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## Comment

Lawrence H. Cox

This article has many ideas to offer, and I am mostly in agreement with the authors' scenario for the future. I will limit my comments to expanding upon one technical area and suggesting a policy area not discussed by the authors.

### MATRIX MASKS

I applaud the characterization of certain data masking techniques in terms of matrix operations  $AXB + C$  on the original data matrix  $X$ , where  $(A, B, C)$  may depend on  $X$ . This characterization offers brevity in expression and the opportunity to

study and compare matrix masking methods using standard tools. It will facilitate the development, analysis and maintenance of computer programs to perform data masking, and it also may attract the attention of a wider class of researchers to problems in data masking.

However, the authors observe that the following are not representable as matrix masks of the form  $AXB + C$ : attribute-specific aggregation over (selected sets of) records; data swapping among some, but not all, attribute fields; (randomly) rounding (all) entries of  $X$ ; multiplication by random noise generated independently; data grouping; and truncation. These data masks indeed can be represented as matrix masks, in some cases by generalizing the definition of matrix mask to include sums or repeated application of elementary matrix masks  $M = AXB + C$  and in other cases by allowing more general arithmetic. Assume henceforth that  $X$  is an  $m \times n$  matrix.

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