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CRIME PREDICTION USING MACHINE LEARNING

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Abstract –

This System strives for the detection of real-world anomalies such as burglaries and assaults in surveillance videos. Although anomalies are generally local, as they happen in a limited portion of the frame, none of the previous works on the subject has ever studied the contribution of locality. Identification is the act of identifying a person. It means determination of individuality of a person. Concerning about different city, the department of Police is the major organization of preventing crimes. Police stations utilize paper-based information storing systems and they don't employ computer based applications up to a great extent. Due to this utilization of paper-based systems police officers have to spend a lot of time as well as man power to analyse existing criminal crime information and to identify suspects for crime incidents. So the requirement of an efficient way for criminal identification as well as crime investigation has arisen. Image processing with the help of machine learning practices is one aspect of criminal identification.

In this work, we explore the impact of considering spatio-temporal tubes instead of whole-frame video segments. For this purpose, we enrich existing surveillance videos with spatial and temporal annotations: it is the first dataset for criminal identification and crime scene detection with bounding box supervision in both its train and test set. Our experiments show that a network trained with spatio-temporal tubes performs better than its analogous model trained with whole-frame videos. In addition, we discover that the locality is robust to different kinds of errors in the extraction phase at test time. Finally, we demonstrate that our network can provide spatio-temporal proposals for unseen surveillance videos leveraging only video-level labels. By doing, we enlarge our spatio-temporal crime scene dataset without the need for further human labelling.

Keywords – K-Nearest Neighbor Support, Vector Machine Autoregressive moving average, recurrent neural network, Recursive Feature Elimination, National Crime Records Bureau

1. Introduction –

1.1 Crimes all over the world are the significant threat to the humankind. Crimes happens at a regular interval of time around the globe. It is spreading and increasing at a fast and vast rate. Crimes are evident in a small village maybe a town or big cities. Crimes are of different type – murder, rape, robbery, assault, false imprisonment, homicide, kidnapping, etc. With increasing rates of crime there is a need to solve these cases in a much faster way. It is the responsibility of police department to control and reduce the crime activities. Crime prediction and criminal identification are the major problems to the police department as there are tremendous amount of crime data that exist and thus there is a need of technology which aids in the solving of cases in a much faster way.

1.2 The above problem made us to make a research about how solving a crime case can be made easier. Through many documentation and previous researches, we came to a conclusion that machine learning and data science can make the work easier and faster.

1.3 The aim of this project is to make crime prediction using different features present in the dataset we extracted from the official sites. With the help of machine learning algorithm, and python as core we can predict the type of crime which will occur in a particular area.

1.4 Our objective here would be to train a model for prediction. The training will be done using a training data set which we will test using our test dataset. We will build the model using better and more accurate algorithms. The Convolutional Neural Network and Naive Bayes Classifier algorithms will be used for crime prediction. Visualization of the dataset is done to analyse the crimes which may occur in the country. This will help the law enforcement agencies to predict and detect crimes with improved accuracy and thus help reduce the crime rate.

2. Proposed Methodology –

2.1. Pre processing:

Given a visual input (image), illumination normalization, registration and alignment be- tween the image sequences, and face detection are typical required preprocessing steps. Other types of signals, such as speech or physiological recordings, may also need pre- processing, such as segmentation. The most popular algorithm for face detection has been proposed by Viola and Jones. Some off-the-shelf facial expression analysis appli- cations have also been used widely as preprocessing tools, enabling researchers to focus on deriving high level information.

2.2. Manipulation:

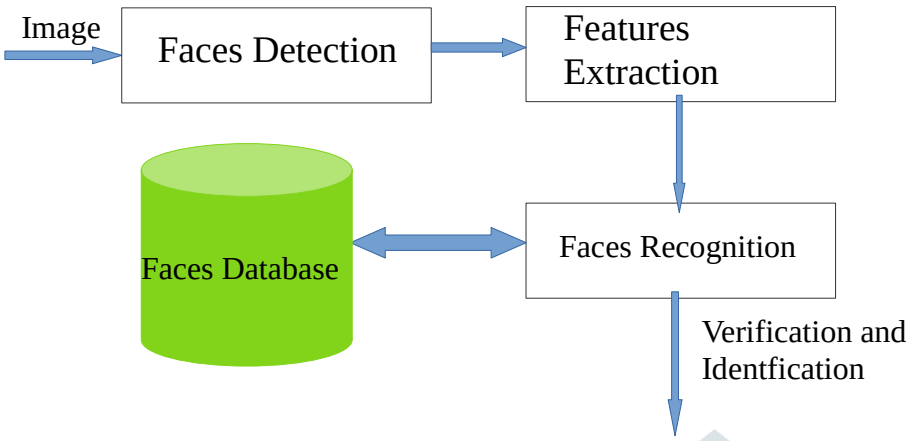
This Subsection describes processes involved in feature extraction, dimensionality reduc- tion, and fusion. The output of this processing stage generates the input to the machine learning stage, where no further manipulation of features is taking place.

2.3. Feature Extraction:

Feature Extraction is an important step in the processing workflow, since subsequent steps entirely depend on it. The approaches reviewed employ a wide range of feature extraction algorithms which, according to the well established taxonomy in, can be classified as a) geometry-based, or b) appearance - based. In the field of depression assessment, several features are derived from the time-series of both (a) and (b) in the form of dynamic features.

2.4. Face Recognition:

Features related to the face are classified here into features from full face, AUs, facial landmarks, and mouth/eyes

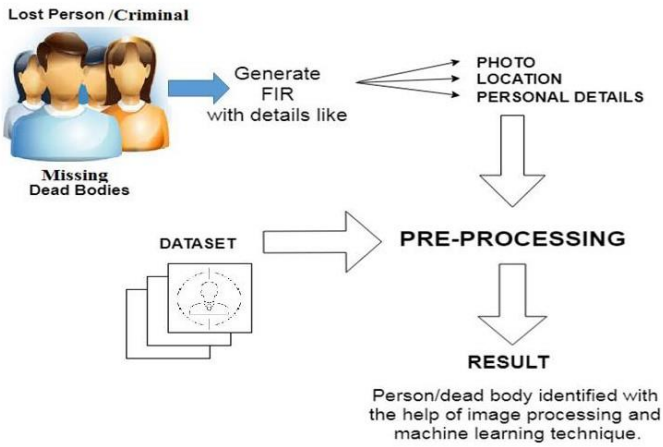


System Overview

3. SYSTEM ARCHITECTURE –

In this system, we extract the optical flow of image data and propose a Convolution Neural Networks model to deal with the problem. The proposed system extracts the spatial and temporal features from image data and these features can be directly feed into the classifier for model learning or inference. The experiments on our own made dataset show that the proposed model achieves superior performance in comparison to current methods.

In this project, we can detect and recognize the faces of the criminals in a video stream obtained from a camera in real-time. The system consists of three databases. First is the citizen database, which will contain the images and unique-id of all the citizens living in that country. Second is local watch list database, which will have the images(min 10) and details(Unique-id, Name, Gender, Religion, Crimes done, etc) of each criminal who belongs to that country. Third is International watch list database, which will have the images(min 10) and details(Unique-id, Name, Gender, Religion, Crimes done, etc) of the criminals who are not the citizens of that country.

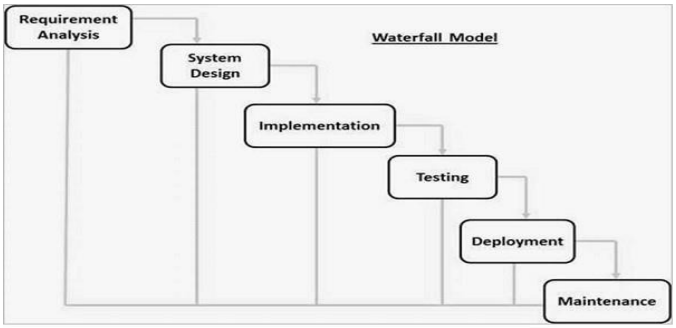


All the images are first preprocessed. Then it goes through feature extraction where Haar cascade is used. The video is captured from the surveillance camera which are converted into frames. When a face is detected in a frame, it is preprocessed. Then it goes through feature extraction where Haar cascade is used.

The features of the processed real-time image is compared with the features of processed images which are stored in the citizen database. If a match is found, it is further compared with the features of images stored in a local watch list database to identify if the person is criminal or not. If he is criminal a notification is sent to the police personnel with all the details and the time for which he was under the surveillance of the camera. If he is not a citizen of that country, it is then compared with the features of images stored in the international watch list database. If a match is found, a notification is sent to the police personnel with all the details and the time for which he was under the surveillance of the camera. If a match is not found in both the watch lists, he is innocent.

4. ANALYSIS MODEL –

We are using waterfall model for our project:



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Requirement gathering and analysis:

In this step of waterfall we identify what are various requirements are need for our project such are software and hardware required, database, and interfaces.

• System Design:

In this system design phase we design the system which is easily understood for end user i.e. user friendly. We design some UML diagrams and data flow diagram to understand the system flow and system module and sequence of execution.

• Implementation:

In implementation phase of our project we have implemented various module required of successfully getting expected outcome at the different module levels.

With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.

• Testing:

The different test cases are performed to test whether the project module are giving ex- pected outcome in assumed time. All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.

• Deployments of System:

Once the functional and non-functional testing is done, the product is deployed in the customer environment or released into the market.

• Maintenance:

There are some issues which come up in the client environment. To fix those issues patches are released. Maintenance is done to deliver these changes in the customer en- vironment. The next phase is

started only after the defined set of goals are achieved for previous phase and it is signed off, so the name ”Waterfall Model”. In this model phases do not overlap

5. CONCLUSION –

In this project, we can detect and recognize faces of the criminals in a video stream obtained from a camera in real time. We have used Haar feature-based cascade classifiers in OpenCV approach for face detection. It is a machine learning based approach where a cascade func- tion is trained from a lot of positive and negative images. It is then used to detect objects in other images. Also, we have used Convolutional Neural Network (CNN) for face recognition. Several advantages of this algorithm are: Efficient selection of features, Scale and location in- variant detector, instead of scaling the image itself, we scale the features. CNN recognizer can recognize faces in different lighting conditions with high accuracy. Also, CNN can recognize efficiently even if single training image is used for each person.The real-time automated face detection and recognition system proposed would be ideal for crowd surveillance applications. In this proposed system, we’ve got investigated the functionality for CNN to analyze capa- bilities from video frames. We recommend a unified deep reading primarily based definitely framework for abnormal event detection and criminal identification in public. The proposed system includes 3 blocks that are designed to advantage 3 keys of extraordinary detection in neural networks. In quick, the motion fusion block is designed to keep the temporal and spatial connection between the movement and look cues. The function transfer block is used to extract discriminative competencies by using exploiting the transferability of the neural community from extremely good responsibilities/ domain names. The coding block is a singular LSTM to benefit rapid sparse coding, that may enjoy rapid inference and give up-to-stop mastering. Big experiments show the promising usual performance of our method in photo reconstruction and bizarre events detection in surveillance.

6. LITERATURE SURVEY –

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