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SURVEY ON FACE DETECTION, RECOGNITION, EXPRESSIONS AND LIGHTENING CONDITIONS

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ABSTRACT: As one of the most successful applications of image analysis and understanding face recognition has recently gained significant attention especially during the past several years There are at least two reasons for such a trend the first is the wide range of commercial and law enforcement applications and the second is the availability of feasible technologies after many years of research Moreover recent significant advances in multimedia processing has also helped to advance the applications of face recognition technology Among the diverse contents of multimedia face objects are particularly important For example a database software capable of searching for face objects or a particular face object is very useful Another example is a security system that is able to automatically track human objects and report their IDs Though tracking and recognizing face objects is a routine task for humans building such a system is still an active research Among many proposed face recognition schemes image based approaches are possibly the most promising ones However the 3D images and patterns of 3D face objects can dramatically change due to lighting and viewing variations Hence illumination and pose problems present significant obstacles for wide applications of this type of approaches reviewed in this paper.

Keywords: [Face Detection, Recognition, Expression, Image Conditions, Lightening.]

1. INTRODUCTION

Face detection concerns about where a face is located in an image. Now it may seem very easy but in reality we have to consider many constraints like single face or multiple faces, image rotation, pose etc. So there may arise some false detected regions of an image, which do not contain any face. IN spite of all these problems there are lots of techniques available. Face detection is a procedure by which we can able to extract face region from a human body. Now, the concept can be implemented in various ways but mainly we use four steps for this implementation. With the ubiquity of new information technology and media, more effective and friendly methods for human computer interaction (HCI) are being developed which do not rely on traditional devices such as keyboards, mice, and displays. Furthermore, the ever decreasing price/performance ratio of computing coupled with recent decreases in video image acquisition cost imply that computer vision systems can be deployed in desktop and embedded systems . The rapidly expanding research in face processing is based

on the premise that information about a user's identity, state, and intent can be extracted from images, and that computers can then react accordingly, e.g., by observing a person's facial expression.

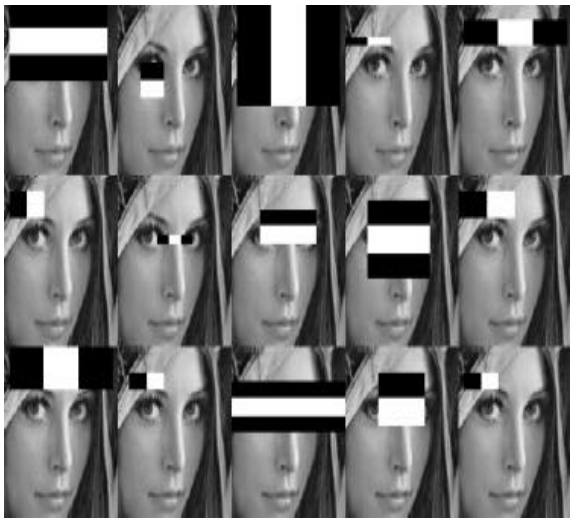

Figure 1: Face Identification

In the last five years, face and facial expression recognition have attracted much attention though they have been studied for more than 20 years by psychophysicists, neuroscientists, and engineers. Many research demonstrations and commercial applications have been developed from these efforts. A first step of any face processing system is detecting the locations in images where faces are present. However, face detection from a single image is a challenging task because of variability in scale, location, orientation (up-right, rotated), and pose (frontal, profile). Facial expression, occlusion, and lighting conditions also change the overall appearance of faces. We now give a definition of face detection: Given an arbitrary image, the goal of face detection is to determine whether or not there are any faces in the image and, if present, return the image location and extent of each face. The challenges associated with face detection can be attributed to Pose, Presence or absence of structural components, Facial expression, Occlusion, Image orientation and Imaging conditions.

2. LITERATURE SURVEY

Pratik Saraf, R. R Sedamkar, and SheetalRathi, proposed Prefixspan Algorithm is developed based on projection is used in Prefix Span algorithm for mining sequential patterns. The basic idea behind this method is, rather than projecting sequence databases by evaluating the frequent occurrences of sub-sequences, the projection is made on frequent prefix. This helps to reduce the processing time which ultimately increases the algorithm efficiency. A novel algorithm called Prefix Span (Prefix-projected Sequential Pattern Mining) algorithm which works on projection of database and sequential pattern growth. Prefix Span algorithm is evaluated by running the algorithm on different datasets .The two parameters minimum support and maximum prefix length are provided at start of the execution of algorithm. The sequences having value greater than minimum support are extracted from sequential datasets. Minimum support is the number of sequences which are calculated by dividing the pattern occurs with the total number of sequences in the database. The maximum prefix pattern value used to specify the length of the sequence to be there in output sequential patterns which is beneficial while executing the algorithm on large datasets. For getting the sequential output based on minimum support and maximum prefix length, the two parameters time complexity and memory utilization are set as the benchmark for performance evaluation of algorithm on different datasets. Both the parameters vary from one dataset to other. These results are plotted in bar graph and are useful in order to analyse the performance of existing algorithm.

Niek Tax, Natalia Sidorova, Wil M.P. vander Aalst, proposed Prefix span Algorithm is developed based on Process mining aims to extract novel insights from event data (vander Aalst, 2016). Process discovery plays a prominent role in process mining. The goal is to discover a process model that is representative for the set of

event sequences in terms of start-to-end behavior, i.e. from the start of a case till its termination. Many process discovery algorithms have been proposed and applied to a variety of real life cases. A more conventional perspective on discovering insights from event sequences can be found in the areas of sequential pattern mining and episode mining, which focus on finding frequent patterns, not aiming for descriptions of the full event sequences from start to end.

Prof. AlpaReshamwala, Ms. Neha Mishra, proposed Prefix span Algorithm is developed based on pattern mining is the mining of frequently occurring ordered events or subsequences as patterns literature .Compared with projected databases and subsequence connections, Prefix Span was more efficient than SPADE and SPAM. Prefix Span does not require candidate generation, also it can reduce the scale of projected databases substantially relative to the original sequence database, and the major cost of Prefix Span is the construction of projected databases. In addition, scanning projected databases repeatedly also reduce the efficiency of the algorithm. Generally speaking, reducing both the scale of projected databases and the time of scanning projected databases are the main ways of improving Prefix Span. However, when mining long frequent concatenated sequences, this method is inefficient. Therefore, it is impractical to apply Prefix Span to mine long contiguous sub-sequences from sequential database. The comparison study of SPADE, SPAM and the Prefix span algorithm is done on the results collected. As per the results, SPADE performs better in both the dense as well as sparse dataset such as sign and kosarak10k respectively. Performance of SPAM is worst when executed on sparse dataset. Prefix span is approximately approaching the performance of SPADE in sparse dataset whereas the performance of SPAM and Prefix span is same in dense dataset. The number of sequences generated is same in both the dataset. For dense dataset prefix span is uses less memory whereas in sparse dataset it utilizes the most. In Dense dataset SPAM and SPADE are utilizing approximately constant memory. In sparse dataset minimum utilization of memory is by SPADE.

Jian Pei, Jiawei Han, Wei Wang, proposed Constraint Based Sequential Pattern Mining Algorithm is developed based on A constraint C for sequential pattern mining is a Boolean function C(α) on the set of all sequences. The problem of constraint-based sequential pattern mining is to find the complete set of sequential patterns satisfying a given constraint C. Constraints can be examined and characterized from different points of views. We examine them first from the application point of view in this section and then from the constraint-pushing point of view in the next section, and build up linkages between the two by a thorough study of constraint-based sequence mining. From the application point of view, we present the following seven categories of constraints based on the semantics and the forms of the constraints. The problem of pushing various constraints deep into sequential pattern mining. We characterize constraints for sequential pattern mining from both the application and constraint-pushing points of views. A general property of constraints for sequential pattern mining, prefix monotone property is identified.

Yu Hirate, HayatoYamana, proposed Constraint Based Sequential Pattern Mining Algorithm is developed based on constraint-based mining and extended sequence-based mining, in this paper, we generalize sequential pattern mining with item interval. The generalization includes three points; (a) a capability to handle two kinds of item-interval measurement, item gap and time interval, (b) a capability to handle extended sequences which are defined by inserting pseudo items based on the interval itemization function, and (c) adopting four item-interval constraints. Generalized sequential pattern mining is able to substitute all types of conventional

sequential pattern mining algorithms with item intervals. Evaluations using a Japanese earthquake dataset confirmed that generalized sequential pattern mining with time interval is able to extract interval extended sequences that include time interval with variable segmentation size. In addition, by adapting our types of constraint related to time intervals, it also excludes extraction of interval extended sequences with time intervals in which the user is not interested.

ManikaVerma, Dr. Devarshi Mehta, proposed Constraint Based Sequential Pattern Mining Algorithm is developed based on .Sequential pattern mining helps to extract the sequences which are most frequent in the sequence database, which in turn can be interpreted as domain knowledge for several purposes. Sequential pattern mining is used in various areas for different purposes. It can be used for identifying Customer Shopping Sequence. Various algorithms have been implemented for identifying frequent sequences from sequence database. One of the approaches used to identify frequent sequences is apriori approach. "The apriori approach is based on the apriori property, as introduced in the context of association rule mining. This property states that if a pattern a is not frequent then any pattern b that contains a cannot be frequent. Two of the most successful algorithm that takes this approach are GSP and SPADE. The major difference between the two is that GSP uses a horizontal data format while SPADE uses vertical one. The comparison among GSP, SPADE and Prefix Span algorithms. This paper presented the concept and explanation of the above mentioned algorithms. Using SPMF it is determined that Prefix Span is better than GSP and SPADE in performance as it takes lesser time than GSP and SPADE. SPADE takes less time than GSP but it takes quite more time than Prefix Span. The memory required by Prefix Span is much less than GSP and SPADE while the memory required by GSP and SPADE is same. Various attributes like Total Time required for executing algorithm, frequent sequences found by algorithms and Maximum memory used by algorithm.

BhawnaMallick , Deepak Garg , and Preetam Singh Grover, proposed CFM-Prefix Span Algorithm(CFM- Compactness, Frequency, Monetary) is developed based on Prefix Span is the most propitious pattern-growth approach, which is based on constructing the patterns recursively. On the basis of apriori (e.g., GSP algorithm) and pattern growth (e.g., Prefix Span algorithm) approaches, quite a few algorithms have been proposed for successful sequential pattern mining. A robust CFML-Prefix Span algorithm for mining all CFML sequential patterns from the customer transaction database. The CFML Prefix Span algorithm has utilized a pattern-growth methodology that discovers sequential patterns via a divide-and-conquer strategy.

NitiAshish Kumar Desail and Amit Ganatra, proposed CFM-Prefix Span Algorithm(CFM- Compactness, Frequency, Monetary) is developed based on Most of the existing SPM methods work purely on frequency parameter, formally known as support threshold. Support is important to distinguish if patterns appear repeatedly or not. On the other hand, the proposed Constraint-based Prefix Span algorithm would be concerned about decision maker's perception. Proposed algorithm through use of Regency constraint determines current buying patterns and through use of profit constraint determines the more profitable buying patterns. Further compactness constraint can be used to identify buying behavior of customer during specific time span including seasonal patterns. Proposed Constraint-based Prefix Span algorithm is not restricted to conventional Sequential Pattern Mining (SPM) parameter frequency but incorporates six more important parameters like Gap, Regency, Compactness/Duration, Profitability, Item and Length. Incorporation of these constraints in FP-growth based—Prefix Span leads to more efficient and effective results by reduction of patterns. Concise patterns present

relevant and precise results in terms of users' interest. Seven different experiments are performed on IBM generated six synthetic datasets. Comparison made for run times and pattern generation of three algorithms: proposed constraint-based Prefix Span with RFM and Prefix Span. Proposed constraint-based Prefix Span algorithm is more efficient and effective in terms of reduction of patterns generation of interesting patterns for user.

BhawnaMallick, P. S. Grover and Deepak Garg, proposed CFM-Prefix Span Algorithm(CFM- Compactness, Frequency, Monetary) is developed based on CFM patterns from the static database are efficiently mined using the CFM algorithm proposed in our previous work. The relevant part of the CFM algorithm that is based on Prefix Span is presented here for the completeness of this article. We have used two concepts namely, monetary and compactness that are derived from the aggregate and duration constraints which are presented in the available literature. An efficient progressive CFM-miner algorithm to handle the maintenance problem of CFM sequential patterns. We have built an updated CFM-tree using the CFM- sequential patterns obtained from the static database to control the dynamic nature of data updating process and deletion process into the sequential pattern mining problem. Subsequently, the database gets updated from the distributed database that may be static, inserted, or deleted. Whenever the database is updated from the multiple sources, CFM tree is also updated by including the updated sequence. Then, the updated CFM-tree is used to mine the progressive CFM-patterns using the proposed tree pattern mining algorithm. Eventually, the experimentation is carried out using the synthetic and real life datasets that are given to the progressive CFM miner using thread environment.

Probst, Oliver, proposed COPRE framework(Constraint Based Prefix)is developed based on constraints which are defined in a Platform-Independent Model (PIM) into running code that reflects the specified constraints. One of the reasons for the survey is that this semantic transformation is regarded as an open problem which must be solved to be able to use Model-Driven Development (MDD) approaches in general for building information systems. The authors mention four advantages of their approach: The monitoring code which handles the data validation and constraint inspection is independent of the functional code, Easy XML based constraint specification which can be automatically translated to monitoring code, The functional code remains unaffected, Cleaner monitoring and functional code plus easier maintenance We categorize this concept as a cross-tier validation method because the interceptor based approach could theoretically be applied to the request/response messages between the presentation tier and the logic tier or the logic tier and the database tier, i.e. not coupled to a specific tier which means cross-tier.

CONCLUSION

This paper surveys about Face Recognition and its techniques and many researches are under under progress, Different algorithms and different models are proposed to create base for the research, many research papers and literatures are reviewed and the core models and concepts are identified and provided as a literature survey. This paper reviews and categorizes the existing methods proposed to address the pose problem and the different challenges faced in face recognition. Different methods are identified and the best part of the method which produces the better results will be used for further research proceedings.

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