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inf.mpg.de Abstract—Causal  
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**vice versa, given only data  
over their joint distribution.**

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**causal direction from binary  
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Causal inference is one of  
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**problems across all domains of science. We address the problem of inferring a causal direction from two observed discrete symbolic sequences  $X$  and  $Y$ . We present a framework which relies on**



**lossless compressors for  
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**Causal inference is the process of drawing a conclusion about a causal connection based on the conditions of the occurrence of an effect. The main difference between causal**

**inference and inference of  
association is that the  
former analyzes the  
response of the effect  
variable when the cause is  
changed.**

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12: IV I & II; 13: Planning  
evaluations + other  
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## **Program Evaluation**

**Causal inference questions address some of the most interesting and impactful issues, but they are also some of the most difficult. Unlike with description and**

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**Importantly, for discrete data in general, CUTE, which stands for causal inference on event sequences, has only a linear time worst case runtime complexity. While there exist many causal**

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## **Causal Inference on Event**

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encoding  $X$ , and then**

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**encoding  $Y$  given  $X$  , than in  
the other**

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**propose Origo, an efficient  
method for inferring the  
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**Causal inference is concerned with the quantifying the relationship between a particular exposure (the 'cause') and an outcome (the 'effect'). Implicitly or explicitly,**

**causal inference is the  
primary aim of most  
empirical investigations,  
especially in medicine and  
behavioural science.**

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## **1.2. Causal Inference**

**Notation and Assumptions.**

**We first introduce notation  
that will be used throughout  
this article. For subject  $i$ , ( $i$**

**$= 1, \dots, N$ ),  $Y_i$  will denote the observed outcome (here it will be assumed to be a continuous random variable, in Section 2.4 we introduce analogous notation for the binary outcomes setting),  $E_i$**

**will denote a binary  
treatment or exposure, and  
 $X_i$  will ...**

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