**A Comparative Research on the Method of Fitting Statistical**

**Inference into Law Context between Civil Law and Common law.**

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**Keywords\_ Scientific uncertainty, statistical inference, precautionary principle, law of evidence, algorithm governance. .**

Machine learning refers to an automated process of discovering correlations between variables in a data set. However, correlation is a type of statistical inferences. In other words, a correlation does not necessarily reveal causal links. Therefore, it is regarded as one of the barriers to algorithmic transparency. Technicians and lawyers are arguing for a right to explanation, considering discrimination may be cloaked under this opacity. The right to explanation is interpreted based on the General Data Protection Regulation to guarantee the autonomy of personal data. It is still uncertain how should the algorithm be explained, as a contradictory between the statistical inference and the casual one. If we are seeking an explanation of a significantly automated decision, judicial practice in causal inference may be helpful.

In this paper, I will compare common law and civil law in resolving the statistical inference of scientific evidence. Their approaches in transforming scientific correlation into causal inference are suggestive for an explanation to an automated decision. Firstly, I will go through the proof standard in common law states and civil law ones. Then I will investigate cases involving scientific evidence in these jurisdictions, where statistical evidence of epidemiology presents regularly in the courts. Moreover, I will go deeper to explore how different courts mitigate the side effect of retrospective research. When presenting as evidence before a court, epidemiological research is mainly conducted in retrospective and group-based manner. A correlation in the research doesn’t necessarily represent a causal link. European courts and American ones use different approaches to sidestep controversies. National courts in Continental Europe relies on the interference of public administration to avoid judging scientific uncertainty. And actions of public administration is pursuant to the precautionary principle in the EU legislation. In the common law system, particularly in toxic exposure cases, the preponderance of proof doctrine is applied. The approach of common law is more transparent with a higher cost of litigation. By contrary, Continental practice inevitably impacts iteration of new technologies.

Two objectives are realized by this research. Firstly, when seeking for explanation, do we need an explanation of causal inference. Secondly, do a safeguard of casual inference mitigate the risk of automation. Therefore, the research conducts in five parts. Part I takes a glance on the automated decision and trace the debate of the right to explanation. This part determines that the research question is about the barriers to an acceptable explanation to an automated decision. Part II provides a premier to statistical inference in the context of epidemiology and how statistical inference challenges casual inference in courts. Part III will review judicial practice in resolving statistical inference in Continental Europe, particularly in disputes concerning scientific uncertainty. Part IV investigates the American approach in fitting statistical inference into the legal context, for example in cases of toxic torts. A comparison is made in this part between Continental Europe and the U.S, by which a distinction can be found that how to fit retrospective research evidence into causal inference in courts in different jurisdictions.