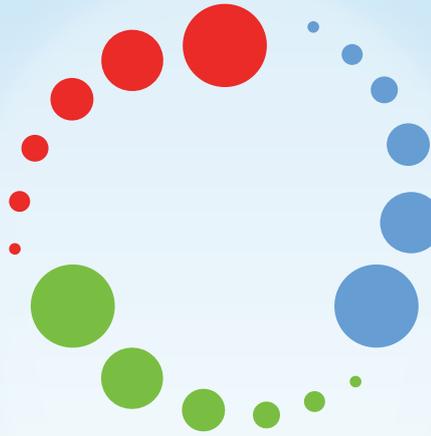


## The pros and cons of using Artificial Intelligence in LCA: a review of 34 LCA-based tools

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The world is becoming increasingly dynamic, and, as a result, decision-making processes within companies have had to accelerate to keep up with this pace. The importance of tools that reconcile environmental issues with the speed of response required by stakeholders emerges - whether in selecting a product with better environmental performance (as in the case of consumers) or in defining a material with a lower environmental burden (as in the case of companies). This paper revised 34 Life Cycle Assessment (LCA)-based tools in the context of integrating them into Artificial Intelligence (AI) features. Several tools were found catering to different sectors and specific environmental characteristics. These tools demonstrate applicability in sectors such as agriculture (14), multisectoral (4), industries (3), construction (2), packaging (2), transport (2), end-of-life (2) and others (5) serving as essential instruments for decision-making based on environmental data. However, it is crucial to emphasize that they do not replace comprehensive LCA studies but instead facilitate analyses and provide robust support for more informed decisions. Finally, the possibility of integrating these tools with Artificial Intelligence (AI) systems stands out for 6 tools, as they are available for download in Excel format, they can therefore be easily integrated with AI using Python libraries. Such integration, by exploring synergies between AI and LCA tools, represents a promising strategy and constitutes the central focus of this work.



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