIs available for integration to existing systems.
- Web portal available to monitor the processed video feeds.
- User's privacy (in camera's view) protected.

## Target Users

**Law Enforcement Agencies/Armed forces/Shopping Malls/Public places.**

## Potential Applications

Fairs/Melas, Rallies.  
Social and religious  
gatherings.  
Public Places like,  
Railwaystation, bus station,  
Malls,markets, etc.

## System Requirements

- ❖ Intel Core i5, 8th Generation equivalent or higher
- ❖ RAM: Min. requirement is 16 GB
- ❖ Graphics card / GPU Processor (NVIDIA recommended)
- ❖ OS: Linux Ubuntu 18.04 and higher
- ❖ CCTV Camera (min. Resolution 2MP recommended)
- ❖ High speed connection between camera and server

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## प्रगत संगणन विकास केन्द्र

## CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

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Scientific Society of the Ministry of Electronics & Information Technology, Government of India

Plot No. 6 & 7, Hardware Park, Sy No. 1/1, Srisailam Highway,

Pahadi Shareef Via (Keshavagiri Post), Hyderabad - 501510, Telangana (India).

# Fire and Smoke Detection



Our system performs Fire and Smoke detection on CCTV/ video feeds. Our system fulfills the requirement of early-warning fire detection at lower cost, as compared to the traditional sensor based systems. If any fire and smoke event happens in the video, the system will detect its presence and do immediate reporting. The system uses latest AI/ML algorithms for video processing.



## Features

- Processes (CCTV) video feeds and reports any Fire and Smoke event.
- Key frames having fire or smoke are saved for future reference.
- Multiple cameras processing supported in real time.
- Uses state of the art AI/ML algorithms for video processing.
- Web APIs available for integration to existing systems.
- Web portal available to monitor the processed video feeds.
- User's privacy (in camera's view) protected.

## Target Users

Law Enforcement Agencies / Manufacturing plants & Petroleum Refineries / Shopping Malls / Public places.

## Potential Applications

Commercial and residential Buildings.

Street and public places.

Areas prone to fire accidents.

## System Requirements

- Intel Core i5, 8th Generation equivalent or higher
- RAM: Min. requirement is 16 GB
- Min. requirement is 1TB HDD
- Graphics card / GPU Processor(NVIDIA recommended)
- OS: Linux Ubuntu 18.04 and higher
- CCTV Camera(min. Resolution 2MP recommended )
- High speed internet connection to camera and server.

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