A Noval Approach for Process Mining Using Concept Drift

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ABSTRACT

The development in the operation systems for business process gives a strict rule to provideinnovative analysis andmethodologies. Due to the frequent changes drifts may occur. Drifts are known as continuously occurring changes. These changes occur due to the seasonalinfluences which affects occur due to the new legislation of the country. For this, process mining is recommended. This process mining helps in maintaining the steady state in business process. Process mining is combined with data mining for large data processing. This approach is referred to as businessintelligence (BI) and business processmanagement (BPM).Process mining extracts the knowledge from event logs recorded by the information system. Process mining is implemented as the real time example in Dutch municipality. Enterprise resource planning (ERP) and work flow management systems (WFMS) are used to support the process mining is the business process.

KEYWORDS:*Business intelligence (BI),business process management (BPM) enterprise resource planning (ERP), work flow management systems (WFMS).*

INTRODUCTION:

The methods in process mining have become more matured in the recent years. [2] The process provided is unstable and traces have been recorded, so it is possible for discovering a high speed and high-quality process. [7]The high-quality process produced should reduce the costs and simultaneously improve the performance of the system. [10]The customers expect the today's business process to adapt thetoday's business circumstances and be flexible to the changes.[9]Manylegislation acts were developed to extreme variations and customer's demands which are affected seasonally due to the

natural calamities which lead to thedisasters of the business organization which leads to changes in process. [5]Enterprise resource planning (ERP) and workflow management systems used to support the business process. [8]Business process like procurement, operations, logistics, sales and human resources must be supported and frequently monitored in the modern companies. [6]The increase in the integration system does not only provide the idea to increase the effectiveness and efficiency and also the possibilities of producing of new access and analysis. [11]The application of techniques and tools for generating information from digital date is called business intelligence (BI). [1]Business intelligence uses two Approaches they are online analytical processing (OLAP) and date mining. [13]OLAP approaches uses tools like analyzing multidimensional date using operators like roll-up and drill down, Sliceand dice or split and merge. [3]And data mining helps for discovering patterns among verylarge sets.[4] But the development in thetodays technologies has not only become a blessing in our world. But also have become a curse also.[14]Hence, the cause of information overflow, date explosion and big data illustrate several problems have arise from numerous amount of data. [12]Where humans cannot handle large amount of

data, so data mining process finds the patterns and relationships and analyze them. Here the overall abstraction obtains which reduces the complexity and process easy. [17]The aim of process mining extracts the information about business process. Process mining contains the techniques, tools and methods to discover monitor and improve real processes by extracting knowledge from event logs. [15]Process mining behaves as the connecting bridge between data mining and business process management.[20] Process mining evolved in thecomputer engineering processes by Look and Wolf in 1990's and Karagiannls introduced the concept of workflow in process mining.

[19]For example: if there is a natural calamity during the economic success of an organization, then the operation procedure changes. For the welfare success of an organization they should be ready to adapt the changes that arisesuddenly. This concept is known as concept of drifts.

[16]Concept drifts refers to situation in which the process in changing while being analyzed. [18]Process is changed according to three main perspectives, such as control flow, data flow and resources. This defines the changes done when, how, by whom? Concept drifts satisfies the law of second order of dynamics. Hence, analyzing the changes is the utmost importance during supporting and improving the operations. The min step to detect the concept drifts is to detect the time at which change occurs, the concept drifts should be able to detect the process changes at the onset of the season.[20]So, by this time period were the changes occur is detected from this the event log of an organization is analyzed.

Hence the drift as been detected then the next step is to charge and characterize the event log to find a suitable solution by referring the time period, the region of change….so on. Hence these drops are compensated in some business organization by implementing the idea of discount offers in holiday seasons…etc.

METHODS

The methods involved in process mining mainly concentrate to detection, localization, characterization and process discovery. Process can change according to mainperspectives like control, data and resources. There are three main topics which deal with the topics of concept drifts in process mining.

a)CHANGE POINT DETECTION:

The first and initial step is to detect the point at which concept drift occurs. Once the concept drift has been detected next step is to identity the time periods at which changes have taken place. And another method to analyze the event log from an organization. So, the process should be in such way that it should be able to detect process changes happen and that the changes happen at the onset of season. Once the drift has been identified the detection process follows these two steps i) capturing the characteristics traces, ii) identifying when these characteristics changes.

b)CHANGE LOCALIZATION AND CHARACTERISTION:

Once the process has been identified, the next step is to characterize the nature of change, the region of change. So finding these changes is really a challenging job because it involves both identification of change perspective and identification of the exact change itself. For example, of seasonal

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process, the change should be like more resources are developed or announcing special offers during holiday seasons.

c)CHANGE PROCESS DISCOVERY:

So after identified, localized and characterized the changes the next step is to put all these factors into perspectives. There is a great need of techniques and tools which are used to relative operations. Unravelling the evolution of the process must result in the discovery of the change process which satisfies the second order dynamics. This process can also be shown through animation which explains how the overall process is evolved over the period of time with annotations showing several perspectives based on performance metrics.

To satisfy, the above three perspectives, process mining is used. This process mining consists of the activities like: i) data extraction, ii) data filtering and loading, iii) mining and reconstruction, iv) analysis.

DATA EXTRACTION

Here, after the place at which the concept drift is identified then process mining extracts the data where all details are obtained.

DATA FILTERING AND LOADING

Once the extracted details have been obtained then they are filtered to reject all the problem causing cases and the obtained data's are loaded again.

MINING AND RECONSTRUCTION

Thus obtained details after loading the data is mined and reconstructed to the adaptable format.

ANALYSIS

After the final product is received it is analyzed and checked before deployment. If the process is not analyzed it may produce heavy loss to the particular organization.

MODULES

The main modules used in concept drifts in process mining are

DISTINGUISING NOISE AND INCOMPLETENESS

Erroneous records in the event log should be distinguished from the process called noise. Thus, process mining should be able to handle noise.

DEALING WITH COMPLEX EVENT LOGS

Events in the event log produces case, hence the process mining must be able to store high quality even data. This is based on system's ability to record.

FINDING, MERGING AND CLEANING OF EVENT DATA'S

Data can be distributed to different sources, so, this data must be merged or else this may produce some problems. Here, event data's does not point to exact process instances, it may contain exceptions (error). Hence it needs debugging. Event occur in particular context like weather, workload ….etc , were the response time is longer than usual

DEALING WITH CONCEPT DRIFT

The concept drift refers to the situation at which the process changes while analyzing. Hence, this gives rise to drifts.

CROSS ORGANIZATIONAL MINING

Process mining concentrates only on single organization, but there is a scenario where the event logs of multiple organizations are available for analysis. Here in cross organizational mining, consider the collaborative setting where different organization work together and it considers the

setting where different organizations are essentially executing the same process while sharing experiences.

PROVIDE OPERATIONAL SUPPORT

Initially process mining was on the analysis of historical data. Hence, the software have be updated process mining should adaptoffline- analysis and also be used for online operational support.

RELATED WORK

For the last decades many research have been taken based on working flexibility business process. They are of three main categories: 1) sudden, 2) anticipatory,3) evolutionary. The first published work on concept drift in process mining was done by JC Bose et , which deals handling drift in process mining through offline.

CONCLUSION

Thus the concept drifts in process mining have been analyzed using many perspectives and process mining behaves has the bridge between data mining and business process management. Through this assumption an individual organization can detect changes in real-life event logs. Thus process mining helps in detection, verification, monitoring of concept drifts.

FUTURE WORK

Hence for the future enhancement the process mining process should try to balance the quality criteria such as fitness,simplicity, precision and generalization.

And also process mining can also be combined with other types of analyze

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