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Why are Italian trials taking so long? A process mining approach

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Introduction

The **inefficiency of civil justice** has a significant economic impact: delays and inefficiencies are estimated to generate a loss of over 16 billion euros, equal to 1% of GDP. Therefore, understanding the causes of these delays is crucial to **improve the efficiency and effectiveness** of the civil justice system.

The use of a **large dataset** from the **Milan Court of Appeal** allows us to examine the key factors contributing to the slowness of civil justice.



15.000+ Defined Cases



2017 - 2022



Ordinary Rite

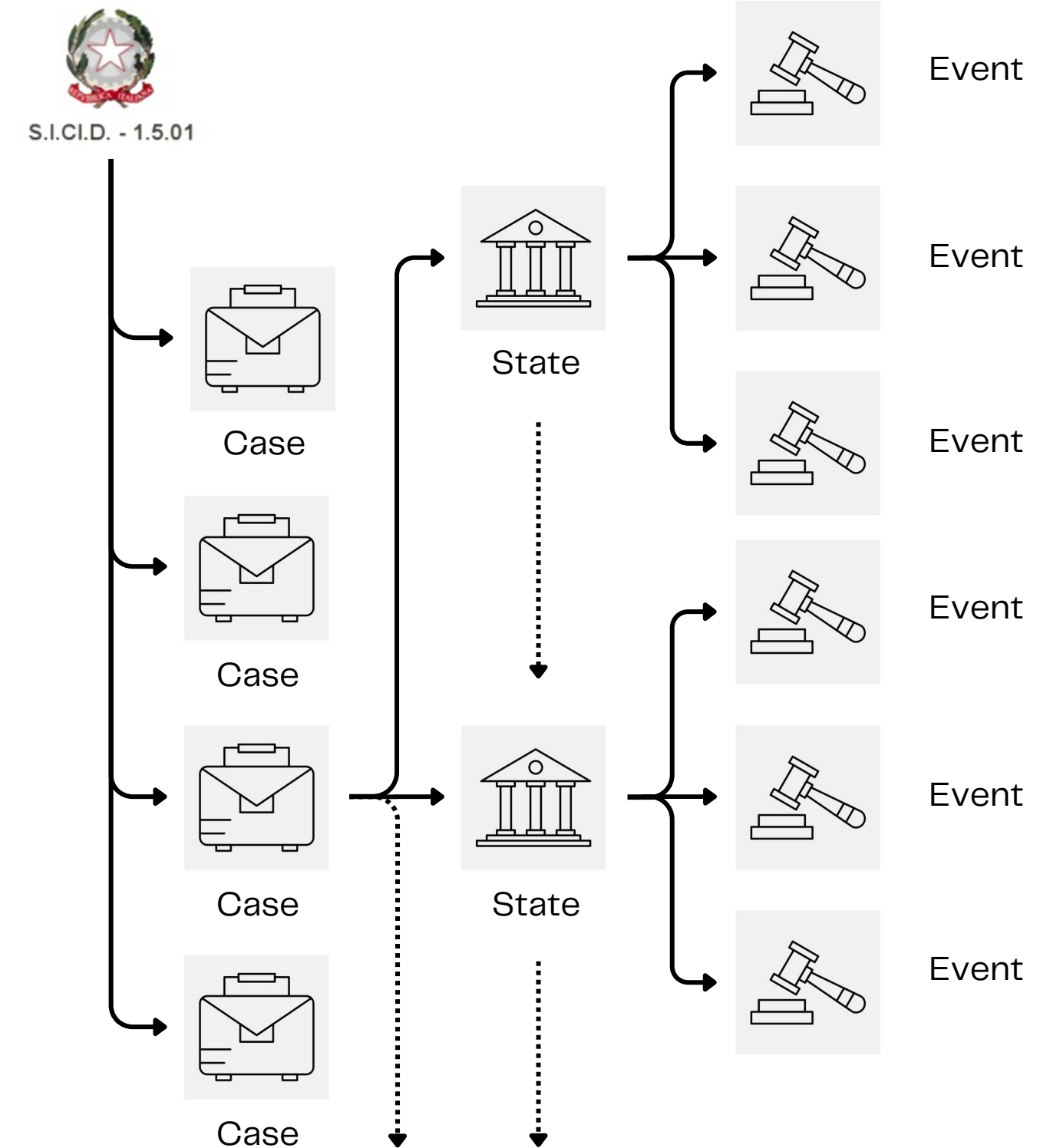


4 Sections











The process logs

The Italian information system for civil cases (**SICID**) is based on a **register of events in tabular form**. Each event corresponds to a row, characterized by the date of the event, the date of registration, the type of event, the previous and next status and other metadata.

Case	State	Event	Date	Section
1/2018	AS	IA	02/03/2018	-
1/2018	AS	DECO	06/03/2018	-
1/2018	AS	DECO	12/03/2018	-
1/2018	GC	AS	23/03/2018	02
1/2018	GC	OF	23/03/2018	02
1/2018	GC	XV	30/03/2018	02



Variant analysis

	 15.415 cases	 727 variants	Variant 1 <ul style="list-style-type: none">Percentage: 47,53%,Avg. duration: 1,59 years	Variant 2 <ul style="list-style-type: none">Percentage: 9,85%,Avg. duration: 9,25 months	Variant 3 <ul style="list-style-type: none">Percentage: 8,13%,Avg. duration: 11,17 months
 Attesa assegnazione sezione			✓	✓	✓
 Attesa designazione giudice			✓	✓	✓
 Attesa esito Udienza di Trattazione			✓	✓	✓
 Attesa esito Udienza di Precisazione Conclusioni			✓	✗	✗
 Attesa deposito conclusionali e repliche			✓	✓	✗
 Attesa deposito provvedimenti			✓	✓	✓
 Attesa pubblicazione provvedimento			✓	✓	✓
 Procedimento definito			✓	✓	✓

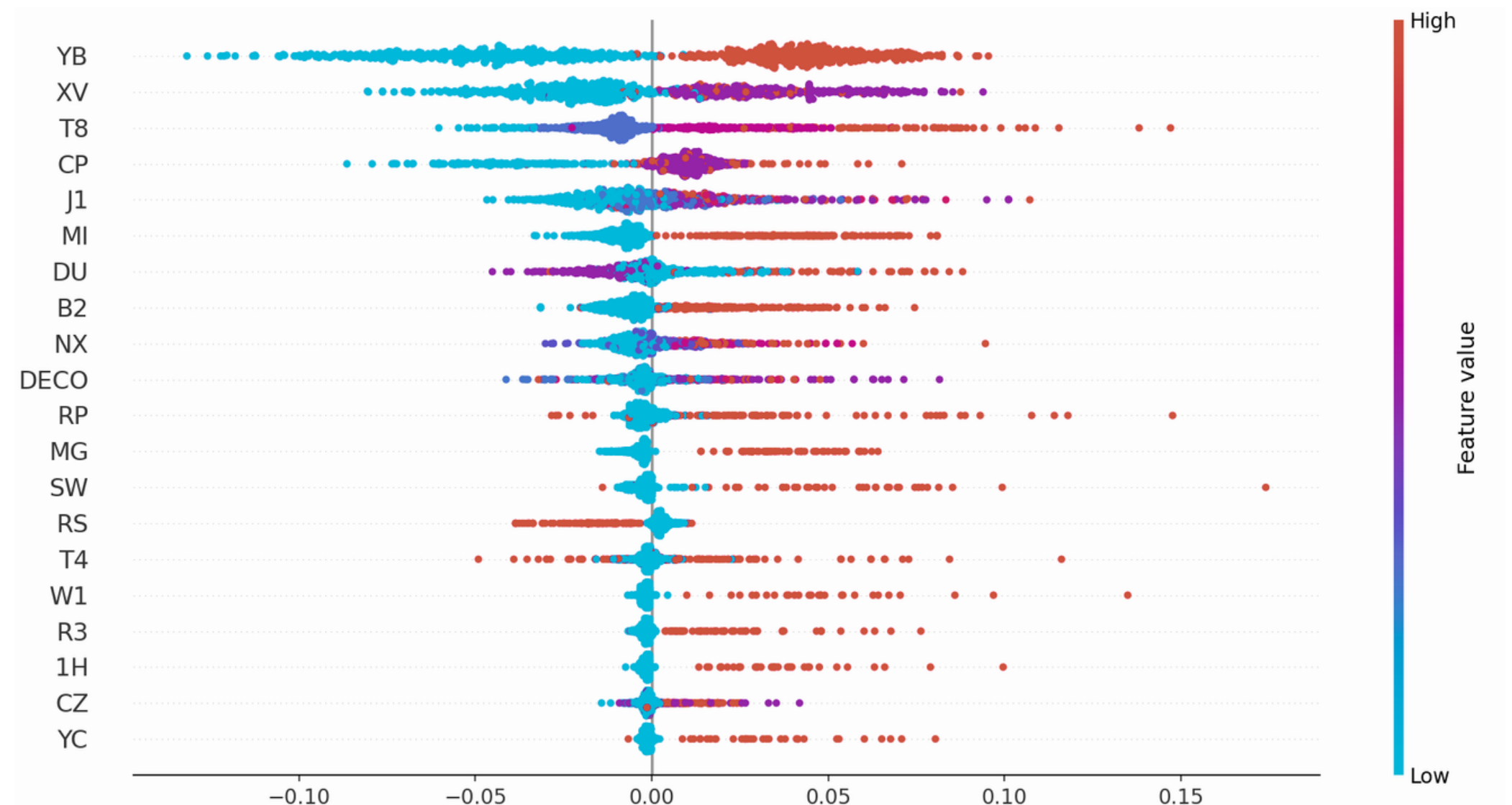
**No Udienza di
Precisazione Conclusioni**

**No deposito conclusionali
e repliche**

The impact of events

After analyzing each state of the process, we investigated the most critical states in more detail to **understand which events have the greatest influence on its total duration.**

Using machine learning techniques such as **Shapley Values** and **Permutation Importance**, we gain a deeper understanding of how events contribute to process duration by observing how the presence or absence of specific events affects regression models.



Future work

Ongoing and future work includes a deeper analysis on the different possible types of **events** in judicial cases and **prediction models** for ongoing processes, in order to identify possible critical aspects in their outcome.

