

Employing LLMs and GenAI to Model Case-based Legal Argumentation



相關文獻

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Abstract

This paper explains the changes in AI computational models of case-based legal argumentation in the last nine years. It focuses on a series of projects in my lab at the University of Pittsburgh in which my students have developed and evaluated argument-scheme-based prompting and LLM hybrid models.

Case-based legal argument involves using past decided cases in arguments to persuade a judge how to decide a similar later case. Computational models of case-based legal argument frequently employ factors, stereotypical patterns of fact that strengthen or weaken a side's argument with respect to a type of legal claim. "Knowledge-based" computational models of legal argument explicitly represent aspects of legal knowledge such as legal rules, concepts, factors, and argument schemes. Argument schemes are templates or "blueprints" for typical kinds of legal arguments such as arguing by analogizing to past cases or distinguishing a precedent.

Today, knowledge-based models are passé, having been replaced by machine learning, large language models, and generative AI. Argument schemes, however, may still have a role to play. Argument schemes employing factors can inform argument-scheme-based prompts to lead large language models to generate case-based legal arguments. Supportive prompting can enable generative AI to identify case factors and factor magnitudes with which to implement argument

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schemes. LLM-based hybrids can employ elements of knowledge-based models to generate legal arguments.

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I. Introduction

Researchers in the field of Artificial Intelligence and Law have developed computational models of case-based legal argumentation since the 1980s. With the advent of text analytic machine learning techniques, especially large language models (LLMs) and generative AI (GenAI) the nature of those models has radically changed. This article recounts some of these changes and explains how the older models are still relevant to the new.

Case-based legal argumentation involves supporting legal inferences with arguments that compare a problem scenario and relevant cases. *Black's Law Dictionary* defines precedent as “an action or official decision that can be used as support for later actions or decisions; esp., a decided case that furnishes a basis for determining later cases involving similar facts or issues.”¹ For purposes of this paper, “basis” should be read more broadly than in terms of binding precedents or *stare decisis* as it applies in the common law. Past decided cases can also furnish a basis for an argument that helps or persuades a court to determine how to decide a similar later case. Case-based legal argumentation, so considered, is practiced in civil law, as well as common law, contexts.²

More specifically, this article focuses on case-based arguments in factor-based legal domains. Law professor S. Rempell defines legal factors as “consideration[s] a decision maker must or may take into account to determine an outcome.”³ Factors play important roles in a variety of legal

¹ Precedent definition, *Black's Law Dictionary* (12th ed. 2024), available at Westlaw.

² D. Neil McCormick & Robert S. Summers (ed.) *INTERPRETING PRECEDENTS* (1997) Aldershot, UK: Ashgate / Dartmouth.

³ Scott Rempell, *Factors*, 70 *BUFF. L. REV.* 1757 (2022), available at <http://dx.doi.org/10.2139/ssrn.4095435>.

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運用大型語言模型與生成式人工智慧 建構案例式法律論證模型

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摘要

本文說明近九年來，案例式法律論證的人工智慧運算模型所發生之變遷。聚焦於筆者在美國Pittsburgh大學實驗室所進行的一系列研究計畫；在該等計畫中，學生分別開發並評估了以論證圖式為基礎之提示設計，以及結合大型語言模型之混合式模型。

所謂案例式法律論證，係指於法律論證中援引既往已裁判之案例，以說服法官於後續相似案件中作成特定裁判結果。此類法律論證之運算模型，經常運用所謂的「要素」(factors)，亦即具有典型性之事實模式；該等要素會就某特定法律主張，強化或削弱一方當事人之論證立場。

「知識導向」之法律論證計算模型，係以明確方式表徵法律知識之不同面向，例如法律規則、法律概念、要素，以及論證圖式。所謂論證圖式，係指對於常見法律論證型態之模板或「藍圖」，例如透過與既往案例進行類比，或對先例加以區辨來建構法律論證。

當前人工智慧發展脈絡下，知識導向模型已逐漸被視為過時，並為機器學習、大型語言模型及生成式人工智慧所取代。然而，論證圖式仍可能具有其理論與實務價值。結合要素之論證圖式，得為基於論證圖式之提示提供指引，進而引導大型語言模型生成案例式法律論證。透過輔助性提示之設計，生成式人工智慧得以辨識案件中之相關要素及其強度，並據以落實論證圖式之應用。進一步而言，以大型語言模型為核心之混合式模型，得以整合知識導向模型之部分要素，生成具法律說服力的論證。

關鍵詞： 案例式法律論證運算模型、以案例為基礎之法律論證圖式、基於論證圖式之提示設計／提示方法、知識導向模型與機器學習模型之比較、以大型語言模型為核心之混合式模型

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