IMPLEMENTATION OF PICKPOCKETERS IDENTIFICATION SYSTEM FROM MULTI-SCALE PUBLIC RECORDS

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ABSTRACT

Huge facts gathered through automatic fare series (AFC) structures provide possibilities for analyzing both private visiting behaviors and collective mobility patterns in urban areas. Existing studies on AFC facts have notably focused on identifying passenger's motion patterns. However, we creatively leveraged such information for identifying pickpocket suspects. Stopping pickpockets in the public transit machine has been quintessential for enhancing passenger pleasure and public safety. Nonetheless, in practice, it is difficult to discern thieves from everyday passengers. In this project, we proposed a suspect detection and surveillance system, which can become aware of pickpocket suspects primarily based on their everyday transit records. Specifically, we first extracted a wide variety of beneficial points from every passenger's daily activities in the transit system. Then, we took a two-step method that exploits the strengths of unsupervised outlier detection and supervised classification models to pick out thieves, who usually exhibit strange travelling behaviors. We additionally proposed a prototype gadget for attainable uses via security personnel since passengers in the public transit systems have less attention to their property when they are in a rush or in a crowded environment.

Key words: AFC, mobility patterns, public records

PROBLEM STATEMENT

Identifying the pickpockets, who typically exhibit abnormal traveling behaviors, therefore provides security for passengers when they are in a rush or in a crowded environment.

INTRODUCTION

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of

signal processing in which input is an image and output may be image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies. It forms core research area within engineering and computer science disciplines too. Image Comparison is comparing two images as finding differences or similarities between two images. Differences may be quantitative or qualitative. Comparing images may be useful if finding differences or similarities is relevant to the problem being analyzed. Image processing is a collection of methods which includes techniques for enhancing image quality to the point where relevant data can be extracted from a comparison. Public transit passengers can easily become distracted in crowded environments, where they are often rushing from one location to another. Having their focus drift from their belongings, they often become common targets of pickpockets. With rapid advances in information technology and infrastructure, transactional records collected by automated fare collection (AFC) systems are now available for understanding passengers' mobility patterns and urban dynamics. Most existing studies focus on identifying regular, collective mobility patterns, such as commute flows and transit networks. Our study is the first to focus on identifying thieves based on AFC data. It is possible to detect thieves using AFC records because behavioral differences logged in the mobility footprints may be used to separate suspects from regular passengers. Examples of such behaviors include traveling for an extended length of time, making unnecessary transfers, and taking regular routes with random stops. Designing an intelligent system that automatically extracts specific, identified behavioral features and dynamically detects and tracks pickpocket suspects has become a possibility.

1. LITERATURE SURVEY

The detection of outliers in spatio-temporal traffic data is an important research problem in the data mining and knowledge discovery community. However to the best of our knowledge, the discovery of relationships, especially causal interactions, among detected traffic outliers has not been investigated before. Here the proposed algorithms construct outlier causality trees based on temporal and spatial properties of detected outliers. Frequent substructures of these causality trees reveal not only recurring interactions among spatio-temporal outliers, but potential flaws in the design of existing traffic networks. The traffic patterns on roads vary across days of a week and hours

of a day. Different road segments have often distinct time-variant traffic patterns. It is difficult to use one model to detect outliers across the road network at different time periods. Even though we could have a large number of sensors probing the traffic on roads, there are many roads that have only a small number of samples given a large size of road networks in a major city.

2.ISSUES IN EXISTING SYSTEM

The existing literature focuses on finding patterns in passenger activity records. Such knowledge can be useful in a variety of applications, and plays a vital role in effectively finding and satisfying passenger needs. Examples include assessing the performance of the transit network, identifying and optimizing problematic or flawed bus routes, improving the accuracy of passenger flow forecasted between two regions, and making service adjustments that accommodate variations in ridership on different days. In particular, estimated the crowdedness of various stations in the transportation network using AFC data. Measured the variability of transit behaviors on different days of the week.

In this paper, a comprehensive approach to the pickpocket detection problem is adopted. First the city area is partitioned into regions with functional categories. Then, the mobility characteristics of passengers were extracted from transit records dynamically over time. A core component of the system was a two-step passenger classification process, the first step being regular passenger filtering, and the second step being suspect detection. The two-step pickpocket detection framework was proposed to combat the problem of extreme imbalance between positive and negative samples. In our preliminary work, we assessed the feasibility of this two-step framework with promising results.

3.PROPOSED SYSTEM

In this paper, we developed a suspect detection and tracking system by mining large-scale transit records. The system assists in identifying pickpocket suspects' and enables active surveillance in high-risk areas. Specifically, we first constructed a feature representation for profiling passengers. Then, we established a novel two step framework to distinguish regular passengers from pickpocket suspects. Finally, we leveraged real world datasets from multiple sources for model training and validation, and implemented a prototype system for end users. Finally, we leveraged real-world datasets from multiple sources for model training and validation, and implemented a prototype

system for end users. Experimental results on real-world data showed the effectiveness of our proposed approach. During the first 9 months of 2014, it was reported that 350 pickpockets were apprehended in the subway system and 490 on buses in Beijing. Many other big cities around the world, such as Barcelona, Rome, and Paris, also suffer from pickpocket problems. Indeed, it is challenging to detect theft activities committed by cunning thieves who know how to escape without being discovered. It is critical to provide a smart surveillance and tracking tool for transit system security personnel.

4. SYSTEM ARCHITECTURE

4.1 Proposed Architecture

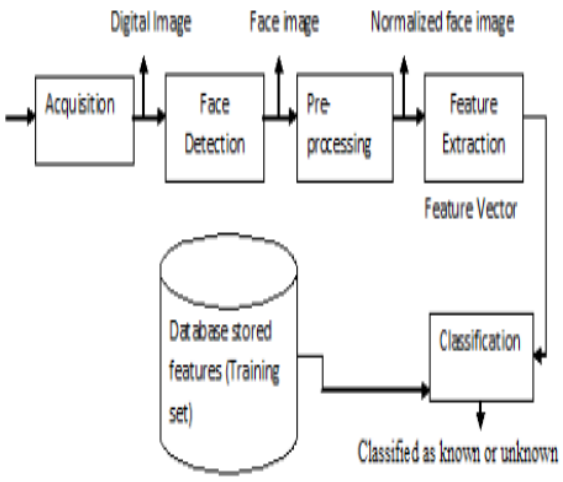

Fig. 1 Proposed Architecture

The user interact with the interface then the system applications start camera and the camera capture the video based on static features and the video is stored in the image database, this images are processed by using the neural network concepts and comparison with identification of the person is done through predicted features. The frames generated by the captured video is compared with the existed images if it is matched then motion is detected. If not again the frames comparison is take place until it is matched. Once the motion is detected then face detection is done by using face coordinates and then face recognition is take place by comparing the image with the existed images.

The input is taken in two ways one is through uploading the images and other is through video. The images and the videos are stored in a memory where the insertion and deletion operations are performed. Once frames are generated from the stored video then the images and frames are compared with each other by using Haar Cascade technique. If the image is matched then it is displayed with in a rectangular box.

Once the camera is in activation then the video is recorded .The captured video generate the frames, per second the video capture generates twenty frames and this are stored in the memory. The frames are compared with the suspect image, if the image is matched with the frames then the victim image is displayed with a

rectangular box. If the image is not matched then suspect is not identified message is displayed. For the purpose of identifying the image as suspect the face detection and face recognition techniques are used and the pickpocket image is send to the higher authorities by using some alert system like mails and sms through mails and phone numbers.

Algorithm

- Capture the video
- Generate the frames
- Compare the frames with images
- Identify the victim
- Victim image is displayed in a rectangular box
- Alert message is send to the authority persons through SMS and emails

The active state of camera capture the recording video footage based on this footage images are generated. The processing is done on the generated images and face detection is taken place based on face coordinates. Then the recognition of the image is done by comparing the images generated from video with the existed images using Haar Cascade technique. Once the image is identified then the appropriate image is notified to law enforcement agencies.

5. IMPLEMENTATION DETAILS

The module in the proposed system is

- Histogram of Oriented Gradients (HOG)
- Video Conversion

5.1 Histogram of Oriented Gradients

Firstly, face patterns are generated using HOG algorithm. The images are made black and white. Here, the part of images that looks more like the original HOG face pattern is found. Finally, the detected face is bounded by a bounding box. The face images are then passed through deep neural network. By doing this, we obtain 128 measurements which are 128 dimension hyper sphere. And no one knows which parts of the face the 128 measurements representing. All we know is that the network outputs the same 128 numbers for two different images of the same person. The active state of camera capture the recording video footage based on this footage images are generated. The processing is done on the generated images and face detection is taken place based on face coordinates. Then the recognition of the image is done by comparing the images generated from video with the existed images using Haar Cascade technique. Sixty eight specific points that are existing on every face are figured out by using the face landmark estimation algorithm. From the landmarks

found, image transformations like scaling, shearing and rotation are used by the

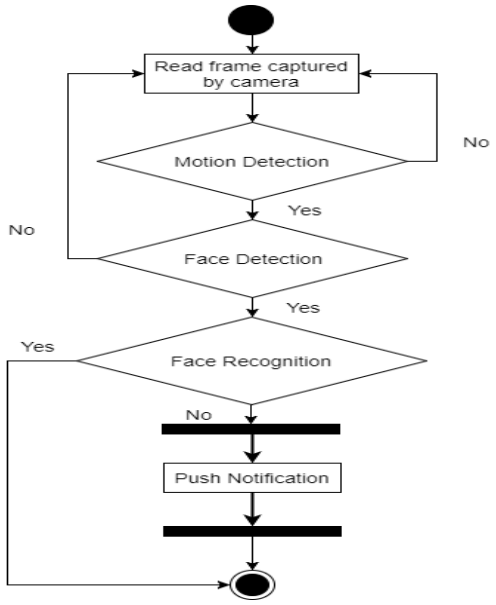

Fig. 2 Flowchart

OpenCV's affine transformation to make the lips and eyes appear in the same location on every image.

5.2 Video Conversion

The video conversion algorithm is mainly used to record the video and convert the captured video to frames. By using this video conversion algorithm we can generate twenty to thirty frames per second. All this generated frames are stored in the database. These frames are compared with the existed image. Once the frames are matched with the existed image then the pickpocket is identified else the comparison is continued with all other existed images. By capturing video as input, it generates twenty to thirty frames per second. The generated frames are stored in the drivers of the system. The stored frames are compared with the static images. Finally, a linear SVM classifier is used to recognize the face. The classifier has been trained in such a way that it can take the measurements from a test image and gives the closest match as output. Here we use Visual studio code which allows users to set the code page in which the active document is saved, the newline character for Windows/Linux, and the programming language of the active document. This allows it to be used on any platform, in any locale, and for any given programming language. Also we used pycharm which provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCSes).

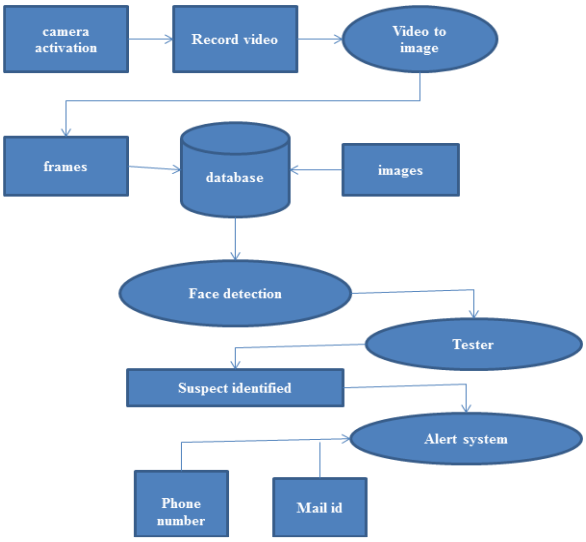

Fig.3 Suspect identification with face detection

As shown in the fig3, when the user executes the application then the camera is activated. Once the camera is in activation state the video is start recording. This recorded video is converted into frames by using algorithm. For each second recording twenty to thirty frames are generated. These frames are compared with the images which are maintained in the database by the user. Once the frames are matched with the existed image, then the suspect is identified and displayed with in a rectangular box. The appropriate victim image is forwarded to higher authority persons through alert messages by maintaining their phone numbers and email id's.

Test objectives

- All function inputs must access properly.
- Output of one function must be redirected to the identical functions.
- The entry inputs, messages and responses must not be delayed.

Features to be tested

- Verify that the correct packages are imported.
- The functions should follow the syntax.
- Exceptions should be handled correctly.

6. CONCLUSION

In this paper, we develop a system that assists in identifying pickpockets in different types of public areas. The user activates the camera by executing the application and the camera start recording the video. The captured video is converted into frames by using OpenCv2 package in python. The video generated twenty to twenty five frames per second by using the algorithm. These frames are compared with the existing image by using Haar Cascade technique. By implementing this algorithm we can have maximum performance and accuracy, so that identification of pickpockets can be done easily in public places. Once the pickpocket is identified then the victim image is forwarded to the authority persons by using alert system like SMS and emails through phone numbers and email id's. Thus we proposed an efficient algorithm which increases the system performance and accuracy in identifying pickpockets by generating more frames compared with existing system.

6.1 FUTURE ENHANCEMENT

The future scope for the proposed method might be the development of an enhanced Pickpocketer identification system that can have the face recognition module along with video tester.

Meanwhile the work can be enhanced for other data files like video, text. Similarly the Haar cascade technique can be developed for Pickpocketer identification system.

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