

**‘REAFFIRMING THE SUPERIORITY OF HUMAN ATTORNEYS IN  
LEGAL DOCUMENT REVIEW AND EXAMINING THE  
LIMITATIONS OF ALGORITHMIC APPROACHES TO  
DISCOVERY’: NOT SO FAST**

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[1] In *Humans Against the Machines: Reaffirming the Superiority of Human Attorneys in Legal Document Review and Examining the Limitations of Algorithmic Approaches to Discovery*,<sup>1</sup> Robert Keeling et al. “challeng[e] the prevailing wisdom around what predictive coding purports to do, and argu[e] that machines are simply not what they are promoted to be, especially in the discovery process.”<sup>2</sup> We choose not to address their erroneous claims that “the results of prior research on predictive coding . . . reveal flaws,” or their asserted “correct[ion] of misunderstandings,” except to say that the study cited in footnote 143 of their paper<sup>3</sup> corroborates the prior research findings and explicitly addresses the impact of manual review as a component of technology-assisted review (“TAR”), showing that manual screening of the results of “predictive coding”<sup>4</sup> increases precision at the expense of recall.

[2] Instead, we focus our analysis on a material error in *Humans Against the Machines* that calls into question its results and conclusions.

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<sup>1</sup> Robert Keeling et al., *Humans Against the Machines: Reaffirming the Superiority of Human Attorneys in Legal Document Review and Examining the Limitations of Algorithmic Approaches to Discovery*, 26 RICH. J. L. & TECH., 2020 at 1.

<sup>2</sup> *Id.* at 2.

<sup>3</sup> Gordon V. Cormack & Maura R. Grossman, *Navigating Imprecision in Relevance Assessments on the Road to Total Recall: Roger and Me*, SIGIR '17: PROC.'S OF THE 40TH INT'L ACM SIGIR CONF. ON RES. AND DEV. IN INFO. RETRIEVAL 5, 5–14 (2017), <https://dl.acm.org/doi/pdf/10.1145/3077136.3080812> [<https://perma.cc/4XH6-TMN9>].

<sup>4</sup> See Maura R. Grossman & Gordon V. Cormack, *The Grossman-Cormack Glossary of Technology-Assisted Review*, 7 FED. CTS. L. REV. 1, 26 (2013), <https://www.fclr.org/fclr/articles/html/2010/grossman.pdf> (defining predictive coding). [<https://perma.cc/B5US-XZWF>].

[3] Keeling et al. claim that their experimental results demonstrate that manual review of the results of predictive coding yields an improvement in precision from 80.69% to 96.4%, at a “small cost” of 2.67% in recall.<sup>5</sup> These values are incorrect, and the data necessary to calculate them correctly have been omitted from the raw numbers provided in a confusion matrix in Table 6 of their paper.<sup>6</sup> Nonetheless, it is possible to infer an estimate of these values, and hence more accurate precision and recall estimates, from statistics provided elsewhere in their article (see Table 1 below). The corrected estimates reveal that *post-hoc human review of the results of predictive coding increases precision from 80.69% to 89.31%, at the cost of reducing recall from 75% to 71.69%.*

[4] This result supports the unremarkable conclusion that post-predictive-coding human review trades recall for precision. *It does not affirm the superiority of human review*, especially in light of Keeling et al.’s assertion that “between the two measures of precision and recall, **recall** is more important to attorneys, regulators, and courts because it measures whether predictive coding is actually identifying the responsive documents,”<sup>7</sup> and because one case study, conducted on a single document collection, without statistical testing or the reporting of confidence intervals, cannot possibly “reaffirm[] the superiority” of anything.

[5] Over and above the serious quantitative error noted above, *Humans Against the Machines* compares the use of a trained automatic classifier (*i.e.*, predictive coding) to the use of a trained automatic classifier followed by human review. Both are forms of technology-assisted review; the former is **not** a form of TAR evaluated in “The TREC Data Study,”<sup>8</sup> and the latter is certainly not “exhaustive manual review,” as examined in

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<sup>5</sup> Keeling et al., *supra* note 1, at 49–50.

<sup>6</sup> *Id.* at 50.

<sup>7</sup> *Id.* at 15 (emphasis added).

<sup>8</sup> See *id.* at 8 n. 18 (citing Maura R. Grossman & Gordon V. Cormack, *Technology-Assisted Review in E-Discovery Can Be More Effective and More Efficient Than Exhaustive Manual Review*, 17 RICH. J. L. & TECH. (2011)).

the TREC Data Study. Therefore, even if the quantitative results were to show the latter to be superior—which they do not—they would still not affirm the superiority of human review.

	<b>First Level Review</b>	<b>Subject Matter Expert: Responsive</b>	<b>Subject Matter Expert: Non-Responsive</b>
Responsive	1,384	1,236	148
Non-responsive	218	57	161
Total	1,602	1,293	309

Table 1: Inferred confusion matrix. Total Subject Matter Expert: Responsive is determined from the predictive model's stated precision of 80.69%,<sup>9</sup> from which we can infer that 80.69% of the 1,602-document sample (1,293 documents) are Subject Matter Expert: Responsive. The remaining cells may be filled in by subtraction. From the stated recall of 75%,<sup>10</sup> we may infer that 1,293 is 75% of the total number of responsive documents, which is necessarily 1,724. Recall is therefore  $1,236/1,724 \approx 71.69\%$  (not 72.33% as reported), and precision is  $1,236/1,384 \approx 89.1\%$  (not 96.4% as reported).

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<sup>9</sup> *Id.* at 49.

<sup>10</sup> *Id.*