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Detect Time Series Sequences by Using Pattern Discovery

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Abstract

Periodic pattern detection in time-ordered sequences is an important data mining task, which discovers in the time series all patterns that exhibit temporal regularities. Periodic pattern mining has a large number of applications in real life; it helps understanding the regular trend of the data along time, and enables the forecast and prediction of future events. An interesting related and vital problem that has not received enough attention is to discover outlier periodic patterns in a time series. A mining method to extract frequent patterns of human interaction based on the captured content of face-to-face meetings. Tree-based mining method for discovering frequent patterns of human interaction in meeting discussions. The mining results would be useful for summarization, indexing, and comparison of meeting records. Hidden interactions are discovered as patterns and the pattern is extracted to give pattern value. Captured meeting videos are converted into frames.
Patterns are represented as frames and each frames are represented as snapshots.

Keywords: Periodic pattern detection, pattern mining, tree based mining.

Introduction

Data mining is a powerful method that discovers new knowledge from a large set of data. It is used in many domains, e.g., medical, genetic research, and marketing, and has produced many good results. In the study of interaction analysis, discover various types of new knowledge on interactions by applying the concept of data mining to data that maintains information on interactions.

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. 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, 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.

Mining human interactions is important for accessing and understanding meeting content. First, the mining results can be used for indexing meeting semantics; also existing meeting capture systems could use this technique as a smarter indexing tool to search and access particular semantics of the meetings. The most common way to capture meeting information is through note-taking. However, fully writing down the content of a meeting is a difficult task, and can result in an inability to both take notes and participate in the meeting. The prospective benefits of having a meeting record on the one hand and the problems with traditional meeting recording on the other hand have triggered the use of technology to create meeting records. While technology automatically captures meeting activities, humans are left free to actively engage in discussions and synthesize what is going on around them, without worrying about tediously preserving details for later memory.

The proposed a pattern detection method, is to discover hidden time patterns in human behaviour. Pattern detection has been adopted in several applications such as interaction analysis and sports research. Although the purpose of these techniques is similar to work, conducting analysis on human interaction in meetings and address the problem of

discovering interaction patterns from the perspective of data mining. Since the algorithm generates the candidate set from the nodes of the trees, it first builds the initial scope-list for the nodes with different labels.

Related Theory

Mining frequent trees is very useful in domains like bioinformatics, web mining, mining semi-structured data, and so on.. Various interactions imply different user roles, attitudes, and intentions about a topic during a discussion. Presented visualization systems for reviewing a group's interaction dynamics,e.g., speaking time, gaze behavior, turn-taking patterns, and overlapping speech in meetings. Natural interactions are those initiated by a person spontaneously, and reactive interactions are triggered in response to another interaction.

The data to be mined is a set of LOOK events and SPEAK events. First of all, all of the subsets of the events occurring at the same time are extracted. All of the subsets are grouped by the model which is explained in the previous section and durations of each subset are summed up in each group. This operation is equivalent to moving from the start to the end of the data, extracting all combinations of events at each time, and summing up the durations of all patterns.

In [2], the aspects of a meeting that are important are meeting-dependent. In general, meetings can be roughly classified into two types. In one type of meeting, there are a large number of attendees, but only a few of them are active. An example of such a meeting is a lecture in which there is one lecturer and a large audience. In the other type of meeting, there are a small number of attendees, but the majority of them are active. Examples of such meetings are brainstorming sessions, team weekly status meetings, and new hire discussions.
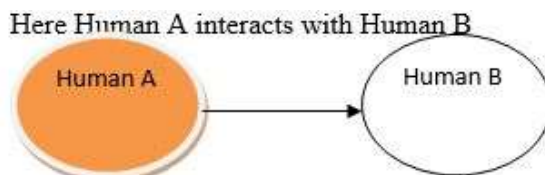
Fig: 2.1 Example of interaction pattern

In [3], In today's busy work environments, many people cannot attend all of the meetings to which they are invited because of travel and scheduling issues. When travel is the issue, people have turned to remotely attending meetings. When scheduling is the issue, the only option available is to view a recording of the missed meeting. However, viewing recorded meetings is not popular today. One of the main reasons is a poor viewing experience. This paper focuses on improving the experience, and thus, increasing the popularity of viewing remote meetings.

In [4], they proposed a tree-based mining method for discovering frequent patterns of human interaction in meeting discussions. The mining results would be useful for summarization, indexing, and comparison of meeting records. They also can be used for interpretation of human interaction in meetings. The tree based mining called embedded tree mining used for hidden interaction pattern discovery. Embedded sub trees are a generalization of induced sub trees, which allow not only direct parent child branches. It is valuable to capture various categories of meetings for analysis such as panel, debate, interview, etc. There would be some differences in the frequent interaction patterns for different meeting styles.

In [5], the authors Anton Nijholt, Rutger Rienks, Job Zwiers, Dennis Reidsma university of twente has surveyed the well-known projects of multi-modal interaction have been created to bridge research on smart environment and ambient intelligence research on one hand and meeting or teleconferencing research in other hand. AMI (Augmented multi-party interaction) is a research project in the European 6th framework program and concerned with research on multi-modal interaction and as multi-modal interaction in multi party context and a context where two or more persons interacting with each other. The AMI project concentrates on multi-party interacting during meetings, its main aims therefore are to develop technologies for the disclosure of meeting content and the provision of live meeting support of meetings.

In [6], the authors have detailed about Frequent structure mining (FSM) and introduced the notion of mining embedded subtrees in a database of trees. Tree mining, being instance of frequent structure mining has obvious relation to association and sequence mining. Frequent tree mining is also related to tree isomorphism and tree pattern matching. Finally the authors have planned to apply the tree mining techniques to other compelling applications such as finding common tree patterns in RNA structures, as well as the extraction of structure from XML documents and their use in classification and clustering.

System Design and Proposed System

A time series records features captured regularly at uniform interval of time. Real life has several examples of time series such as weather record, stock price movement, road or network traffic density pattern, sensory data, transactions record, etc. Time-series database records such time-ordered features, and data mining aims to discover in the database hidden information, which cannot be found by classical database query languages like SQL. Periodicity detection in time-series databases is a data mining problem where periodically repeating patterns are discovered. Periodic patterns are found in weather data, transactions history, stock price movement, road and computer network traffic density, gene expression, etc. In time-series analysis, periodicity detection identifies the periodic functions to capture seasonality, e.g., using Fourier transforms. Periodic pattern mining is an important task, as it facilitates data analysis leading to prediction or forecast of future events and patterns. It also helps in identifying abnormal activities (or anomalies) in the data, i.e., events which occur at unexpected time.
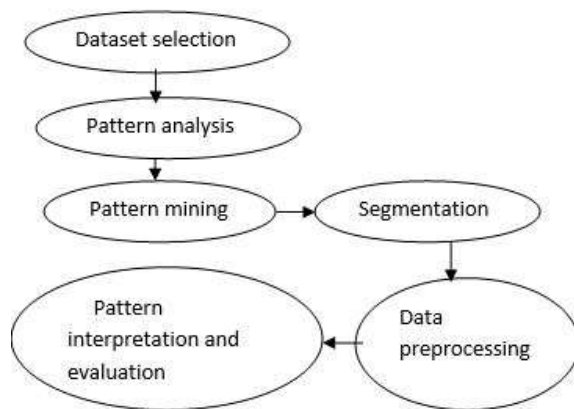

Fig: 3.1 Block diagram

In current meeting research see modest attempts to visualize the information that has been obtained by either capturing or probably more importantly by interpreting the activities that take place during a meeting. The meetings being considered take place in smart meeting rooms. Cameras, microphones and other sensors capture meeting activities. Captured information can be stored and retrieved. Captured information can also be manipulated and in turn displayed on different media. Mining human interactions is important for accessing and understanding meeting content. Various interactions imply different user roles, attitudes, and intentions about a topic during a

discussion. Presented visualization systems for reviewing a group's interaction dynamics,e.g., speaking time, gaze behavior, turn-taking patterns, and overlapping speech in meetings. Natural interactions are those initiated by a person spontaneously, and reactive interactions are triggered in response to another interaction.

Periodic pattern detection in time-ordered sequences is an important data mining task, which discovers in the time series all patterns that exhibit temporal regularities. Extracted patterns are useful for interpreting human interaction in meetings. Cognitive science researchers could use them as domain knowledge for further analysis of human interaction. Moreover, the discovered patterns can be utilized to evaluate whether a meeting discussion is efficient and to compare two meeting discussions using interaction flow as a key feature.

Pattern discover can be utilized to evaluate whether a meeting discussion is efficient and to compare two meeting discussions using interaction flow as a key feature. Pattern discovery is a data mining technique that provides an alternative to the frequent pattern discovery approach that underlies most association rule learning techniques. Frequent pattern discovery techniques find all patterns for which there are sufficiently frequent examples in the sample data.

Periodic Outlier Pattern Detection

The proposed system extracted patterns are useful for interpreting human interaction in meetings. Mining results can be used for indexing meeting semantics, also existing meeting capture systems could use this technique as a smarter indexing tool to search and access particular semantics of the meetings. The discovered patterns can be utilized to evaluate whether a meeting discussion is efficient and to compare two meeting discussions using interaction flow as a key feature. Embedded Tree Mining performs Hidden interaction pattern discovery. Discovered patterns can be evaluate whether a meeting discussion and also compare two meeting discussions.

Pattern discovery

The general goal of pattern discovery may be described ascending frequent, a priori unknown patterns or associations thereof among the objects stored in a given data repository, both with or without the assumption of some domain-specific prior knowledge. Sequential pattern mining is a data mining concerned with finding statistically relevant patterns between data examples where the values are delivered in sequence.
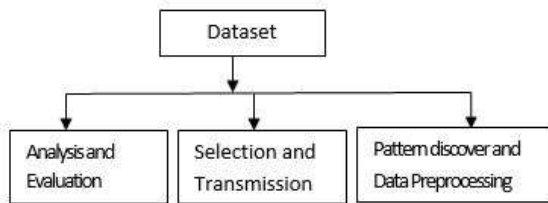
Fig: 3.2 Information extraction

Tree based pattern mining

Tree structure to represent an interaction flow and then adopt a string for encoding the tree formally. Frequent pattern mining technique are divided into 2 categories : Apriori based algorithm and Tree structure based algorithm. The apriori based algorithm uses a generate and test strategy for finding frequent pattern by constructing candidate items and checking their frequency count and minimum support against transactional databases. The tree structure based algorithm follows a test only approach. There is no need to generate candidate items sets and test only the minimum support count or frequency count.

This paper provides a tree-based mining method for discovering frequent patterns of human interaction in meeting discussions. The mining results would be useful for summarization, indexing, and comparison of meeting records. They also can be used for interpretation of human interaction in meetings. In the future, we will develop several applications based on the discovered patterns. We also plan to explore embedded tree mining for hidden interaction pattern discovery. With our definition, we can also identify outlier patterns that may involve some (or all) frequent events, as we check the repetitions of combination of events and not just the individual events. In this paper we propose a pattern mining method to extract important patterns of interaction from a data set that contains primitive information of interaction like gazing or utterance. The method extracts coincidental patterns of interaction formed by a set of primitive events when such a pattern occurs more than randomly.

Output And Results

Homepage of the output displays a username and password to login the user. The captured video using the web camera is given as the input of the pattern detection.

The input given as the video is converted into datasets and the datasets are converted into frames and the frames. Here preprocessing of data mining application is done for avoiding the duplication of datasets.
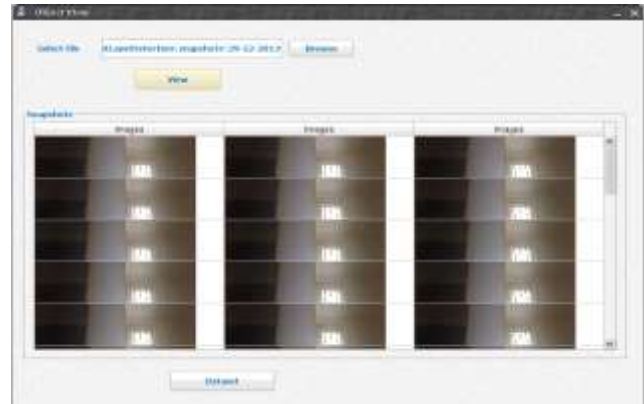
Here preprocessing is used to examine the quality of data. After this method pattern value is given for each pattern based on their priority.

The patterns that are converted into datasets are evaluated, and the datasets are classified as cluster by using suffix tree method. Suffix tree which reduces the noise in data to find substring from the original string.

Here the datasets are clustered into one data to prove the quality and it includes only dynamic data set. Audio wave of the video is separated for giving the performance evaluation of the given input.

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