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# Ethics and algorithms: Mitigating bias in deep machine learning

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Technology innovations continue to drive organizational efficiencies and improve the consumer experience. The media is awash in articles, interviews, and op-ed pieces attacking or defending the emergence and ascendancy of robotic process automation (RPA) and artificial intelligence (AI). RPA may be regarded as a qualified support mechanism — an assistant — that performs lower-value steps in a process, thus allowing humans to focus upon the higher-value analytical aspects of the process. Organizations are turning to AI systems to further realize efficiencies by employing algorithms to perform that analysis that supports effective decision-making.

### Deep machine learning

AI has been recognized across industries as an effective approach to human learning and reasoning. Machine learning, a subset of AI, has been applied to data mining to optimize decision-making in fields as diverse as medical research<sup>[1]</sup> to consumer marketing. Deep machine learning (DML) first appeared in 2006 as a new field of research within machine learning, and was initially referred to as “hierarchical learning.”<sup>[2]</sup>

DML involves both an abstract layer analysis and hierarchical methods applied to myriad real-life scenarios. Nonlinear processing in multiple layers employs an algorithm where the current layer takes the output of the previous layer as an input. Hierarchy is established among layers to organize the importance of the data to be considered as useful or not. The algorithmic design, as well as the breadth or limitations of the chosen data set, lend themselves to inherent biases exhibited by the individuals who design and choose.

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