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Detection and Mitigating Facial Recognition Classifiers against Adversarial Attacks

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ABSTRACT: The aim of this project is to present a unified framework for human action and activity recognition.Black box models use the classification accuracy of the performance metric for validating their defense. This is a problem for biometrics verification applications where the incoming image is not cannot compute the accuracy of the classifier.Attacks is a critical step of deep learning solutions for biometrics verification. It proposes a novel framework for defending Black box systems from adversarial attacks using an ensemble of iterative adversarial image purifiers performance is using Bayesian uncertainties. This is used to estimate an intra-prediction mode from a prediction unit and to reduce encoding time significantly by avoiding the intensive Rate-Distortion optimization of a number of intra-prediction modes. The proposed technique is High Efficiency Video Coding Test Model (HM) video coding standard and Joint Exploration Model (JEM) reference software, by integrating the random forest trained off-line into the codecs.To summarize a set of events and to search for particular events because they contain various pieces of context information.

I. INTRODUCTION

1.1 Human Interaction

Human interaction is one of the most important characteristics of group social dynamics in meetings. Meetings are an important communication and coordination activity of teams: status is discussed, decisions are made, alternatives are considered, details are explained, information is presented, and ideas are generated. We are developing a smart meeting system for capturing human interactions and recognizing their types, such as proposing an idea, giving comments, expressing a positive opinion, and requesting information. To further understand and interpret human interactions in meetings, we need to discover higher level semantic knowledge about them, such as which interactions often occur in a discussion, what interaction flow a discussion usually follows, and what relationships exist among interactions. This knowledge likely describes important patterns of interaction. We also can regard it as a grammar of meeting discussion.

Data mining, which is a powerful method of discovering new knowledge, has been widely adopted in many fields, such as bioinformatics, marketing, and security. In this study, we investigate data mining techniques to detect and analyze frequent interaction patterns; we hope to discover various types of new knowledge on interactions. Human interaction flow in a discussion session is represented as a tree. Inspired by tree-based mining, we designed interaction tree pattern mining algorithms to analyze tree structures and extract interaction flow patterns. An interaction flow that appears frequently reveals relationships between different types of interactions. Frequent Structure Mining (FSM) refers to an important class of exploratory mining tasks, namely those dealing with extracting patterns in massive databases representing complex interactions between entities. FSM not only encom- passes mining techniques like associations and sequences, but it also generalizes to more complex patterns like frequent trees and graphs. Such patterns typically arise in applications like bioinformatics, web mining, mining semi-structured documents, and so on. As one increases the complexity of the structures to be discovered, one extracts more informative patterns; we are specifically interested in mining tree-like patterns.

Objective:

To propose a model to achieve enhanced video surveillance is to discourage criminals, but if a crime does take place it also makes it possible to establish the course of events and identify the people and objects involved.

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II. LITERATURE SURVEY

2.1 Human Activity Analysis: A Review

Human activity recognition is an important area of computer vision research. Its applications include surveillance systems, patient monitoring systems, and a variety of systems that involve interactions between persons and electronic devices such as human-computer interfaces. Most of these applications require an automated recognition of high-level activities, composed of multiple simple (or atomic) actions of persons. This paper provides a detailed overview of various state-of-the-art research papers on human activity recognition. We discuss both the methodologies developed for simple human actions and those for high-level activities. An approach-based taxonomy is chosen, comparing the advantages and limitations of each approach. Recognition methodologies for an analysis of simple actions of a single person are first presented in the paper. Space-time volume approaches and sequential approaches that represent and recognize activities directly from input images are discussed. Next, hierarchical recognition methodologies for high-level activities are presented and compared. Statistical approaches, syntactic approaches, and description-based approaches for hierarchical recognition are discussed in the paper. In addition, we further discuss the papers on the recognition of human-object interactions and group activities. Public datasets designed for the evaluation of the recognition methodologies are illustrated in our paper as well, comparing the methodologies' performances. This review will provide the impetus for future research in more productive areas.

2.2 A Survey of Vision-Based Hand Gesture Recognition System

The task of hand gesture recognition is highly challenging due to complex background (i.e. disturbance), presence of non-gesture hand motions, and various illumination environments. The proposed techniques begin by detecting the hand, tracking the hands movements and analyzing the variations in the hand locations (i.e. Motion detection), and finally recognizing the appropriate gesture. Since the introduction of new gesture recognition technologies, interactive hand-gesture devices (such as smart televisions and displays) have been rapidly emerging. A dynamic gesture changes over period of time perhaps a static gestures can be observed at the quantum of time. A waving hand means goodbye is an example of dynamic gesture whereas; the stop sign is an example of static gesture. To understand the complete message, it is necessary to encode and decode all the static and dynamic gestures over time. This complex process is called as gesture recognition. Gesture recognition is a task of recognizing and interpreting multiple streams of continuous frames from the given set of input data.

III. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

- The intensive computational complexity increases power consumptions and hardware costs, which obstructs deployments of the techniques to video coding applications.
- The prediction of each randomized tree is combined to make the ensemble in the forest and defeat an over fitting problem.
- Difficult to build all possible behaviors of the user, because these behaviors not static and new patterns may old habit may be forgotten or stopped.

DRAWBACKS:

- Cannot be concluding human activities.
- Impossible to attend all events and it takes several times for data collection.
- It cannot be able to capture important events.

3.2 Proposed System:

- The proposed technique, which aims to choose an angular prediction mode efficiently, also belongs to this category.
- Machine learning is able to discover effective representations of high dimensional multimedia data, in video coding.
- To integrate the proposed algorithm into the recent video coding standard frameworks, the intra-prediction mode derived from the proposed technique, called an inferred mode (IM), is used to shrink the pool of the candidate modes before carrying out the Rate-Distortion (R-D) optimization.

Advantages:

- The estimation is very fast because only few pixels are used for evaluating a prediction mode.
- Subsequent iterations it samples patterns that are of better quality.
- Interactive pattern mining system enables mining of frequent patterns from hidden data.

IV. SYSTEM IMPLEMENTATION

4.1 GENERAL

Design Engineering deals with the various UML [Unified Modeling language] diagrams for the implementation of project. Design is a meaningful engineering representation of a thing that is to be built. Software design is a process

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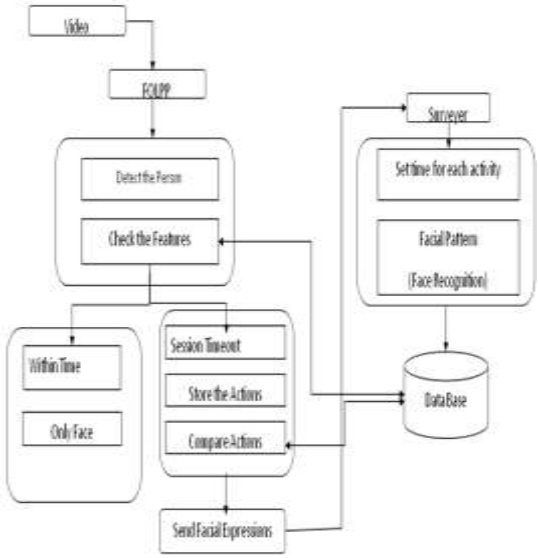
through which the requirements are translated into representation of the software. Design is the place where quality is rendered in software engineering. Design is the means to accurately translate customer requirements into finished product.

4.1.1 System Architecture:



V. SYSTEM IMPLEMENTATION

Module Description

Video Image Segmentation

In this module performs to achieve image tracking in video file to find out the correspond pairs of adjacent frames. An image will make the pixels in each frame in a color that is very similar the circle will be created by hitting the frame around the face. The first contribution is a new a technique for computing a rich set of image features using the integral image. The second is a learning algorithm, based on OFLPP, which selects a small number of critical visual features and yields extremely efficient classifiers.

Image Acquisition

The first stage of any vision system is the image acquisition stage. Acquiring images directly from a camera or from a video source. After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks required today.

Human Face recognition(HFR)

HFR related to global and local feature extraction models with their merits and demerits. Global approaches based on the silhouette images or contour of the body which gives the shape information, while the local representation works on the small patches which is used in object recognition. ROI also helps in making these images invariant to scale and translational variations and further divided into sublevels, and for each level, we compute the orientation of the edges at finer scale. It reduces the computational time and complexity of the system.

Flow Construction

Spontaneous interactions are those that are initiated by a person spontaneously, and reactive interactions are triggered in response to another interaction. For instance, propose and ask Opinion are usually spontaneous interactions, while acknowledgement is always a reactive interaction. Whether an interaction is spontaneous or reactive is not determined by its type (e.g., propose, ask Opinion, or acknowledgement), but labeled by the annotator manually.

VI. SOFTWARE SPECIFICATION

6.1. GENERAL

This chapter is about the software language and the tools used in the development of the project. The platform used here is J2EE. The Primary languages are JAVA and MYSQL.

6.2 .THE JAVA PLATFORM

6.2.1 Java

Java acts as the front end, which drives its syntax from C and object-oriented features from C++. The main feature is platform independent. Java is popular among Internet programmers. It expends the universe of objects that can move about freely in cyberspace. Java can be used to create two types of programs, application and applets. An application is a program that runs on the computer, under the operation system of that computer. An applet is a tiny java program, dynamically downloaded across the network.

6.2.2The Byte code

The output of java compiler is not executable code, it is byte code. It is a set of instructions to be executed by java run-time system called java virtual machine (JVM) it is an interpreter for byte code. Some of the java Buzzwords.

- **Simple**
- **Secure**
- **Portable**
- **Object-oriented**
- **Robust**
- **Multithreaded**
- **Architecture-neutral**
- **Interpreted**
- **High performance**
- **Distributed**
- **Dynamic**

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VII. TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement. The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

7.2 DEVELOPING METHODOLOGIES

The test process is initiated by developing a comprehensive plan to test the general functionality and special features on a variety of platform combinations. Strict quality control procedures are used.

The process verifies that the application meets the requirements specified in the system requirements document and is bug free. The following are the considerations used to develop the framework from developing the testing methodologies.

7.3 TYPES OF TESTING

7.3.1. Unit testing

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produces valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

- Functional testing
- System Testing
- Performance Testing
- Integration Testing
- Acceptance Testing
- Black Box and White Box Testing
- Build the test plan

7.3.8. VALIDATION

At the culmination of the integration testing, Software is completely assembled as a package. Interfacing errors have been uncovered and corrected and a final series of software test begin in validation testing. Validation testing can be defined in many ways, but a simple definition is that the validation succeeds when the software functions in a manner that is expected by the customer. After validation test has been conducted, one of the three possible conditions exists.

1) The function or performance characteristics confirm to specification and are accepted.
2) A deviation from specification is uncovered and a deficiency lists is created.
3) Proposed system under consideration has been tested by using validation test and found to be working satisfactory.

Require field Validation: User input the all require field for data validate.
Compare Validation: Compare the two fields of the input data.
Custom Validation: We can apply here the own validation.

Regular Expression Validation: We can use for control to validate the input class. You can use regular Expression to restrict the range of valid characters, to strip unwanted characters, and to perform length and format checks. We can constrain the input format by defining patterns the input must match.

VIII. CONCLUSION AND FUTURE ENHANCEMENT

8.1 CONCLUSION

It proposes and combines two orthogonal methods to utilize automatically detected human attributes to significantly improve content-based face image retrieval (up to 43% relatively in MAP). To the best of our knowledge, this is the first proposal of combining low-level features and automatically detected human attributes for content-based face image retrieval. Attribute-

enhanced sparse coding exploits the global structure and uses several human attributes to construct semantic-aware code words in the offline stage. Attribute-embedded inverted indexing further considers the local attribute signature of the query image and still ensures efficient retrieval in the online stage. The experimental results show that using the code words generated by the proposed coding scheme, we can reduce the quantization error and achieve salient gains in face retrieval on two public datasets; the proposed indexing scheme can be easily integrated into inverted index, thus maintaining a scalable framework. During the experiments, we also discover certain informative attributes for face retrieval across different datasets and these attributes are also promising for other applications (e.g., face verification). Current methods treat all attributes as equal. We will investigate methods to dynamically decide the importance of the attributes and further exploit the contextual relationships between them.

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