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Business intelligence an approach to understand human behavior pattern

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Abstract

Human interaction is one of the most important characteristics of group social dynamics in meetings. 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

Keywords: decision support systems, query, OLAP, data mining, stemming

Business intelligence (BI) is a broad category of applications and technologies for gathering, storing, analyzing, and providing access to data to help enterprise users make better business decisions. BI applications include the activities of decision support systems, query and reporting, online analytical processing (OLAP), statistical analysis, forecasting, and data mining.

Business intelligence involves business layer, Administration and operation layer and implementation layer. BI decision-support environment is to provide cross-organizational business analysis capabilities to all business people and all departments in the organization. That involves a variety of new tasks, shifted roles and responsibilities, and a more hands-on business intelligence project planning and management approach.

Everyone manages the data warehouse up to some extent, but the scope of management activities varies with the person doing it. The implementation of Business intelligence in designing the data warehouse manages day to day activities of executives, managers, customers, suppliers, operation workers in a efficient way which includes OLAP that is not available in the current data warehouse. It is used for information consumers and information producers to extend and mange their organization in a efficient way using OLTP(Online Transaction Processing) and OLAP (Online Analysis Processing) .Proposed prototype can be applied in the business model for identification, comparison and evaluation of data's.

The BI plays the vital role for managers, performance management, quality of customer service, process improvement and operational BI

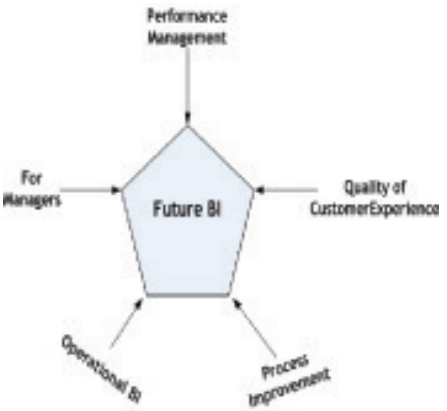

Fig. 1: Roles of BI

Business intelligence applications can be:

- Mission-critical and integral to an enterprise's operations or occasional to meet a special requirement
- Enterprise-wide or local to one division, department, or project
- Centrally initiated or driven by user demand

Business Intelligence information and applications available broadly to employees, consultants, customers, suppliers, and the public. The key to thriving in a competitive marketplace is staying ahead of the competition. Making sound business decisions based on accurate and current information takes more than intuition. Data analysis, reporting, and query tools can help business users wade through a sea of data to synthesize valuable information from it - today these tools collectively fall into a category called "Business Intelligence."

Human interaction is one of the most importat characteristics of group social dynamics in meetings. We are developing a smart meeting system for capturing human interactions and recognizing their types, such as proposing an idea, giving comments, expressing a positiveopinion, 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, andwhat 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.

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 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.

Human Interaction is a vital event to understand communicative information. Understanding human behavior is essential in applications including automated surveillance, video archival/retrieval, medical diagnosis, and human-computer interaction. The advent of smart meeting that automatically records a meeting and analyzes the generated audio-visual content for future viewing .such kind of group social dynamics can be useful for determining whether meeting was well organized and whether the conclusion was rational. Human interaction plays an important role in understanding this communicative information and different from physical interactions (e.g. turn-taking and addressing), the human interactions here are defined as behaviors among meeting participants with respect to the Current topic, such as proposing an idea, giving some comments, expressing positive opinion, and requesting information. When incorporated with semantics (i.e. user intention or attitude towards a topic), interactions are more meaningful in understanding conclusion drawing and meeting organization. The interaction issues including turn-taking, gaze behavior, influence and talkativeness and analyzing user interactions during poster presentation in an exhibition room are mainly focus on detecting physical interactions between participants without any relations with topics.

Discovering hidden time patterns in behaviour:T-patterns and their detection

This article deals with the definition and detection of particular kinds of temporal patterns in behaviour, which are sometimes obvious or well known, but other times difficult to detect, either directly or with standard statistical methods. Characteristics of well-known behaviour patterns were abstracted and combined in order to define a scale-independent, hierarchical time pattern type, called a T-pattern.

A corresponding detection algorithm was developed and implemented in a computer program, called Theme. The proposed pattern typology and detection algorithm are based on the definition and detection of a particular relationship between pairs of events in a time series, called a critical interval relation. The proposed bottom-up, level-by-level (or breadth-first) search algorithm is based on a binary tree of such relations. The algorithm first detects simpler patterns. Then, more complex and complete patterns evolve through the connection of simpler ones, pattern completeness competition, and pattern selection. Inter individual T-patterns in a quarter-hour interaction between two children are presented, showing that complex hidden T-patterns may be found by Theme in such behavioural streams. Finally, implications for studies of complexity, self-organization, and dynamic patterns are discussed.

A Pattern Mining Method for Interpretation of Interaction

This paper proposes a novel mining method for multimodal interactions to extract important patterns of group activities. These extracted patterns can be used as machine readable event indices in developing an interaction corpus based on a huge collection of human interaction data captured by various sensors. The event indices can be used, for example, to summarize a set of events and to search for particular events

because they contain various pieces of context information. The proposed method extracts simultaneously occurring patterns of primitive events in interaction, such as gaze and speech, that in combination occur more consistently than randomly. The proposed method provides a statistically plausible definition of interaction events that is not possible through intuitive top-down definitions. We demonstrate the effectiveness of our method for the data captured in an experimental setup of a poster-exhibition scene. Several interesting patterns are extracted by the method, and we examined their interpretations.

A typical Enterprise

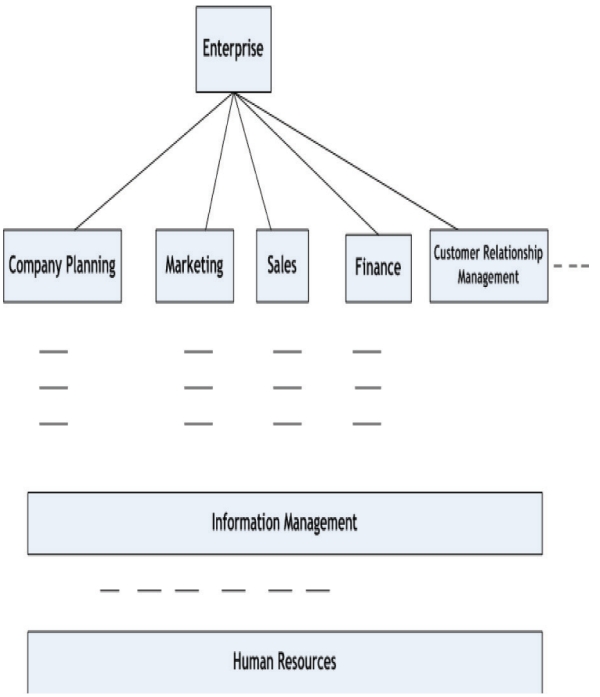

Fig. 2: Strategies of BI

Business Intelligence in IT

- Payroll processing applications
- Online Transaction Processing Systems
- Train/Air reservation application

Business Process / Model Innovation

- Amazon book store

Key purpose of using BI

IT application like payroll processing ,consider payroll has a key IT application for HR function. The core purpose of the IT application is to calculate the salary payable to all.

Employees, generate pay slips and inform the bank for funds transfer to the respective employee accounts. The same work can definitely be done manual but the manual system works well when the number of employees is small ans salary computation is simple. for eg . if there are 10,000 employees to pay and the salary calculation needs to take care of several data pieces like leave, over time, promotions, partial working and so on, and the entire work needs to be done very quickly? Needs to face many challenges there could be computational errors and wrong assumptions that would lead to delay and dis satisfaction. However when the salary calculation is automated, the benefits gained will be speed, accuracy, and the ability to repeat the process any number of times. These IT applications also help in fast information retrieval and generate statutory report. Such a type of application is termed as Department IT application. A payroll IT application generates computed data, and the volume of such data increases with every successive payroll run. This kind of historical data is very useful in business analytics. Some common IT applications like Train/Bus/airline ticket reservation systems. These are called online transaction processing. Online transaction also generate large volumes of data, typically stored in RDBMS.

Human interaction in meetings has attracted much research in the fields of image/speech processing, computer vision, and human-computer interaction two-layer Hidden Markov Model (HMM) framework. The AMI project was proposed for studying human interaction issues in meetings, such as turn-taking, gaze behavior, influence, and talkativeness. Otsuka et al. used gaze, head gestures, and utterances in determining interactions regarding who responds to whom in multiparty face-toface conversations. DiMicco et al. presented visualization systems for reviewing a group's interaction dynamics, e.g., speaking time, gaze behavior, turn-taking patterns, and overlapping speech in meetings. In general, the above-mentioned systems aim at detecting and visualizing human interactions in meetings, while our work focuses on discovering higher level knowledge about human interaction.

We propose a mining method to extract frequent patterns of human interaction based on the captured content of face-to-face meetings.

Treebased interaction mining algorithms are designed to analyze the structures of the trees and to extract interaction flow patterns.

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.

An interaction flow that appears frequently reveals relationships between different types of interactions. For instance, if one type of interaction appears, what is the probability of another type following it?

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 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.

System Architecture

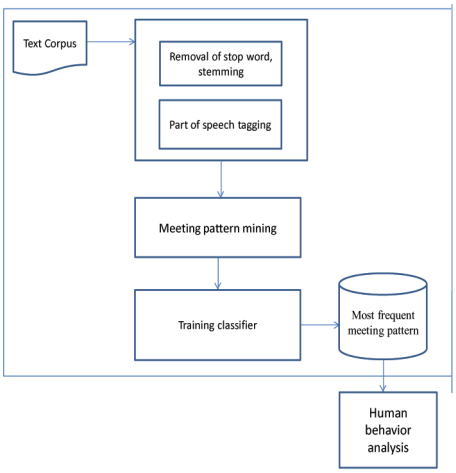

Fig. 3: Architecture of pattern mining

Modules

Module 1 : PRE-PROCESSING
Module 2 : PATTERN MINING
Module 3 : CLASSIFICATION
Module 4 : CLUSTERING
Module 5 : Evaluation parameters & Strategy

Module 1: Pre-Processing

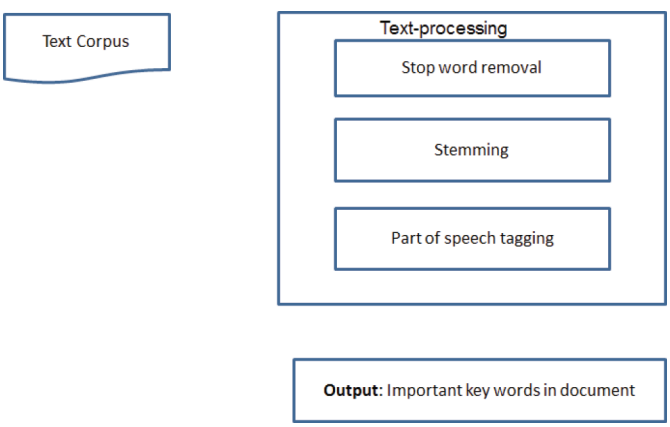

Fig. 4: Representation of text processing

- Input:
  Set of minutes of a meeting
- Methodology:

1. Stop word removal
2. Stemming (Porter Stemmer Algorithm)
3. Part of speech tagger

- Output:
  Important keywords in the document

Module 2 Pattern Mining

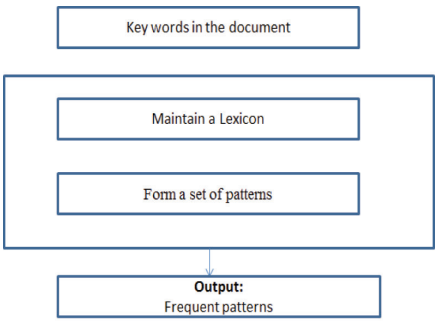

Fig. 5: Representation of pattern mining

- Input: keywords in the document
- Methodology:

1. Associate the keywords and group them
2. Form a set of patterns PRO-COM, PRO-ACK, PRO-COM-ACK, PRO, PRO-COM-COM-ACK
3. Apriori algorithm

- Output: Frequent patterns

Module 3 Classification

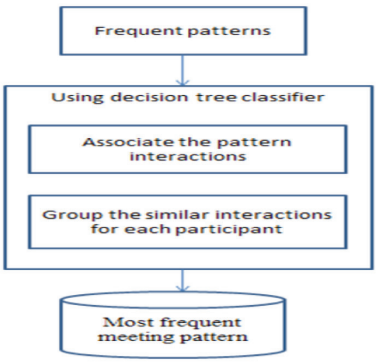

Fig. 5: Classification of patterns

- Input : Frequent patterns
- Methodology:
  - Classifier : C4.5 decision tree
  - Output:
  - Summary of patterns and the corresponding participant

Eg: P1 commented twice, P2 proposed once

Module 4: Clustering

- Input: Interaction patterns and the identity of the participant
- Methodology: k-means clustering
- Output: Behavior of participant identified, if the person's Proposal level is high then he will have a passion in the enhancement of the organization.

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