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## AI-Based Topology Optimization of Freehand Sketches

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### Abstract

In order to minimize the effort involved in conceptualizing lightweight designs, this paper presents a novel approach to topology optimization that helps designers to enhance their initial sketches for a lightweight structure. The presented tool can interpret photographs of design sketches and proposes optimized flows of forces. At the core of this tool is an artificial neural network being trained to generate structures matching the sketched load cases. The findings include an intuitive means of communication between designers and an artificial intelligence tool, ways for implementing the tool, and the appropriate means of structuring and training the neural network.

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