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The development of a concept design support tool for car wheels

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In recent years, the demand for car wheels heightened, not only as a part to be lightened, but also as a part for decoration. As a result, makers which only take charge of production of wheels have increased in the car industry, and the design of wheels is tending to diversify. For this reason, the aim of this study is to make a tool to support the concept design of car wheels.

In this study, I parameterize the car wheel, and operate the parameters of design with an interactive genetic algorithm to narrow down candidates in concept design. The design support tool which I developed in this study can show about 2,400,000 candidates from a genetic combination. The user chooses one design matching their taste from among 16 kinds of design candidates which the tool suggests. The system treats the design as the optimal solution, and shows the new design candidate that inherits a part of the design with the genetic algorithm. User can converge to their intended design by repeating this processing. But user can specify the crossing-over rate and the mutation rate, which are the parameters of the genetic algorithm.

From experimental results, I found that the tool can show candidates of various designs, but that users must use trial and error to reach a specific design.