An Internship Report

on

PROCESS MINING VIRTUAL INTERNSHIP

Submitted in partial fulfillment of the requirements

for the award of the degree of

BACHELOR OF TECHNOLOGY

in

Computer Science and Engineering (Data Science)

by

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)

SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY
(AUTONOMOUS)

(Affiliated to JNTUA, accredited by NAAC with 'A' Grade, Approved by AICTE, New Delhi & Accredited by NBA (EEE, ECE & CSE))
Rotarypuram village, B K Samudram Mandal, Ananthapuramu-515701.

2024 - 2025

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Certificate

This is to certify that the internship report entitled "Process mining virtual internship" is the bonafide work carried out by **R.SURAIAH KHAISAR** bearing Roll Number 224G1A3298 in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering (Data Science)** for 10 weeks from April 2024 to June 2024.

Internship Coordinator   **Head of the Department**

Mr. P. Veera Prakash, M. Tech., (Ph.D.),   Dr. P. Chitralingappa, M. Tech., Ph.D.,
Assistant Professor & HOD of CSE   Associate Professor

Date: **EXTERNAL EXAMINER**

Place: Ananthapuramu

PREFACE

The All India Council for Technical Education (AICTE) is a statutory body, and a national-level council for technical education, under the Department of Higher Education. Established in November 1945 first as an advisory body and later on in 1987 given statutory status by an Act of Parliament, AICTE is responsible for proper planning and coordinated development of the technical education and management education system in India.

Purpose:

The AICTE Act was constituted to provide for the establishment of an All India Council for Technical Education with a view to proper planning and co-ordinated development of a technical education system throughout the country, the promotion of qualitative improvements of such education in relation to planned quantitative growth, and regulation & proper maintenance of norms and standards in the technical education system and for the matters connected therewith.

Company's Mission Statement:

Providing affordable education to all. Making Indian Technical Education globally acceptable. To be a forward-looking organization that has an efficient, flexible and empowered manpower, sensitive to stakeholders' expectations**.**

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- ➢ Regulation and Accreditation

- ➢ Maintain standard norms

- ➢ Allocate Funds

- ➢ Grant approvals to institutions

- ➢ Ensure integrated developed

- ➢ Evaluate courses and programs

ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mention of people who made it possible, whose constant guidance and encouragement crowned our efforts with success. It is a pleasant aspect that I have now the opportunity to express my gratitude for all of them.

It is with immense pleasure that I would like to express my indebted gratitude to my internship coordinator **Mr. P. Veera Prakash, Assistant Professor & HOD, Department of Computer Science and Engineering**, who has supported me a lot and encouraged me in every step of the internship work. I thank him for the stimulating support, constant encouragement and constructive criticism which have made possible to bring out this internship work.

I am very much thankful to **Dr. P. Chitralingappa, Associate Professor & HOD, Computer Science and Engineering (Data Science),** for his kind support and for providing necessary facilities to carry out the work.

I wish to convey my special thanks to **Dr. G. Balakrishna, Principal** of **Srinivasa Ramanujan Institute of Technology** for giving the required information in doing my internship. Not to forget, I thank all other faculty and non-teaching staff, and my friends who had directly or indirectly helped and supported me in completing my internship in time.

I also express our sincere thanks to the Management for providing excellent facilities and support**.**

Finally, I wish to convey my gratitude to my family who fostered all the requirements and facilities that I need.

R.SURAIAH KHAISAR

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LIST OF ABBREVIATIONS

CSV	comma-separated values
ERP	Enterprise Resource Planning
MRI	Magnetic Resonance Imaging
PM	Process Mining
RPA	Robotic process automation
SRM	Supplier Relationship Management
XML	Extensible Markup Language.

CHAPTER 1

INTRODUCTION

The developing need of getting to know greater about how the technique executes inner real international inner a corporation has superior, there can be boom inside the usage of gadget mining techniques. process mining factors out the hassle which maximum 'method owners' has very restricted know-how about what's truly taking place their organization. In workout, usually a giant sag among whatever predefined or alleged to show up, & what virtually its does. The purpose of system mining is to deliver permission for analyses the employer machine generally on basesof event going on.

- It makes use of a tool which provides information about how people & techniques in reality art work, thinking about SAP events logs all transactions that comprises of the humans and technique it is a top-notch example.

- Technique mining is a useful weapon to look at the predefined strategies and the real set up. The numerous records mining techniques consisting of sophistication, association, clustering are in most times used to first rate step within the ordinary industrial company approach however can't completed to recognize and test a technical as a one. It extracts recognize – how from occasion logs.
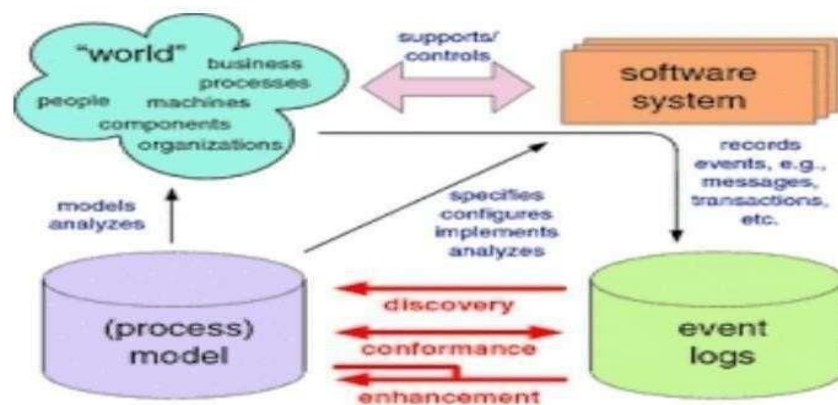

Fig 1.1 Types of Process Mining Techniques

The researchers approximately the data of system mining. It studies location, it consists of manner modelling and method evaluation, along with company intelligence

& records mining. It is also used as even a tool that offers that offers information techniques, one-of-a-kind technique mining algorithms, challenges and location of software program had been described.

An event can be described as a bypass time just like the vicinity to start of the manner mining. A chronological relation among occasions is wanted in manner mining strategies. every hobby is a totally particular method instance, i.e it is a part of particular event, moreover, extra statistics collectively with the supply starting or vehicle hobby (someone or a tool), the prevalence and finishing time of activities (may be interest statistics elements enlisted with the incident) consisting of the scale of an order), this is needed that lets in you to generate a realistic version.

1.1 Process Mining Techniques

There are three types of Process Mining techniques

- **Process Discovery:** This method take no-from the earlier route blueprintspecifically in view of an event log some diagram is built. For instance, the usageof the alpha arrangement of rules, a gadget pattern might be found in view of low stage exercises.

- **Process Conformance:** This strategy adopts a present strategy pattern. This construction is utilized as a source of perspective and investigate if reality take after the blueprint for instance, there might be a technique composition showing demonstrating that buy request of numerous thousand Rupees required evaluations.

- **Process Enhancement:** This method takes the present system pattern. This pattern is increment with a greatly cutting edge component or outlook particularly the design isn't check conformance anyway endeavours to separate new from it for instance inside the location of data conditions.

CHAPTER 2

PROCESS MINING

Process mining is a set of techniques for the analysis of operational processes based on event logs extracted from company's databases, information systems, or business management software such as enterprise resource planning (ERP), customer relationship management (CRM), electronic health records (EHR), etc. In simple words, it's about finding out how the processes are actually performed to discover problems and areas for improvement.

2.1 History

The term "Process mining" was first coined in a research proposal written by the Dutch computer scientist Wil van der Aalst. Thus began a new field of research that emerged under the umbrella of techniques related to data science and process scienceat the Eindhoven University in 1999. Process mining is a relatively recent field that emerged at the intersection of data mining, business process management, and information systems. It involves the analysis of event logs from various systems to gain insights into business processes. The history of process mining can be summarized as follows:

- Emergence of Process Mining (Late 1990s - Early 2000s): The roots of process mining can be traced back to the late 1990s when researchers like Wil van der Aalst began exploring ways to analyze event logs generated by information systems. These logs contained valuable data about how business processes were executed, but extracting meaningful insights from them was a challenge.

- Early Research and Algorithm Development (Early 2000s - Mid 2010s): In the early 2000s, researchers started developing algorithms and methodologies to analyze event logs and extract process-related information. The "workflow nets" proposed by van der Aalst were among the early formalisms used to model and analyze processes. The Alpha algorithm (2004) and Heuristics Miner (2007) were significant developments during this time, enabling automated process discovery from event logs. As organizations recognized the value of datadriven insights into

their processes, process mining started to be adopted in various industries. Commercial process mining tools emerged, offering user-friendly interfaces and advanced analysis capabilities.

- Industry Adoption and Commercial Tools (Mid 2000s - Mid 2010s): As the potential value of process mining became evident, industries such as finance, healthcare, manufacturing, and telecommunications started adopting processmining techniques. Organizations recognized that analyzing event data could lead to better process optimization and compliance. Commercial process mining tools like ProM (open-source) and Celonis (commercial) emerged to support these efforts.

- Expansion of Process Mining Capabilities (Late 2010s - Early 2020s): Process mining continued to evolve, incorporating more advanced capabilities. Conformance checking, which compares actual process execution to a model to identify deviations, gained prominence. Predictive analytics started being appliedto forecast process behaviour, while prescriptive analytics provided recommendations for process improvement. The foundations of process mining were laid in the early 2000s, with researchers like Wil van der Aalst and others exploring ways to extract process-related information from event logs generated by information systems.

- Integration with Advanced Technologies (Late 2010s - Present): With the rise of artificial intelligence and machine learning, process mining began to integrate these technologies. This enabled more sophisticated analysis, anomaly detection, and even automated decision-making within processes. The combination of process mining and robotic process automation (RPA) allowed for end-to-end process optimization. The integration of process mining with other technologies like machine learning and artificial intelligence became more common, enabling more sophisticated analysis and automation. rocess mining continued to evolve,incorporating more advanced techniques such as conformance checking, predictive analytics, and prescriptive analytics. The integration of process mining with other technologies like machine learning and artificial intelligence became more common, enabling more sophisticated analysis and automation.

CHAPTER 3

CHARACTERISTICS

3.1 Process mining is not limited to control –flow Discovery

Gadget mining isn't confined to control coast revelation. The disclosure of way models from event logs powers the creative energy of the two professionals and educator's accordingly, control drift revelation is frequently unmistakable in light of the fact that the greatest exciting segment of way mining.

3.2 Process mining is not just a specific type of data mining

Isn't just a specific sort of data mining technique mining might be noticeable as a result of the truth the "lacking connection" among realities mining and customary rendition driven BPM. Most extreme insights mining systems aren't technique driven even the slightest bit. Technique models most likely demonstrating simultaneousnessare unique to smooth information mining frameworks together with choice trees and affiliation rules. hence, really new styles of portrayals and calculations are required.

3.3 Process mining is not limited to offline analysis

Isn't limited to disconnected evaluation gadget mining procedures extricate from old event data. never again withstanding of reality "submit mortem" records is utilized; the outcomes can be connected to walking times. Section headings should be left justified, bold, with the first letter capitalized and numbered consecutively, starting with the Introduction. Sub-section headings should be in capital and lower-case italic letters, numbered 1.1, 1.2, etc, and left justified, with second and subsequent lines indented. All headings should have a minimum of three text lines after them before a page or column break. Ensure the text area is not blank except for the last page.
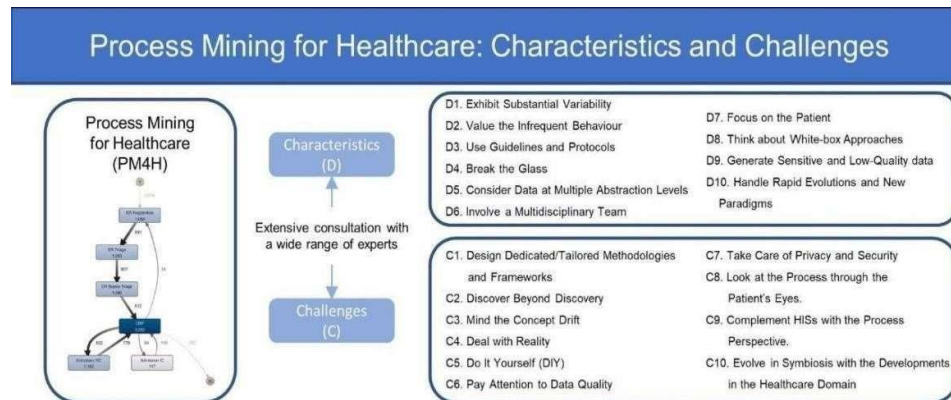
Fig 3.1: Characteristics of Process Mining

- Nowadays, many healthcare processes are – at least partially – supported by Health Information Systems (HISs). HISs that commonly support healthcare processes are Electronic Health Records (EHR) systems provided by vendors such as Epic, Cerner, MEDITECH, Allscripts[7], athenahealth, IBM, McKesson, and Siemens. Such systems record data about the execution of processes in a healthcare organisation. This process execution data can be leveraged to create an event log.

- Event logs containing process execution data are the primary input for process mining algorithms.

- An event log is composed of cases representing different process instances, e.g. the execution of a treatment process for a specific patient. Each case is composed of a sequence of events, where an event could refer to the completion of a particular activity in the treatment process. As illustrated in an event log typically records the following information for each event: (a) an identifier of each case ('Case id'), (b) the activities that each case included ('Activity'), and (c) a reference to when each activity was executed ('Timestamp'). Besides this information, an event log can also contain information regarding the type of event ('Transaction type'), the resource associated to an event ('Resource'), as well as other attributes regarding the activity or case.

CHAPTER 4

HOW PROCESS MINING WORKS

4.1 The four stages of Process Mining

The Celonis Intelligent Business Cloud delivers Process Mining in four key stages. In this section we're going to break down the different concepts, technologies, activities and people at work in each stage.
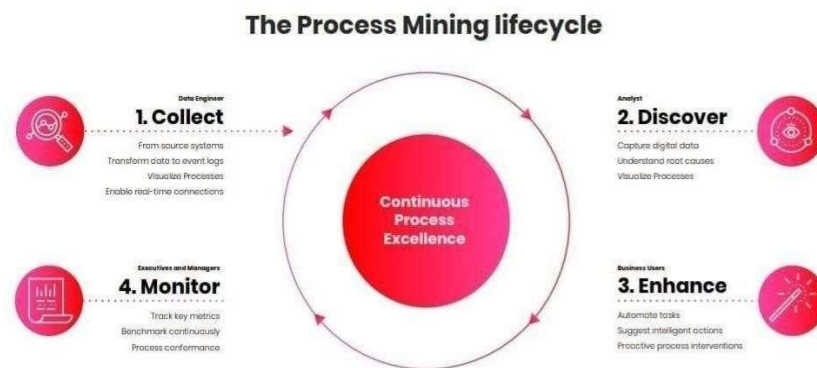
Fig 4.1: Life Cycle of Process Mining

4.2 Collect

raw data from source systems to create event logs

Every interaction inside the transactional systems your business runs on (like SAP, Oracle, Salesforce, ServiceNow, etc.*) leaves digital footprints—raw data that can be turned into a record of actions The first stage of Process Mining is for data engineers to establish a real-time link to those key data sources (through pre-built connectors and APIs), extract that raw data and turn it into an event log.

Event log have 2 parts:

- o An activity
- o A time-stamp

4.3 Discover

Analysing event logs at scale renders your whole process environment in a level of detail that whiteboards, interviews and process mapping software could never provide—every step of every process, every time it's ever been executed. In the second stage of Process Mining, data analysts methodically quantify the sum total of your process environment: every case, pathway, variation and error, as well as their business impacts.

- On-time delivery

- Working capital

- Customer satisfaction

- Risk reduction

- Operating costs

4.4 Enhance

The variations and root causes identified during the Discover phase form the basis of enhancement opportunities—practical actions that remove friction and automate flow for your human and digital work forces. In the third stage of Process Mining business users leverage AI and machine learning models to execute these enhancement actions across all relevant transitional systems within the same Process Mining interface.

These actions could be in service of:

- Correcting errors

- Removing erroneous steps (or adding new ones)

- Reducing manual effort

4.5 Monitor

Continual improvement is central to Process Mining—discovery, analysis and enhancement are on-going activities that keep your processes in tight lockstep.

● Hold teams accountable to progress against targets

● Course-correct in real time

Footprints—raw data that can be turned into a record of actions The first stage of Process Mining is for data engineers to establish a real-time link to those key data sources (through pre-built connectors and APIs), extract that raw data and turn it into an event log.

CHAPTER 5

PQL

The Process Query Language (PQL) is a domain-specific language tailored towards a special process data model and designed for business users. PQL enables the user to translate process related business questions into queries, which are then executed by a custom-built query engine. PQL covers a broad set of operators, ranging from process-specific functions to aggregations and mathematical operators. Its syntax is inspired by SQL, but specialized for process-related queries.

To gain valuable process insights, it is essential for Process Mining users to formalize their process questions as executable queries. For this purpose, we present the Celonis Process Query Language (Celonis PQL), which is:

- a domain-specific language
- tailored towards a particular process data model and e designed for business users.
- It translates process-related business questions into queries and executes them on a custom-built query engine, the Celonis PQL Engine.

Celonis PQL does not support all operators that are available in SQL. This is because customer requirements drive the development of the language, and only operators needed for the target use cases are implemented. Second, Celonis PQL is not supported by a data manipulation Language(DML).

As all updates in the Process Mining scenario should come from the source systems, there is no need to manipulate and update the data through the query language directly. Celonis PQL does not provide any data definition language (DDL). As the data model is created by a visual data model editor and stored internally, there has not been any need for creating and modifying database objects. In contrast to SQL, Celonis PQL is domain-specific and offers a wide range of Process Mining operators not available in SQL. Consequently, Celonis PQL seamlessly integrates the data with the process perspective. Celonis PQL is an integral component of the Celonis Software

Architecture. All Celonis applications use this language to query data from a data model.
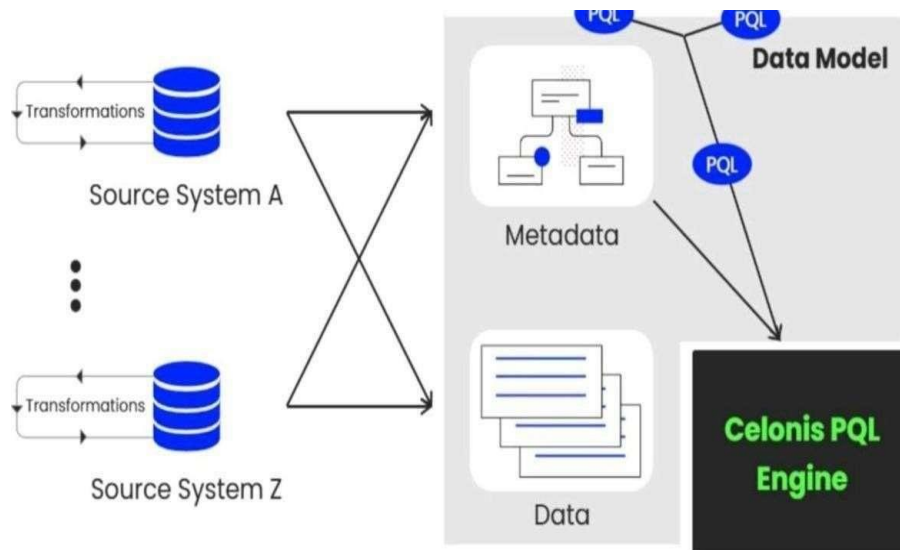
Fig5.1: celonis software architecture

Across all classes of operators, Celonis PQL follows four language features:

- First, operators usually create and return a single column that is either added to an existing table (e.g., the case or activity table) or to a new, temporary result table .But note, there are also a few operators that create and return one or more tables with multiple columns (e.g., for computing a process graph).
- Second, the supported data types comprise STRING, INT, FLOAT, and DATE.
- Third, Boolean values are not directly supported, but can be represented as integers.

CHAPTER 6

MODULES

6.1 Techniques of Process Mining

Every company's operations are centred on its business processes. Processmining techniques help you gain an understanding of your processes and the workflows that lead to the successful operation of your business. This lets you know how well these processes are working, what problems may exist within them, and how you can improve them to make your business run more smoothly. The technique an organization employs for process mining depends on the stage at which its process models are stored. The following are the most widely used process mining techniques.

6.2 Automated Process Discovery

Automated process discovery is a subset of process mining that defines the data-driven visualization of a process. It provides an intuitive, visual, and interactive method for exploring each and every step of processes in order to identify bottlenecks. It uses both machine learning and artificial intelligence to keep track of all the possible ways in which a process might be carried out and to suggest ways to automate them. As a result, process discovery aids in creating workflows and deploying automated processes quickly and efficiently.

The following are the steps involved in automated process discovery:

Data Extraction: Get data from a variety of sources in the form of event logs and performance metrics.

Event processing and mapping: Using the event logs, the collected data is analyzed and mapped out for each specific case. This is also the point at which process deviations appear.

Variations are usually due to manual changes or errors.

Create "as-is" processes by combining events: To fully comprehend each process variation and the associated subprocesses, the generated process maps must be combined and visualized

6.3 Conformance checking

Process mining makes use of event logs to show how a process works. Conformance checking is the process of comparing an actual process or event log to an existing reference model or target model. The event log and process model are used as inputs, and the output is diagnostic data showing the model's differences and similarities with the log. Event logs are examined for compliance with four main qualitydimensions:

- Fitness indicates how well the process model captures observed behaviour.

- Simplicity prevents models with excessive complexity.

Precision restricts process models that allow unlikely event log behaviour. Generalization refers to process models ability to generalize and recreate future behaviour, rather than capturing each log trace.

All quality dimensions must be considered when evaluating a process model. Performing conformance tests will reveal any discrepancies between the actual process and the ideal process or reference model. This entails skipping, duplicating, or performing unplanned process activities. Inaccuracies in these processes can lead to audit issues and other regulatory violations. In addition, process deviations may necessitate additional resources or undermine product or service quality, making it moredifficult to achieve the desired outcome. Because of this, the majority of process deviations lead to financial losses. Finding and correcting any unplanned process sequences is a top priority for businesses. In some cases, process adaptions require a shift in the target process model.

6.4 Performance Mining

This is sometimes called model enhancement, extension, or organizational mining. It is the process of analyzing a data-driven process model for potential optimization. The data-driven process paradigm uses a progress log. Depending on this information, changes or improvements are made. If these changes are not implemented correctly, they can have unintended consequences on the business. Performance mining results reflect analysis quality and serve as a benchmark for future analysis. These results are used in process discovery and conformance checking methods.

6.5 Variant analysis

Variant analysis techniques compare two or more event logs from different business process variants to determine their differences. Business processes can be analyzed from a distinct perspective using variant analysis techniques.

Control flow: Variants are compared based on the occurrence of activities in execution traces and their relative execution order.

Performance:

Variants are compared based on performance measures. Process variant analysis splits an event log into two sub-logs, each of which represents a cohort. The split can be carried out based on contextual data. Then, we can identify distinct process maps for each log file. Finally, we must compare these two process maps using various metrics (such as performance and control flow) in order to assist analysts.

CHAPTER 7

GOALS AND OBJECTIVES

As referred before Process Mining aims to improve the extraction of knowledge from event logs by providing techniques and tools for the discovering process, organizational, social, and performance information from event logs. It is a method of distilling a structured process description from a set of real executions.
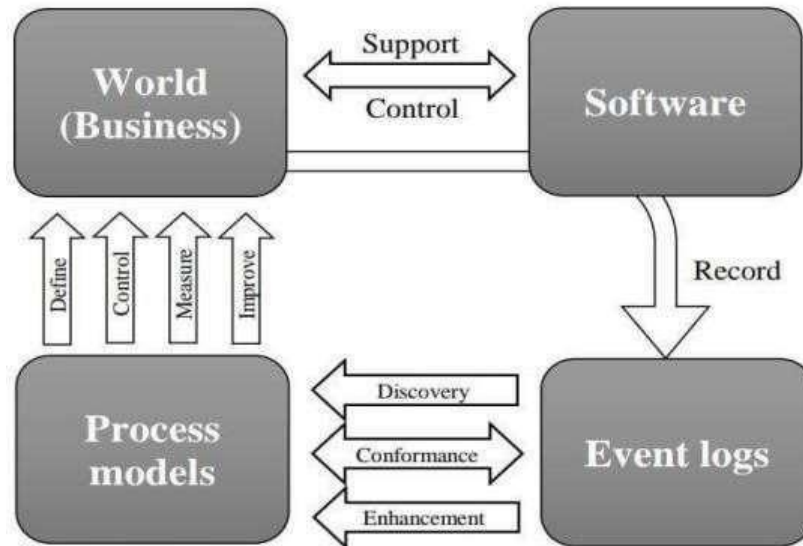
Fig 7.1: Goals and objectives of Process Mining

Process Mining tools aim to discover, check, predict and recommend based on objective and systematic data. Their techniques attempt to extract knowledge from event logs recorded by an information system and automate process discovery, that is, extracting process models from an event log, execute conformance checking, namely monitoring deviations by comparing a model with a log, social network/organizational mining, automated construction of simulation models, case prediction, and history-based recommendations.

Every organization will support some kind of transitional information, even if the process management maturity level is in its lower level (ad-hoc or informal processes). This information combined with some mining techniques can be used to get

more insight about the company's process. It is always possible to create event logs with event or transactional data. On the other hand, this event logs can be used to construct a process specification, which adequately models the behaviour registered in the systems.

The biggest ambition of Process Mining is to exploit event data in a meaningful way, for example, to provide insights, identify bottlenecks, anticipate problems, record policy violations, recommend countermeasures, and streamline processes. That is to say untap the reservoir of knowledge already maintained by the organizations about the way people conduct every-day business transactions. The practical relevance of Process Mining is increasing as more and more event data become available. Process Mining techniques aim to discover, monitor and improve real processes by extracting knowledge from event logs, given that events logged by some information systems can be used to extract information about activities and their causal relationships.

The two major Process Mining tasks, like described in the previous sections, are process discovery, i.e learning a process model from example behaviour recorded in an event log and conformance checking, that is, diagnosing and quantifying discrepancies between observed behaviour and model behaviour. The increasing volume of event data provided both opportunities and challenges for process mining. The topic of process mining has attracted the attention of both researchers and tool vendors in the Business Process Management (BPM) and Business Intelligence (BI) vectors. But BPM as described before is model-centric and doesn't construct models based on event data and, one the other hand BI may focus on data and includes many buzz words in its umbrella but mostly can be summarized by simple management reporting and dashboard tools.

A lot of technologies can be included in BI. Business Activity Management (BAM) that enables real time monitoring of business processes. Complex Event Processing (CEP) processes large amounts of event to help the management monitor, guide and optimize the business on the fly. Corporate Performance Management (CPM)

measures the performance of a process or organization. Some management frameworks and approaches can be included like Business Process Improvement (BPI), Continuous Process Improvement (CPI), Six Sigma, Total Quality Management (TQM) and many others. In all this approaches, frameworks and disciplines the business process is put in spotlight, put under scrupulous analysis and meticulously reviewed to identify issues and improvement opportunities. Basically Process Mining should be an enabling technology and desires to be a requirement for all these process management frameworks. Ultimately Process Mining serves the same purposes as all the BI tools.

The topic of process mining has attracted the attention of both researchers and tool vendors in the Business Process Management (BPM) and Business Intelligence(BI) vectors. But BPM as described before is model-centric and doesn't constructmodels based on event data and, one the other hand BI may focus on data and includes many buzz words in its umbrella but mostly can be summarized by simple management reporting and dashboard tools.

CHAPTER 8

TOOLS

8.1 Prom

Prom is a loosened open-supply structure advanced on the school of Eindhoven, wherein mining develop as imagined it's mile device with heaps of calculations and capacities. It offers modules for bounty exact mining calculation, as assessment, change and highlights. It gives plug – ins for parts exact mining calculations, as legitimately as appraisal, change and fare modules.

8.2 Disco

Disco is a device furthermore progressed in Eindhoven, a turn – off of the school of Eindhoven. It has a miles more instinctive interface and coordinated import for CSV or Excel records. Its calculation is based at the Fuzzy Miner, besides covered inside the prom system. prom and Disco are stand – alone applications.

Celonis and discerning are on line in-program programming, which might be leverage in present day network based environments. QPR technique Analyzer can be opened in-program or downloaded as a module for MS Excel. It gives the develop the underlying people. promenade is a loosened open convey structure predominant on the school of Eindhoven, in which strategy mining adjusted into transformed it's far a compelling procedure mining instrument with heaps of calculations and capacities. It offers modules for parcels exceptional mining calculations, comparatively to assessment, transformation and fare modules.

ARIS PPM bears offices aggregately with quantitative estimations of wants and representation of gadget occurrences. Like a mix way view can be gathered from an assortment of certainties sources and acknowledged as a way chart.Fujitsu changed into utilized for picturing business organization strategy streams construct absolutely with respect to insights amassed from frameworks, is flawlessly included inside technique

Analytics programming program. It offers an encompassing, stop-to-surrender perspective of day tasks and company method to indicate basic system convergenceand shrouded issues alongside bottlenecks, deferrals, redundancies and disappointments.

Name	Category
ProM	Academic
InWoLvE	
Process Miner	
MinSoN	
ExperDiTo	
ServiceMosaic	
Rbminer/Dbminer	
Genet/Petrify	
Aris PPM	Commercial
HP BPI	
ILOG JViews	
Comprehend	
Discovery Analyst	
Flow	
Enterprise Visualization Suite	
Interstage Automated Process Discovery	
OKT Process Mining suite	
Process Discovery Focus	
ProcessAnalyzer	
Reflect|one	
Futura Reflect	
Disco	

Fig:8.1: Process Mining Tools

CHAPTER 9

APPLICATIONS

Process Mining features include representing the process in a diagram, a Petri Net and any other process modelling language, monitoring the execution of the process, predict results of the process and compare process models, basically executing a conformance checking. The baseline requirements for a Process Mining tool should be aligned with the implementation objectives. That is, the solution should help the business:

- Gather insight about the how a business process is defined, understand how it works and what are the limitations and issues.

- Support the discussion and brainstorming about the business process. It should create a common baseline, acceptable and concrete to start the discussion;

- Document and instruct, that is, enhance transparency and knowledge sharing, informing all relevant resources of their tasks, responsibilities and the impact of their actions;

- Audit and verify the process, review and look out for errors and mistakes in the design, the systems or even in individual actions;

- Analyze process performance and drive improvements, by understanding the process and also being able to determine the key pain points the solution should enable the determination of the key change drivers that improve the service levels;

- Animate and roll play models, allowing users to explore and play out the process bringing new insights and feedback about the process;

- Process design for system or process specification, that is, the model can serve as a binding contract or list of requirements for system setup, on the one hand, and as the baseline for process change.

Process Mining does not cover everything, for example Process Simulation, i.e. understand how process would work (prediction) based on predetermined criteria and scenarios, and determine end result and metrics of process changing variables (e.g. adding resources, changing event relationships) and perform all other feature identified in the process discovery but for the simulated version. All business analytics are by

results, metrics and indicators, they should produce outputs that may support and bring some business insight to proactively improve it. With that said, Process Mining performance metrics and outputs should include, among others, the following:

- Process bottlenecks

- Most frequent path

- Shortest path

- Longest path

- Processing time (of event)

- Flow time (between events)

- Gaps and missing links

- Outliers and weird paths

- Deviations highlights

- Conformance measures for conformance review

- Execution alerts to support monitoring tasks

- Process automated representation for visual validation / check

CHAPTER 10

LEARNING OUTCOMES

➢ Understand what process mining is and the basics of how it works.

➢ Understanding how process mining helps in Business world.

➢ you will learn to extract to create visual representations of processes to aid decision making and process improvement efforts.

➢ Process mining can help ensure compliance with regulations and internal policies by identifying deviations and non-compliances in process execution.

➢ Analyzing process performance metrics and KPIs.

➢ Summarize what an event log is and why we need it for processing.

➢ You will gain skills in using process mining tools and interpreting the results to enhance organizational efficiency and effectiveness.

➢ Understanding how process mining helps to uncover inefficiencies and methods for insufficient process.

➢ Predicting process outcomes and future behaviour.

➢ After completing this course you will learn about process query language.

➢ Understanding process behaviour and it's applications in daily life.

CONCLUSION

Process mining is a powerful technique that enables organizations to analyze and improve their business processes. By leveraging process mining, companies cangain valuable insights into their processes, identify bottlenecks, measure performance, and discover patterns and trends. Process mining fundamentals include data extraction, data transformation, and data visualization. These foundational elements are essentialfor effectively applying process mining techniques and deriving actionable insights from process data.

Process Mining is achieved by taking the digital footprints that are created in IT systems and using them to reconstruct and visualize process flows. From here, Process Mining technology can identify patterns and deviations and ultimately eliminate bottlenecks. Process mining techniques have been used to improve process flows across a wide variety of industries.

INTERNSHIP CERTIFICATE:

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SURAIAH KHAISAR

Srinivasa Ramanujan Institute of Technology

has successfully completed 10 weeks

Process Mining Virtual Internship

During April - June 2024

Supported By **celonis**

A Gebert
Angela-Sophia Gebert
Global Head of Academic Alliance
Celonis

Shri Buddha Chandrasekhar
Chief Coordinating Officer (CCO)
NEAT Cell, AICTE

Dr. Satya Ranjan Biswal
Chief Technology Officer (CTO)
EduSkills

Certificate ID :d1b940abf6199964a5fbcb167b012165
Student ID :STU641c5b1ba3a8d1679579931

INTERNSHIP GRADE
B

GRADE- O (Outstanding):90-100 | E (Excellent):80-89 | A (Very Good):70-79 | B (Good): 60-69 | C (Fair): 50-59 | D (Average): 40-49 | P (Pass): 30-39 | F (Fail): Below 30

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BADGES EARNED:

REFERENCES

- https://core.ac.uk/download/pdf/143395465.pdf

  https://www.indeed.com/career-advice/careerdevelopment/process-mining

- **Ref website: https://www.processmining.org/**
- [2] Execution management link : https://www.celonis.com/ems/platform/
- **[3] Login page : https://academy-login.celonis.com/s/login/.**