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# Visuliazation of Business Process and Its Risks Using Process Mining

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***Abstract:*** ***This document gives information about the system which was able to efficiently analyse the log data with the help pf Digital Twin of an Organization. The system which was able to identify the bottlenecks and eliminate those bottlenecks present in the business model. The system which is succesfull in animating the Digital Twin of an Organization with the help of the log data and also successful in checking the compliance of the Expected Model with the As-Is Model.***
***Keywords: Process mining, Business process mining, Digital twin of an Organization, Compliance Check, Conformance check, Animation.***

## I. INTRODUCTION

Process mining is a strategy related to data science and process management which is mainly used to analyze the processes based on event logs. The goal of process mining is to transform event data into details and actions with the help of graphics. Process mining techniques use event data to show what people, machines and organizations are actually doing [1]. Process mining will be able to provide new information about the process that can be used to identify the existing technique in the process and to address their operational and compliance issues.

Process mining helps the organization or an individual to easily identify information from event data and also be able to identify possible threats in the business process.

The process of process mining starts with the event data which can also be referred as transaction data. This transaction data is the input that will be passed to the system for identification of the process. This transaction data contains a lot of information that cannot be identified by humans easily. Each transaction contains various attributes like Id, Name, Time duration or Timestamp and in some cases these transactions will also contain additional information like descriptions, start date, end date, role, resource, cost etc. It is very difficult to visualize all these attributes without using tools. With the help of some process mining tools we can easily visualize these transactions.

Process mining tools also provide graphical representation which makes it very easy for anybody to understand the content and the actual flow of the business process. After representing these transactions in various forms, the process mining tool will be able to identify the present bottlenecks in the business process[2]. Every organization wants to eliminate the existing bottlenecks in their process in order to increase their efficiency and reduce their cost [3]. Process mining helps organizations to easily remove existing bottlenecks in the system and reduce the cost.

## II. PROBLEM SPECIFICATION

In every business organization, Time is equivalent to money. The faster the organization completes the task the more revenue it can generate. In order to reduce the time required to complete the given task we need to identify what actually the business process is. Identifying and removing of the existing bottlenecks in the system is necessary to decrease the time required to complete the business process.

Business models are more important to identify the present bottlenecks[4]. One can identify the present bottlenecks in the system only if the actual business model is completely visible and it will be better for analyzing if there will be a graphical representation of the business model. Representing the business model is not an easy task [45].

Identifying the business model was made manually through the help of the transaction data which was taking a lot of time, more time means more money required.

The transaction data contains a lot of information related to the business organization and extracting only necessary information from the transaction data is tedious work to do manually [6]. This is the time where we need a system to use these transaction logs to extract only the necessary information and graphically represent the data in the form of a business model. Business model can then be used to analyze the working of the business process and identify the present bottlenecks in the business model in order to increase the efficiency of the business organization.

 

## III.SOLUTION

The proposed system is going to concentrate on reducing the efforts required to analyze the business process. Business process (e-commerce) is a process that is owned by any Business organization (Flipkart) [7]. These Business organizations use their business process to perform their business and earn money out of it. By reducing the cost required to run these business processes one can increase the profits for the business organization [8]. The system will make money from the business organization as the system will reduce the cost and increase the revenue for the business organization.

The design criterion lays out the features of the component. A system specification is really the business's requirement, which will also be required to be fulfilled [9]. Functional specifications include visualization, animating, simulating, data handling and retrieval. In addition to delivering the production to each module, certain criteria must be met.

*1) Module 1: Digital Twin*

The purpose of this module is to generate a graphical representation of how the process is actually working within the boundaries of the Organization.

Input : Recorded Transactions Data

Output : Digital Twin which is the graphical representation of the process model

*2) Module 2: Animation*

The purpose of this module is to animate the workflow of the process in order to understand the process efficiently.

Input: Log Data of all transactions

Output : Animation of the Digital Twin of the Organization

*3) Module 3: Conformance Check*

The purpose of this module is to compare the As-Is model with the expected model and identify the deviations in the model.

Input: Digital Twin, Expected model.

Output : Comparison result between As-Is model and the Expected model

*4) Module 4: Simulation*

The purpose of this module is to simulate the process to analyze the behaviour of the process after few changes without actually incorporating those changes

Input : Digital Twin, Simulated values

Output : Predictions of the simulated model

### *A. Non-Functional Requirements*

Non-Functional requirements specify the quality attribute of a system[38]. System allows users to impose constraints or restrictions on the system. Non-functional requirements specify the system's 'quality characteristics' or 'quality attributes' [39].

1) *Usability:* Usability is the degree of ease with which the user will interact with the system, tools and metrics to make better decisions.
2) *Readability:* Reports and Metrics show the possibility of any system to fail. To achieve high reliability, one should eliminate all bugs and dummy data that may influence issues while performing analysis on the transaction data.
3) *Performance:* Performance describes how systems' decision matter when the data is related to clients. Poor performance may lead to the failure of the system.
4) *Subjective Nature:* Different users can view, interpret and evaluate various widgets in different ways.
5) *Portability:* The system should be able to perform all the intended tasks without causing any errors when performed on various devices and irrespective of their operating systems.
6) *Availability:* The system should be available to use for more than 98% of the time without causing any disturbance for any business organization.
7) *Reusability:* The system should be capable of having different data and should not require rebuilding the entire application when required to perform process mining for different business organizations.
8) *Security:* The system handles a lot of sensitive information of various business organizations and should not be in any stage to compromise that sensitive information.

## IV. CONCLUSIONS

The Visualization of Business Process and its Risks using Process Mining system has been optimized to reduce the manpower required to visualize the data. The system makes use of the process mining tools in order to visualize the transaction data and identify the present bottlenecks in the business process. An agile methodology of software development was used in the development of this system. This technique divides the main goal into various sub modules and tries to solve the sub modules which in return will solve the main problem. An agile sprint will be taking place for every fortnight to a month in order to track the status of the system development and to improve the development speed.

The transaction logs contain a lot of information about the business process and too much information that a normal person cannot identify with his naked eye. Identifying the business model manually with the help of these transaction data is also a tedious job to do. We require an automated system which can perform all the jobs like identifying the business model, extracting necessary information from the transaction data and also some additional jobs like animating the business model and simulating the business model with some changed attributes for the better analysis of the business process. The proposed system was able to successfully achieve the tasks with the help of process mining tools namely MyInvenio and Apromore. The system also used Knime analytics platform for the pre-processing of the data. Real time tracking of employees was not possible as it included task mining technology and was going out of the scope of our project.

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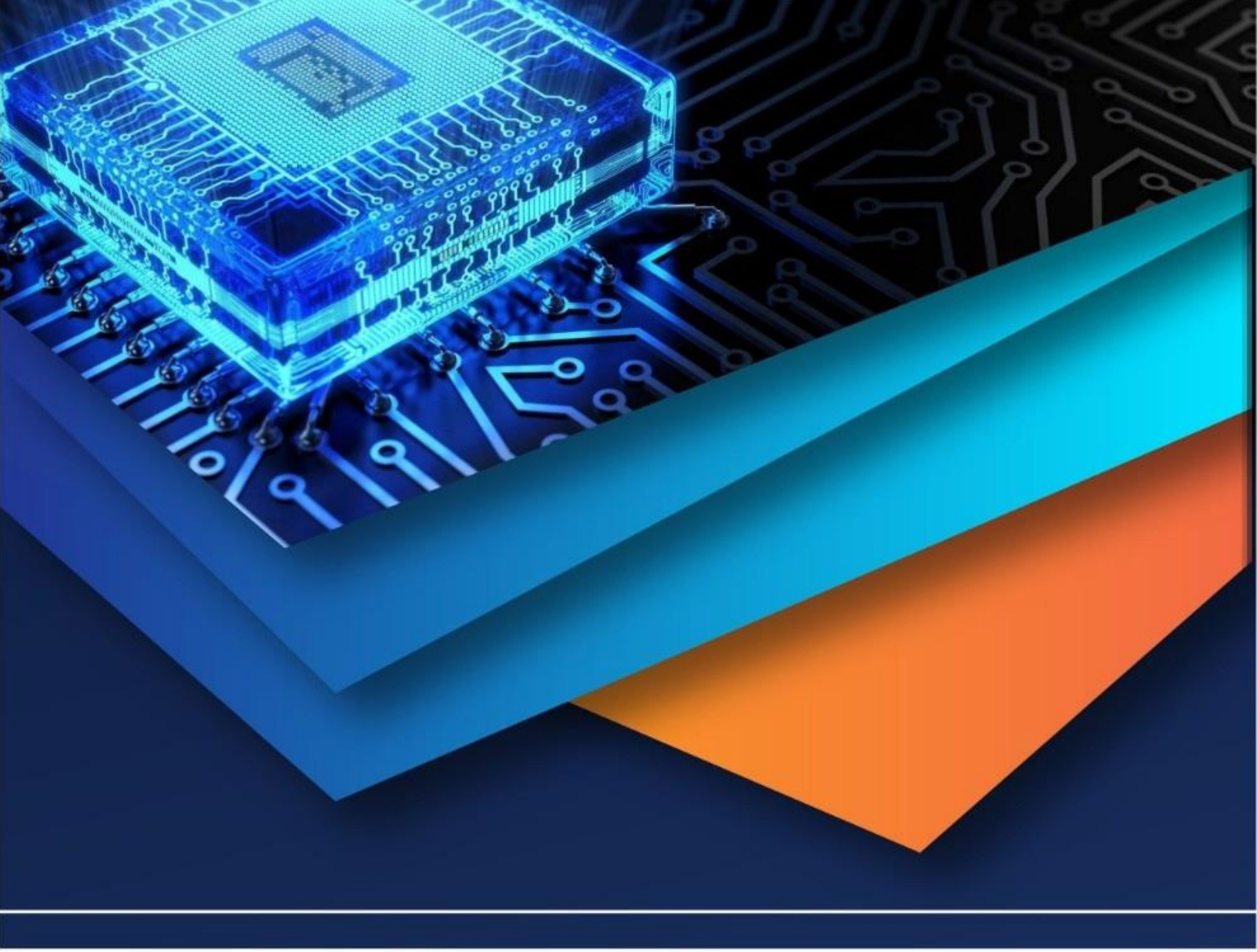

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