DISCOVERING OF PATTERNS TO GATHER NEW KNOWLEDGE USING COMPLETE RANDOM TREE

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ABSTRACT

Discovering new knowledge is significant for understanding and interpreting how people interact in regular problems. In this work, we propose a mining method to extract frequent patterns of problem solving based on the captured contentof face-to-face meetings. Problem solving techniques, such as proposing an idea, giving comments, and expressing a positive opinion, indicate user intention toward a topic or role in a discussion. Problem solving flow in a discussion session is represented as a tree. Tree based interaction mining algorithms are designed to analyze the structures of the trees and to extract interaction flow patterns. Theexperimental results show that we can successfully extract several interesting patterns that are useful for the interpretation of humanbehavior in meeting discussions, such as determining frequent interactions, typical interaction flows, and relationships betweendifferent types of interactions.

KEYWORDS: *Data stream, Emerging new class, Ensemble method, Anomaly detection, Completely-random trees.*

1. INTRODUCTION

Human interaction is one of the most importantcharacteristics of group social dynamics in meetings.We are developing a smart meeting system for capturing human interactions and recognizing their types, such asproposing an idea, giving comments, expressing a positive opinion, and requesting information. To further understandand interpret human interactions in meetings, weneed to discover higher level semantic knowledge aboutthem, such as which interactions often occur in a discussion,what interaction flow a discussion usually follows, andwhat relationships exist among interactions. This knowledgelikely describes important patterns of interaction. We also can regard it as a grammar of meeting discussion.Data mining, which is a powerful method of discoveringnew knowledge, has been widely adopted in many fields, such as bioinformatics, marketing, and security .In this study, we investigate data mining techniques to detect andanalyze frequent interaction patterns; we hope to discovervarious types of new knowledge on interactions. Humaninteraction flow in a discussion session is represented as a tree. we designed interaction tree pattern mining algorithms to analyze treestructures and extract interaction flow patterns. An interactionflow that appears frequently reveals relationships between different types of interactions. 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. Second, the extracted patterns are useful for interpreting humaninteraction 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 isefficient and to compare two meeting discussions usinginteraction flow as a key feature.

2. LITERATURE SURVEY

Multimedia records of meetings contain a rich amount of project information. However, finding detailed information in a meeting record can be difficult because there is no structural information other than time to aid navigation. In this paper we survey and discuss various ways of indexing meeting records by categorizing existing approaches along multiple dimensions. We then introduce the notion of creating indices based upon user interaction with domain-specific artifacts. As an example to illustrate the use of domain-specific artifacts to create meaningful pointers into the meeting record, we describe capture and access in a prototype system that supports general meeting artifacts.

A novel probabilistic framework is proposed for analyzing cross-modal nonverbal interactions in multiparty face-to-face conversations. The goal is to determine "who responds to whom, when, and how" from multimodal cues including gaze, head gestures, and utterances. We formulate this problem as the probabilistic inference of the causal relationship among participants' behaviors involving head gestures and utterances. To solve this problem, this paper proposes a hierarchical probabilistic model; the structures of interactions are probabilistically determined from high-level conversation regimes (such as monologue or dialogue) and gaze directions. Based on the model, the interaction structures, gaze, and conversation regimes, are simultaneously inferred from observed head motion and utterances, using a Markov chain Monte Carlo method. The head gestures, including nodding, shaking and tilt, are recognized with a novel Wavelet-based technique from magnetic sensor signals. The utterances are detected using data captured by lapel microphones. Experiments on four-person conversations confirm the effectiveness of the framework in discovering interactions such as question-and-answer and addressing behavior followed by back-channel responses.

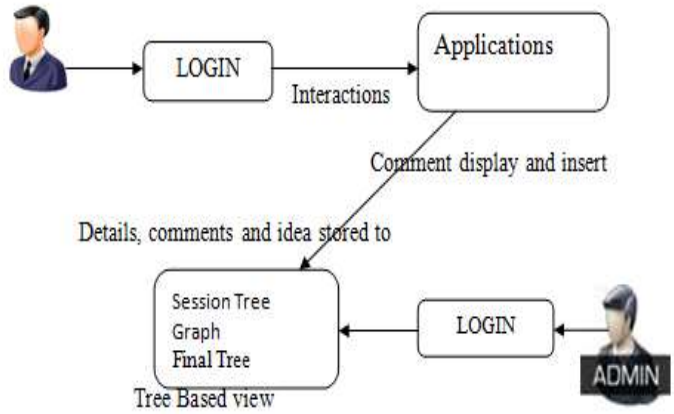
In current meeting research we see modest attempts to visualize the information that has been obtained by either capturing and probably more importantly by interpreting the activities that take place during a meeting. The meetings being considered take place in smart meeting rooms. Cameras, microphones 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. We survey our research in this area, look at issues that deal with turn-taking and gaze behavior of meeting participants, issues that deal with influence and talkativeness, and issues that deal with virtual embodied representations of meeting participants. We stress that this information is interesting not only for real-time meeting support, but also for remote participants and off-line consultation of meeting information.

Activity monitoring, a crucial task in many applications, is often conducted expensively using video cameras. Also, effectively monitoring a large field by analyzing images from multiple cameras remains a challenging problem. In this paper, we introduce a novel application of the recently developed RFID technology: using RF tag arrays for activity monitoring, where data mining techniques play a critical role. The RFID technology provides an economically attractive solution due to the low cost of RF tags and readers. Another novelty of this design is that the tracking objects do not need to attach any transmitters or receivers, such as tags or readers. By developing a practical fault-tolerant method, we offset the noise of RF tag data and mine frequent trajectory patterns as models of regular activities. Our empirical study using real RFID systems and data sets verifies the feasibility and the effectiveness of our design.

3. METHODOLOGY

We propose a mining method to extract frequent patterns of human interaction based on the captured content of face-to-face meetings. The work focuses on discovering higher level knowledge about human interaction. In our proposed system T-pattern technique is used to discover hidden time patterns in human behavior. We conduct analysis on human interaction in meetings and address the problem of discovering interaction patterns from the perspective of data mining. It extracts simultaneously occurring patterns of primitive actions such as gaze and speech. We discover patterns of interaction flow from the perspective of tree-based mining rather than using simple statistics of frequency. The main features of the process are user can also provides the idea about the topic. So admin can easily solve the problem based on users needed.

4. SYSTEM ARCHITECTURE



User will login into a particular applications.They will give their own comments about applications in the form of positive and negative format. So that the admin can list out user comments in session tree module. In the graph module there will be a diagrammatical representation of positive and negative comments. So that user can decision easily about the application.

5. ALGORITHM EXPLANATION

Algorithm 1 Deploying *SENCForest* in data stream

Input:*SENCForest*, B - buffer of size *s*

Output:*y* - class label for each *x* in a data stream

1: **while** not end of data stream **do**
2: **for** each *x* **do**
3: $y \leftarrow SENCForest(x)$
4: **if** $y = NewClass$ **then**
5: $B \leftarrow B \cup \{x\}$
6: **if** $|B| \geq s$ **then**
7: Update (*SENCForest*, B)
8: $B \leftarrow$ NULL
9: $m \leftarrow m + 1$
10: **end if**
11: **end if**
12: Output $y \in \{b_1,...,b_m,NewClass\}$.
13: **end for**
14: **end while**

Algorithm 2 Update SENCForest
Input: *SENCForest* - existing model, B - input data

Output: a new model of *SENCForest*

1: **initialize:** All instances in B are assigned a new class $bm+1$
2: **for** $i = 1,...,z$ **do**
3: $B^0 \leftarrow sample(B,\psi)$
4: Tree $\leftarrow$ *SENCForest*.Tree[i]
5: **for** $j = 1,...,$Tree.LeafNodeNumber **do**
6: $X^0 \leftarrow$ instances of B^0 which fall into Tree.LeafNode$_j$
7: **if** $|X^0| > 0$ **then**
8: $X \leftarrow$ Pseudo instances from Tree.LeafNode$_j$
9: $X^0 \leftarrow X^0 \cup X$
10: Tree.LeafNode$_j \leftarrow$ *SENCTree*(X^0)
11: **end if**
12: **end for**
13: recalculate $\hat{\tau}$ for Tree
14: *SENCForest*.Tree[i] $\leftarrow$ Tree
15: **end for**

6. CONCLUSION

We 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. 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. Embedded sub-trees are a generalization of induced sub-trees, which allow not only direct parent child branches, but ancestor-descendant branches. For example, when there is an interaction of propose, there always follows a comment, directly or indirectly. Finally, we plan to incorporate more meeting content in both amount and category. The current meetings are all task oriented. 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.

7. REFERENCES

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