

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

K.Tejaswini

(224G1A32A1)



**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)**

**SRINIVASARAMANUJANINSTITUTE 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, BK 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 **K.TEJASWINI** bearing Roll Number **224G1A32A1** in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in **Computer Science and Engineering (Data Science)** for three months from Apr to June 2024.

Internship Coordinator

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Date:
Place: Ananthapuramu

EXTERNAL EXAMINER

PREFACE

Brief overview of the company's history:

Process mining has a rich history that dates back to the early 2000s. It emerged as a field of study at the intersection of data mining and business process management. Researchers and practitioners recognized the value of analyzing event data to gain insights into business processes. Over the years, process mining techniques and tools have evolved, leading to advancements in process discovery, conformance checking, and performance analysis. Today, process mining is widely used in various industries to improve operational efficiency, identify bottlenecks, and optimize processes.

- Who founded it

Professor Wil van der Aalst founded

- What purpose and when

The purpose of process mining is to gain insights into business processes by analyzing event data. It helps uncover the actual process flows, identify bottlenecks, measure performance, and discover areas for improvement. Process mining is used to optimize processes and make data-driven decisions. It is typically applied when organizations want to understand their processes, improve efficiency, and enhance overall operational performance.

Company's Mission Statement:

The general mission of process mining companies is to provide innovative solutions and tools that enable organizations to gain valuable insights into their business processes, optimize operations, and achieve operational excellence.

Business Activities:

Process mining involves the analysis of event logs to understand and improve business processes. Its business activities include process discovery, conformance checking, and process enhancement. It helps identify inefficiencies, compliance issues, and areas for optimization in various industries like manufacturing, healthcare, and finance.

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.

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

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LIST OF ABBREVIATIONS

BPI	Business Process Improvement
BPM	Business Process Management
EMC	Enterprise Management System
IEEE	Institute for Electrical and Electronic Engineers
ITSM	Information Technology Service Management
KPIs	Key Performance Indicators
PQL	Process Query Language
SAP	System Applications and Products
TFPM	Task Force on Process Mining

CHAPTER - 1

INTRODUCTION

Process mining is a data-driven approach to analyze and improve business processes. It involves extracting insights from event logs and other data sources to understand how processes are actually executed, identify inefficiencies or bottlenecks, and suggest improvements.

By analyzing event data, process mining techniques can provide a visual representation of the end-to-end process flow, highlighting the sequence of activities, decision points, and interactions between different process participants. This allows organizations to gain a deeper understanding of their processes and identify areas for improvement. We've already learned that you can find processes everywhere in daily life and that they're crucial for frictionless operations. Business Process Management has traditionally examined these processes by talking to the people involved. The problem is that, by gathering information from people, you also gather their (false) assumptions and subjective or fractured observations. Understand the issues that this approach poses.

By contrast, Process Mining offers a data-driven and therefore more objective and holistic approach to understanding business processes. As a result, Process Mining has come to dominate a large majority of operational excellence, automation and digitalization ambitions within industry.

In current times, the majority of apps/websites we are using on a daily basis are greatly interested in how we are using them. That is because they want to learn from the users' behavior and improve in order to attract or retain more users.

Imagine your favorite e-commerce app. Most likely, you are free to browse the products that the company is offering, and every now and then you are gently nudged to create an account in order to actually purchase something. In order to actually become a registered user, you often need to provide some information about you (the amount of information greatly varies per service). After you go through a few screens, you are ready to go and purchase.

Process Mining is the combination of two disciplines: Data Science and Business Process Management. Process Mining essentially uses Data Science techniques, such as Big Data and AI, to address Process Science problems such as process improvement and automation.

Process mining automatically discovers actual business processes and garners insights from existing application data logs — data that can be used to automatically generate process models and calculate process metrics. By analyzing the sequence of events using their timestamps, process mining can completely reconstruct actual processes while identifying and uncovering inefficiencies, bottlenecks and other weaknesses.

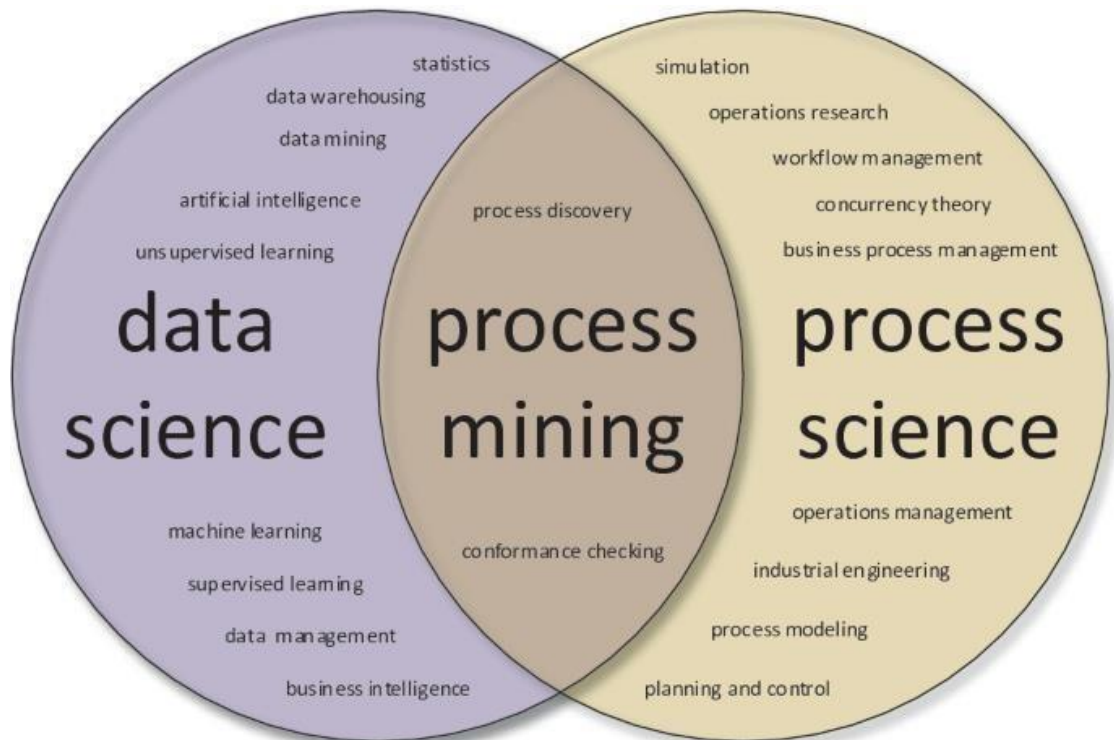


Fig.1.1: Techniques of Process Mining

Data Science: In such a context, it is natural that Data Science, a very young discipline has become a must. It has been booming since 2012. Data Science allows a company to explore and analyze raw data to transform it into valuable information to solve business problems.

Data Science was not born from Big Data, but it makes it even more important. Its objective can be translated in a very simple way: it is about giving value to data. It is therefore not easy to find Data Scientists with across such a wide range of fields.

But above all, the Data Scientist must not lose sight of the ultimate goal: giving the company the means to create value.

To do this, Data Science borrows from different fields:

Mathematics: models, statistics

Technology: especially information- processing technology (algorithms, machine learning, etc.)

Business: data analysis must result in useful conclusions for the company, in order to improve its functioning and help it to generate more profits.

1. **Process Science:** “Process Science” is the future!

This is why other approaches are developing that is more applicable to this objective. Especially the one we can call Process Science.

Like Data Science, it leverages information technology and mathematical processing, but also process management and operations management methods.

While Data Science is often and voluntarily used in an "agnostic" way, Process Science is oriented toward and relies heavily on end-to-end process modeling. It uses the data to analyze the processes in detail.

Process Science thus makes it possible to perfectly understand the progress of the company's processes, to analyze possible malfunctions or non-conformities. Even better, it makes it possible to provide answers to eliminate them, such as Business Process Management (BPM) or Business Process Improvement (BPI).

Process Mining: There is a discipline that creates a real bridge between Data Science and Process Science: Process Mining. Its principle consists in discovering the company's processes thanks to the traces left by their execution in the information system. Process Mining makes it possible to compare the actual execution of processes with pre-established or automatically recreated models.

At insight, as experts in enterprise information systems (SAP in particular), we are acutely aware of the considerable and largely under-exploited mass of information that lies dormant there.

That is why we are strong promoters of Process Mining, which allows us to reveal to our customers the value of their own data and above all to use this data for managing and facilitating the transformations they must carry out in order to remain competitive in their markets.

Most likely, you are free to browse the products that the company is offering, and every now and then you are gently nudged to create an account in order to actually purchase something. In order to actually become a registered user, you often need to provide some information about you (the amount of information greatly varies per service). After you go through a few screens, you are ready to go and purchase.

Process Mining achieves this union 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. Now we will take a deeper look at what is required to reconstruct a process in this way.

CHAPTER – 2

TECHNOLOGY

2.1 Process Mining Technology:

Process mining technology is a data-driven approach that involves analyzing the digital traces left by processes in order to gain insights, optimize efficiency, and improve decision-making within organizations. It's a relatively new field that sits at the intersection of business process management, data science, and information systems. Process mining allows organizations to understand how their processes actually function, identify bottlenecks, deviations, and opportunities for improvement, and make data-driven decisions to enhance their operations.

Process Mining is the leading new technology when it comes to talking about algorithmic businesses - in other words, businesses that use algorithms and large amounts of real-time data to create business value. This has only become possible through the advent of information systems and administrative tools (e.g. Enterprise Resource Planning or Customer Relationship Management systems) which provide a good data source for process analytics.

Process Mining is a solution to costly and time-intensive efforts to get data-driven insights into a business, as acknowledged by the industry research firm Gartner.

Traditional Process Mapping vs. Process Mining

Compared to the traditional process mapping approaches, Process Mining technology solves the complexity and visibility problem.

It's an x-ray for businesses that gives 100% transparency into processes, eliminating process blind spots, and quantifying the impact of process problems on core KPIs.

It leverages data from a business's source systems and user desktops to map the processes, thus eliminating conjecture about how they're running. This allows businesses to better field competing requests from their stakeholders because they can have confidence in the data.

And lastly, because it's using the system data in real-time, it provides a living, breathing view of the processes that is generated immediately and is always up-to-date, substantially reducing cost and the time to value.

One key milestone for the Process Mining technology category was the formation of the Institute for Electrical and Electronic Engineers (IEEE) Task Force on Process mining. The IEEE Task Force brings together both vendors and researchers interested in the field and actively work to define and drive the field further. One of their most important achievements is the publishing of their Process Mining Manifesto. We recommend reading this if you're keen to understand the field from a scientific angle.



Fig. No. 2.1 Task Force Process Mining

From the above Fig.2.1, it can be seen that the goal of this Task Force is to promote the research, development, education and understanding of process mining. More concretely, the goal is to:

- **Process Understanding:** Gain a clear and detailed understanding of how different processes function within the organization, including their inputs, outputs, steps, and interactions.
- **Identify Inefficiencies:** Detect bottlenecks, redundancies, delays, and other inefficiencies within processes that hinder optimal performance.
- **Data-Driven Insights:** Utilize data collected from various sources to uncover insights and patterns that provide a factual basis for decision-making and improvements.
- **Performance Measurement:** Establish key performance indicators (KPIs) to measure the effectiveness of processes and track progress towards improvement goals.

- **Optimization Opportunities:** Identify areas where processes can be streamlined, automated, or reconfigured to enhance efficiency and reduce resource wastage.
- **Root Cause Analysis:** Pinpoint the underlying causes of process-related issues, enabling the task force to address these causes directly for sustainable improvements.
- **Alignment with Objectives:** Ensure that processes are aligned with the organization's overall goals and strategic objectives, enhancing the likelihood of achieving desired outcomes.
- **Cross-Departmental Collaboration:** Facilitate collaboration among experts from different departments, fostering a holistic approach to process improvement that considers various perspectives.
- **Enhanced Decision-Making:** Equip decision-makers with accurate and timely information to make informed choices about process changes and resource allocation.
- **Continuous Improvement:** Cultivate a culture of continuous improvement, where processes are regularly reviewed, refined, and adapted to changing circumstances and evolving best practices.

2.2 Here's how the process mining technology typically works

- **Data Collection** The first step involves collecting event logs or data from the information systems that support various business processes. These event logs contain timestamps, actions taken, and other relevant information related to process activities.
- **Data Preprocessing** Raw event logs might contain noise or irrelevant information. Data preprocessing involves cleaning, filtering, and transforming the data into a suitable format for analysis.
- **Process Discovery** Process mining tools use the event logs to reconstruct the actual process flow. This process discovery phase creates visual representations of processes, often using techniques like process maps, flowcharts, or Petri nets. These representations provide insights into how processes are executed in reality.

- **Conformance Checking** Once the actual process flow is known, the tool can compare it to the intended or documented process to identify discrepancies. This helps to uncover deviations, bottlenecks, and areas of non-compliance.
 - **Enhancement and Optimization** Process mining tools allow organizations to visualize process variations and identify inefficiencies. This information can be used to optimize processes by streamlining workflows, reallocating resources, and eliminating bottlenecks.
 - **Root Cause Analysis** By analyzing process deviations and their impacts, organizations can identify the root causes of inefficiencies or errors. This enables targeted improvements to prevent similar issues in the future.
 - **Predictive Analysis** Some advanced process mining tools use historical data to predict future process behavior. This can be valuable for anticipating potential bottlenecks, delays, or resource requirements.
 - **Monitoring and Continuous Improvement** Process mining doesn't stop with a one-time analysis. Organizations can implement continuous monitoring to keep track of process performance over time. This helps in maintaining process improvements and adapting to changing circumstances.
- Process mining technology transforms event logs into a process map capable of providing insights to better monitor and improve processes through identifying variants, rework patterns, and bottlenecks based on true data.

Process mining provides results that are:

- **Objective:** Process mining removes human error thus empowering organizations with unbiased, as-is process data.
- **Fast:** With a scalable algorithm, process mining quickly analyzes years of process execution data quickly, thus expediting process discovery, process performance analysis, and regulatory compliance checking.
- **Complete:** Every past execution of the analyzed process, regardless of its frequency, is completely represented.

CHAPTER – 3

APPLICATIONS

3.1 Applications of Process Mining

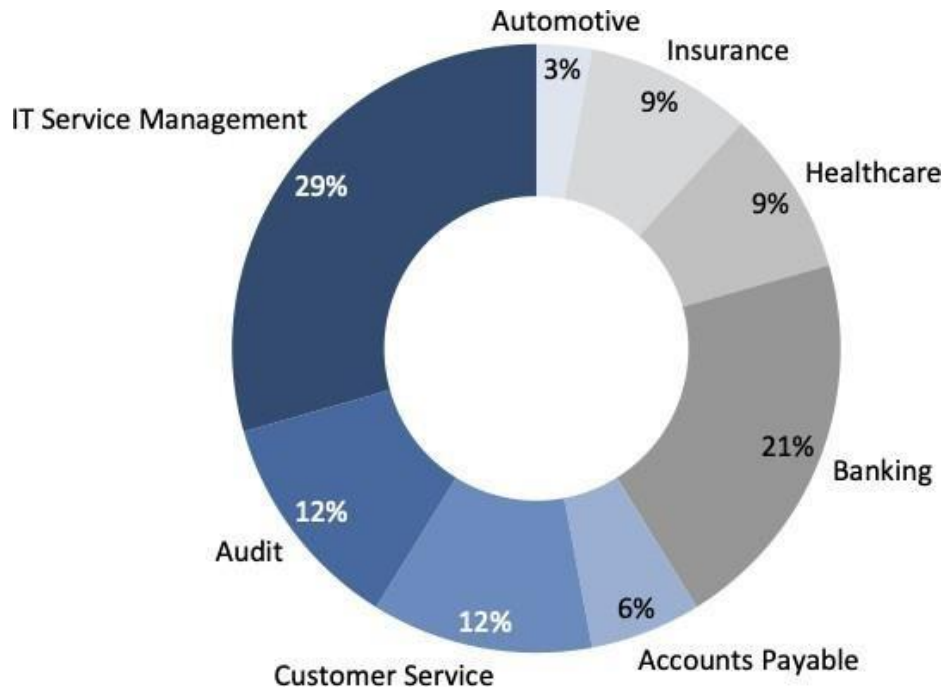


Fig.No.3.1: Applications of Process Mining

From the above Fig.3.1, it can be seen that there are eight applications in process mining.

- 1. IT Service Management** Process mining can be applied to IT Service Management (ITSM) applications in several ways. By analyzing event logs and data from IT systems, process mining can provide insights into the actual execution of IT processes, identify bottlenecks, and help improve the efficiency and effectiveness of IT service delivery.
- 2. Audit** In the context of auditing, process mining can be a valuable tool for analyzing and improving business processes. By analyzing event logs and data from various systems, process mining enables auditors to gain insights into how processes are actually executed, identify potential risks and control weaknesses, and assess compliance with regulations and internal policies.

- 3. Customer Service** When it comes to customer service, process mining can be a powerful tool for improving the customer experience and optimizing service delivery. By analyzing event logs and data from various customer service systems, process mining can provide insights into the actual execution of customer service processes, identify bottlenecks, and help organizations enhance their customer service practices.
- 4. Accounts Payable** When it comes to accounts payable, process mining can be a valuable tool for analyzing and optimizing the payment process. By analyzing event logs and data from various systems, process mining enables organizations to gain insights into the accounts payable process, identify bottlenecks, and improve efficiency.
- 5. Banking** In the banking industry, process mining can be applied to various areas to improve operational efficiency and customer experience. Process mining can be used to visualize the customer journey through various banking services, such as account opening, loan approval, transaction processing, and more. It helps identify steps where delays occur, which activities take the most time, and where potential errors might be happening.
- 6. Healthcare** Process mining in healthcare refers to the application of process mining techniques and tools to analyze and optimize various processes within healthcare organizations. It involves extracting insights from event logs generated by healthcare systems to understand how processes are executed, identify inefficiencies, bottlenecks, and opportunities for improvement.
- 7. Insurance** companies use process mining to analyze and improve their operations. In the context of insurance applications, process mining involves analyzing the data generated by various processes within the company, such as claims processing, underwriting, and customer service. This analysis helps identify inefficiencies, bottlenecks, and areas for improvement in these processes. Insurance companies leverage process mining to enhance efficiency, reduce operational costs, and deliver better services to their customers.
- 8. Automotive** Process mining in the automotive industry involves utilizing process mining techniques and tools to analyze and optimize various processes

within automotive manufacturing, supply chain management, and other related areas.

1.2 Applications of PQL Queries

1. Performance analysis: PQL queries can be used to calculate process performance metrics such as average cycle time, waiting time, or resource utilization. This helps in identifying bottlenecks, inefficiencies, and areas for improvement in a process.

2. Compliance checking: PQL queries can be used to check if certain conditions or rules are satisfied during process execution. This helps in ensuring that processes comply with regulations, standards, or predefined guidelines.

3. Root cause analysis: PQL queries can be used to identify the root causes of process deviations or failures. By analyzing event data, PQL queries can uncover patterns or correlations that contribute to process issues, allowing organizations to address them effectively.

4. Process optimization: PQL queries can be used to identify process variants or alternative paths that deviate from the standard process flow. By analyzing these variants, organizations can identify opportunities for process optimization, such as eliminating unnecessary steps or automating manual tasks.

5. Predictive analysis: PQL queries can be used to analyze historical process data and identify patterns or trends. This information can be used to make predictions or forecasts about future process behavior, enabling organizations to proactively address potential issues or make informed decisions.

CHAPTER – 4

MODULES EXPLANATION

4.1 Process Mining Fundamentals

Process Mining Fundamentals track is structured into three milestones which consist of multiple courses. Those milestones are:

1. Review and Interpret Analyses
2. Build Analyses
3. Case Study: Pizzeria Mamma Mia

Process Mining Fundamentals interpret process visualizations and identify process inefficiencies:

- Conceptualize your process in terms of activities and cases.
- Use the Variant Explorer for an overview of all the ways the process is flowing.
- Use the Process Explorer to quickly identify undesired activities and see how cases are flowing into and out of individual activities.
- Interact with charts and tables to verify your assumptions about how the process is performing and to focus on attributes of cases reflecting inefficiency.
- Leverage Selection Views to filter on cases, even on attributes not visible in Analysis sheets.
- Use the Case Explorer to inspect individual cases.
- Get automated insights with the Conformance checker and explore possible root causes of inefficiencies.
- Save an analysis selection for future reference and even share it with your team; export visualizations and process data.

Process mining is a collection of approaches that relates the fields of data science and process management to support the study of operational processes based on event logs. These techniques were developed to help companies improve their business processes. The objective of process mining is to derive insights and take appropriate action from event data. The availability of event data and the aspiration to achieve

process improvement are the driving forces behind process mining, which is an essential component of data science. The approaches of process mining make use of event data in order to demonstrate what individuals, machines, and organizations are actually doing. Process mining gives fresh insights that may be utilized to determine the execution paths taken by operational processes and address the performance and compliance concerns that are caused by these processes.

Process mining is a data-driven methodology that aims to uncover, analyze, and optimize processes within an organization. It involves extracting insights from event logs recorded by information systems during the execution of various business activities. These logs capture the sequence of events, timestamps, and other relevant data, providing a detailed picture of how processes unfold.

Fundamentally, process mining comprises three key steps: discovery, conformance, and enhancement. Discovery involves creating visual process models from event logs, showcasing the actual flow of activities. Conformance checking compares these models to the real execution data, identifying deviations and potential bottlenecks. Enhancement suggests improvements by analyzing patterns in the data and proposing optimizations.

Process mining offers several benefits, including increased operational efficiency, reduced costs, and better decision-making. It allows organizations to uncover inefficiencies, understand variations in processes, and target areas for improvement. By visualizing processes and their real-world execution, process mining provides valuable insights to drive process optimization and innovation.

4.2 Rising Star- Technical

Technical process mining typically refers to the application of process mining techniques to analyze and optimize technical processes these process can include software development it service management, manufacturing logistics and other technical activities.

- i. Software development analyzing** the software development life cycle to identify areas where code review processes are causing delays or base 13 steps are frequently skipped.

- ii. **IT service management** analyzing the incident management process to identify bottlenecks in resolving technical issues and ensuring timely responses to user request.
- iii. **Manufacturing** analyzing the manufacturing process to identify areas where production is slowing down due to mission breakdowns are in efficient resource allocation.
- iv. **Logistics** Analyzing the logistics process to optimize roots delivery schedules and inventory management.

Rising Star Technical track is structured into two milestones which consist of multiple courses. Those milestones are:

1. Get Data into EMS
2. PQL Queries

1) Get Data into EMS

To get into the EMS (Enterprise Management Systems) of process mining as a rising star technical, you would need to focus on developing your skills and knowledge in process mining techniques and tools. Start by familiarizing yourself with the fundamentals of process mining, such as data extraction, process discovery, and process analysis.

You can begin by learning about popular process mining software like Celonis, Disco,. Explore online resources, tutorials, and courses that provide hands-on experience with these tools. By gaining proficiency in using process mining software, you can effectively analyze and optimize business processes.

Additionally, it would be beneficial to join communities and forums dedicated to process mining. Engage with experts and professionals in the field, ask questions, and participate in discussions. This will help you stay updated with the latest trends and advancements in process mining.

Process mining is concerned with the analysis of collections of event records produced during the execution of a business process. Such event records represent events signaling the start, end, abortion, or other relevant state change of a process or an activity therein, or any other event of relevance to the execution of a process, such as the allocation or deal location of a process worker to a task, the receipt or dispatching of a message to a process participant, and so on.

In general, the main input of a process mining technique is a business process event log, which is a collection of event records relevant to a given business process. An event log is generally structured (but not necessarily) as a set of traces, where each trace consists of the sequence of events produced by one execution of the process (i.e., a case). As a minimum, an event record contains an identifier of the case of the process to which the event refers a time stamp, and possibly a number of additional attributes.

The Execution Management System (EMS) reveals and fixes process inefficiencies. By connecting your data across systems, apps, and desktops, it x-rays your company's entire business operation, showing you how your business really works.

The EMS acts as a brain, orchestrating across systems, processes, and people to optimize process execution without replacing any of your existing systems or tools. It provides the intelligence to understand what to fix first, and empowers your teams to operate at their highest level of efficiency and effectiveness, reaching new levels of performance.

The Execution Management System has real-time connectors to core enterprise applications, including SAP, Oracle and Sales force, as well as task mining technology that picks up user interaction data from desktop processes in applications like Outlook. All of that process data is then fed into the process mining engine, which identifies process performance; the Execution Management System engine then takes the insights and can execute actions across the systems

2) PQL Queries

PQL (Process Query Language) queries in process mining allow you to extract specific information from event logs. With PQL, you can ask questions about your process, such as finding the most common paths, identifying bottlenecks, or analyzing the performance of certain activities.

PQL queries are written in a specialized language that is designed to interact with process mining tools. These queries typically involve filtering and aggregating events based on specific criteria. For example, you can use PQL to select events that occurred within a certain time frame, events related to a specific case or activity, or events that meet certain conditions.

By executing PQL queries, you can gain insights into your process, uncover patterns, and identify areas for improvement. PQL queries are powerful tools for analyzing and understanding the behavior of your processes, enabling you to make data-driven decisions and optimize your operations.

To use PQL queries, you will need to have access to a process mining tool that supports this feature. Different process mining tools may have variations in their PQL syntax and capabilities, so it's essential to refer to the documentation or resources provided by the specific tool you are using.

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.

The intention of PQL is to provide a query language for performing process mining tasks on large amounts of event data. As described in it is based on a relational data model. The event and business data as well as all results (including the mined process models) are represented as relational data. Currently, the supported data types comprise STRING, INT, FLOAT, and DATE. Boolean values are not directly supported but can be represented as integers. Each data type can hold NULL values. In general, PQL treats NULL values as non-existing and ignores them in aggregations. Also, row-wise operations like adding the values of two columns will return NULL.

PQL queries are also instrumental in bottleneck identification. By querying the event logs, we can identify activities or resources that consistently cause delays or impact the overall process efficiency. This information helps organizations optimize their workflows, allocate resources more effectively, and reduce bottlenecks, leading to improved process performance.

PQL queries allow us to analyze customer expectations and how they have shifted over time. By querying the event logs, we can identify patterns in customer behavior, preferences, or service expectations. This analysis helps organizations align their processes with changing customer needs, enhancing customer satisfaction and loyalty.

PQL queries in process mining enable data-driven decision-making. By leveraging the power of PQL, organizations can extract valuable insights from event logs, gain a deeper understanding of their processes, and make informed decisions to improve operational efficiency, customer satisfaction, and overall business performance.

Process mining and task mining can identify execution gaps in your business. Automation lets you turn those data-driven insights into action. It's therefore no surprise that rushing into process automation without understanding your business processes can be a recipe for failure.

4.3 Action Flow Templates.

Action flow templates in process mining are pre-built workflows that represent specific business processes or activities within an organization. These templates are designed to help process mining analysts and business users to quickly understand how a process works, identify inefficiencies, and implement process improvements.

Action flow templates consist of a series of process steps that represent the sequence of actions that must be performed in order to complete a specific task or project. Each step in the process is accompanied by information about the inputs, outputs, and decision points associated with that step, as well as any constraints that affect how the step can be executed.

Action flow templates are particularly useful in process mining because they provide a standard framework that can be used to analyze and optimize any process, regardless of the specific details of that process. By using these templates, analysts can quickly gain insight into how a process works, identify bottlenecks and other inefficiencies, and implement changes that can improve overall efficiency, productivity, and profitability.

The Execution Management System (EMS) combines process and task mining together with automation through Action Flows. Action Flows are a way to define an automated process flow. They can consist of multiple events, decision points and alternative routes. Action Flows can also involve an arbitrary number of different execution applications.

The EMS platform contains many pre-built Action Flows, which contain out-of-the-box integrations and intelligent automations that can trigger actions directly within

operational systems like SAP, Oracle, and Service. Business users can also use our drag & drop builder to add any application to an automated workflow and to automate any process. The EMS only real-time automation engine is used to perform 15 million automations every day. Action flow templates in process mining are predefined patterns or templates that represent common sequences of actions within a process. These templates help in understanding the typical flow of activities and identifying any deviations or variations from the expected process behavior.

By analyzing event logs, process mining algorithms can automatically discover and create action flow templates based on the observed patterns in the data. These templates provide a visual representation of the most common sequences of actions performed in a process.

CHAPTER – 5

REAL TIME EXAMPLES

5.1 REAL TIME EXAMPLES OF PROCESS MINING

1. **Loan Application Process:** Process mining can help analyze the loan application process, from initial application submission to final approval or rejection. By examining the event logs and data, banks can identify bottlenecks, delays, and inefficiencies in the process. This allows them to streamline the loan application process, reduce turnaround time, and provide a better customer experience.
2. **Fraud Detection and Prevention:** Process mining can be utilized to detect and prevent fraudulent activities in banking operations. By analyzing patterns and anomalies in transaction data, banks can identify potential instances of fraud, such as unauthorized access, money laundering, or identity theft. This enables banks to take proactive measures to prevent fraudulent activities and protect their customers' assets.
3. **Medical Billing and Claims Processing:** Process mining can be used to analyze the medical billing and claims processing workflows. By examining the steps involved in billing, coding, and claims adjudication, healthcare providers can identify inefficiencies, errors, and opportunities for automation. This helps in reducing billing errors, improving revenue cycle management, and streamlining the reimbursement process.
4. **Manufacturing Process Analysis:** Process mining can be utilized to analyze the manufacturing processes in the automotive industry. By examining the production data and event logs, manufacturers can identify areas where the manufacturing process can be optimized, such as reducing cycle times, improving resource allocation, and minimizing defects. This helps in enhancing productivity and product quality.
5. **Claims Processing Optimization:** Process mining can help analyze the end-to-end claims processing workflow. By examining the event logs and data, insurance companies can identify bottlenecks, delays, and inefficiencies in the claims handling process. This allows them to streamline workflows, reduce processing times, and improve the overall customer experience.

6. **Clinical Pathway Analysis:** Process mining can assist in analyzing clinical pathways, which are standardized care plans for specific medical conditions or procedures. By examining the actual execution of clinical pathways, healthcare providers can identify variations, deviations, and potential areas for improvement. This helps in standardizing care delivery, reducing variations in outcomes, and enhancing patient safety.

5.2 Real Time Examples of PQL Queries

1. **Customer Segmentation:** Using PQL queries, a marketing team can analyze customer data to segment customers based on demographics, purchase behavior, or engagement level.
2. **Sales Analysis:** PQL queries can be used to analyze sales data, such as total revenue, top-selling products, or sales performance by region or salesperson.
3. **Inventory Management:** PQL queries can help track inventory levels, identify slow-moving items, and generate reports on stock availability and replenishment needs.
4. **Fraud Detection:** PQL queries can be applied to identify patterns and anomalies in transaction data, helping to detect and prevent fraudulent activities.
5. **Website Analytics:** PQL queries can analyze website traffic, user behavior, and conversion rates to gain insights into website performance and optimize marketing strategies.
6. **Supply Chain Optimization:** PQL queries can analyze supply chain data to identify bottlenecks, optimize inventory levels, and improve overall efficiency.

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CHAPTER - 6

LEARNING OUTCOMES OF THE INTERNSHIP

- Gain an overall understanding of basic Process Mining concepts.
- Become familiar with Mining core services and tools.
- Learn the architectural principles of the process Mining.
- Understand and be able to explain Process Mining and compliant measures.
- Understand the Process Mining budget and pricing philosophy.
- Engage in hands-on practice to hone key skills
Learn the knowledge and skills required to take the Process Mining Virtual Internship Certified.

CONCLUSION

- ❖ Bydoing this internship we learnt
 - The importance of Process Mining.
 - Tools that helps us to optimize our service costs.
 - Software Production and Estimation.
 - Processing the Huge data.
 - And other different Services that are provided in Mining.



REFERENCES

- Login page: <https://academy-login.celonis.com/s/login/>
- <https://academy.celonis.com/learn/course/introduction-to-process-mining/introduction-to-process-mining/course-outline?client=academic-alliance-celonis&page=2>
- <https://www.ibm.com/topics/process-mining>