CHAPTER 1
INTRODUCTION

Our world and the people in it use processes for many things, like buying items and managing orders. These processes can sometimes be tricky, involving many parts and causing issues. But when things work smoothly:

- You can easily find the groceries you want in a store.
- Airplanes arrive on time.
- People don't have to wait long at hospitals.

Process Mining is a clever way to understand how businesses work using real data. It's much more trustworthy and complete than other methods. This has become really important for making operations better, automating tasks, and using digital solutions in different industries.

Think of Process Mining as a special tool, like an x-ray, for understanding how a business runs. It looks at how things happen and where there might be problems. It uses information from computers and systems to show exactly what's going on. This helps businesses see the real facts, not just guess. It works in real-time, showing what's happening right now, which saves time and money.

More and more businesses are using Process Mining because it's so helpful. Even big companies like Celonis use it to do their work better. It's like having a map that guides

businesses to work smarter and faster, especially in a world where being efficient and automated is really important.

Fig. 1.1: Introduction to Process Mining

Traditional approaches struggle to handle the complexity and vast amounts of data in processes. In contrast, Process Mining is a modern way of understanding how businesses work using real data. This helps businesses improve their operations, automate tasks, and use technology better.

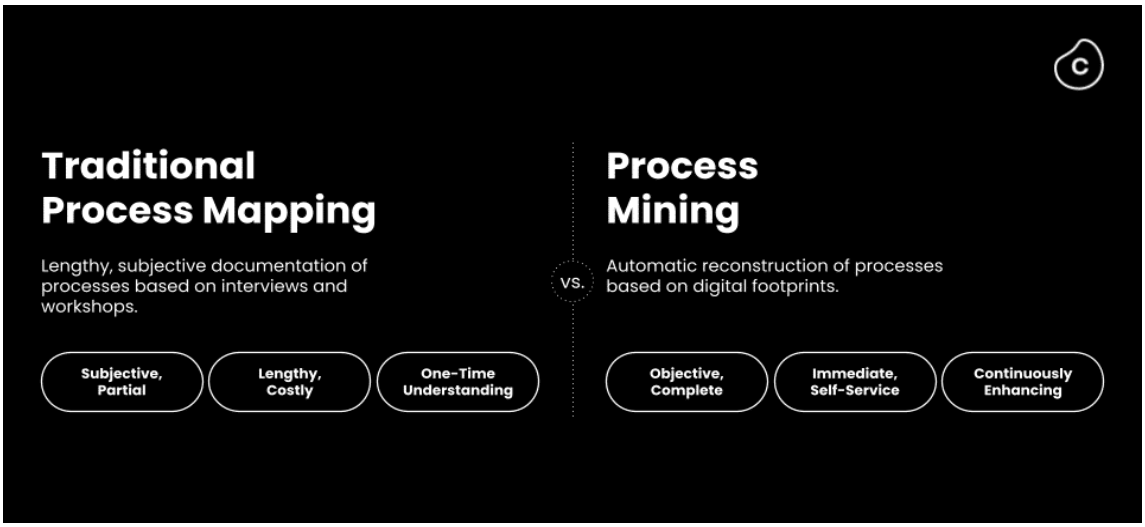

Fig. 1.2: Traditional Process Mapping vs Process Mining

Process Mining is like making a map of how things are really happening in a business. It's based on facts from actual events, not just guesses. It helps businesses see what's

going well and where there are problems. This is better than traditional methods that use static diagrams.

Here's how Process Mining works:

1. Data Collection: Information is gathered from systems, applications, and logs. These events show what's happening and when.

2. Process Discovery: A visual picture of the process is created using the collected data. This could be a map, diagram, or other representation.

3. Process Analysis: The created model is analyzed to find ways to improve. It helps find where things slow down, where the process goes off track, and how to make things work better.

Benefits of Process Mining include:

Factual Insights: It shows how things are actually happening, based on real data.

Improvement: It helps find and fix problems in processes, making them better over time.

Compliance: It ensures that processes follow rules and regulations, which is important for audits.

Understanding Issues: It helps figure out why things go wrong and how to fix them.

Measuring Performance: It gives real numbers to show how well processes are working.

Automation: It guides the automation of tasks, making things smoother and faster.

Fig. 1.3: Benefits of Process Mining

Process Mining is used in different industries, like manufacturing, healthcare, finance, and more. As technology improves, Process Mining gets even better at handling big and complex data. This helps businesses make smarter decisions and work more efficiently.

What is a Process?

- A process is like a set of steps you follow to get something done. For example, think of it like the steps you take to solve a problem or complete a task.
- In sales, it's the steps you take to turn a potential customer into an actual sale.
- In order management, it's the steps from a customer ordering something to you delivering it and getting paid.

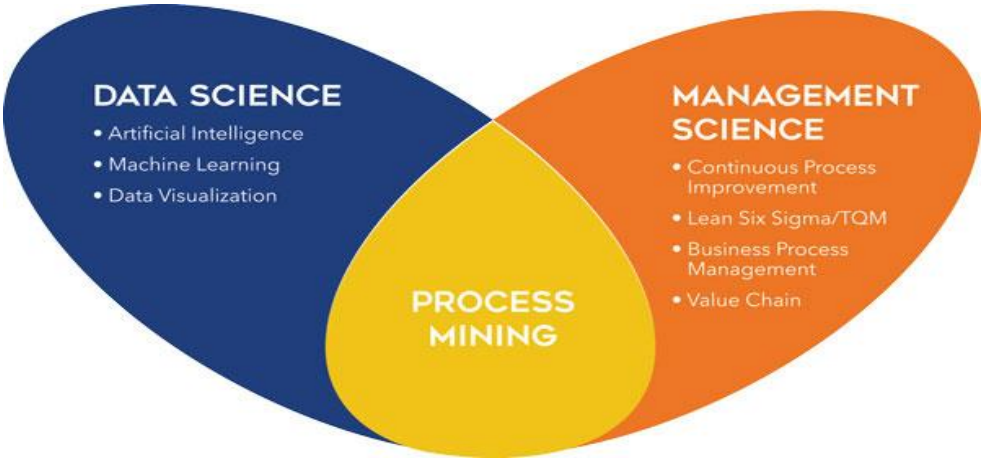

Fig. 1.4: Process Mining Model

Process Mining from a Science Perspective

- Process Mining brings together two things: Data Science (using things like Big Data and AI) and Business Process Management (making processes work better).
- It's like using smart science techniques to solve how processes can be improved and automated.

What is an Event Log?

- An event log is like a record of what happens in computer systems. It's like a logbook for computer activities, showing what happened and when.
- These logs come from different computer systems like ones for managing orders, supplies, or customers.
- Event logs are important because they show the unique ID (like an order number), what happened (like an order being created), and when it happened (the date and time).

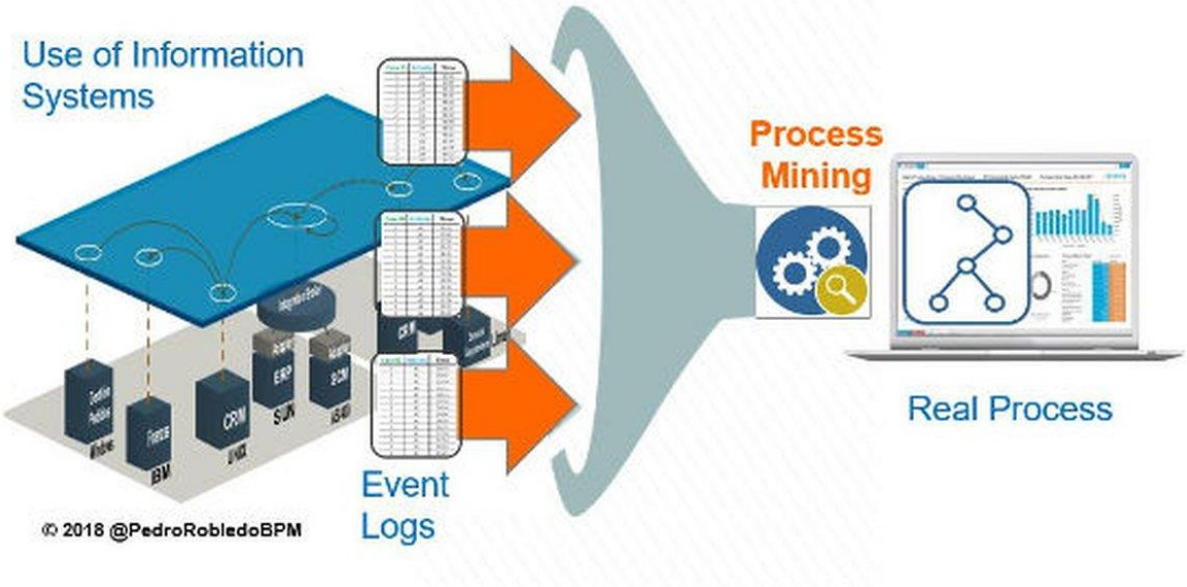

Fig. 1.5: How Event logs works

Key Facts About Process Mining

- The market for Process Mining is getting bigger, with the estimated size going from $418 million in 2020 to $3.2 billion by 2025.
- The biggest challenge with using Process Mining is not having enough knowledge or tools (52% say this) – so learning about it is a great opportunity.
- If you're using a tool like Celonis and you're studying, there's more training available to learn about Process Mining.

Significance of Process Mining:

Process mining is important because it uses smart techniques to understand and improve how a business works. It helps organizations see how their processes are running and find ways to make them better. This leads to higher productivity and better outcomes for customers and the business itself.

Key Points:

Transparency and Improvement: Process mining uses advanced methods to show how processes are happening now. This helps organizations improve them and find better ways of doing things.

Valuable Insights: Process mining quickly finds valuable information that can boost productivity and make a big impact on customers and profits.

Key Performance Indicators (KPIs): It looks at important measures like time (how long things take), cost (how much it costs), and quality (if outcomes are good).

Real-Time and Historical Data: Process mining uses both current and past data to deeply understand what's happening. This is a big change from older methods that were slower and manual.

Examples of Process Mining: It's used for many things like improving processes, managing business activities, ensuring compliance, analyzing data, supporting digital changes, and optimizing IT operations.

Challenges Addressed by Process Mining:

Complex Systems: Businesses use many different systems that are hard to monitor. Process mining breaks down these barriers and brings all the data together.

Handling Lots of Data: There's so much data from different sources like networks, devices, websites, and more. Process mining handles big data and even cleans and prepares it automatically.

Lack of Expertise: Many organizations don't know how to use their data effectively. Process mining tools are made for regular users, helping them make decisions without needing to be data experts.

Using Data Effectively: Process mining not only shows data but also helps organizations use it to make smart decisions.

Flexible Reporting: Instead of spending time organizing data that leads to more questions, process mining helps create clear and useful reports.

In Simple Words:

Process mining is like a smart tool that helps businesses understand and improve how they work. It finds important information, helps with decisions, and makes processes work better. It's like having a guide that helps a business be more efficient and successful.

INTERNSHIP GOALS:

Throughout the course of this internship, I aim to achieve the following goals: Mastering Tools and Techniques: I am excited to familiarize myself with industry-leading process mining tools such as Disco, ProM, and Celonis. By learning various techniques, including process discovery, conformance checking, and data visualization, I aim to become proficient in applying these tools to real-world scenarios. Data Proficiency: I intend to gain hands-on experience in preparing and transforming raw event data into a structured format suitable for analysis. This includes data cleaning, preprocessing, and organizing event logs to ensure accurate insights. Process Discovery and Analysis: One of my primary goals is to grasp the process discovery techniques, enabling me to unveil underlying process models from event logs. I look forward to analyzing these models to identify key process elements, decision points, and variations. Conformance Checking and Improvement: Through conformance analysis, I plan to learn how to compare discovered process models with the actual execution. This will help me identify discrepancies and areas for process enhancement, ultimately leading to improved efficiency and effectiveness. Data Visualization and Communication: I recognize the importance of clear communication of complex data insights. By honing my data visualization skills, I aim to create informative dashboards and visual representations that effectively convey my findings to various stakeholders.