

Abstract

This Request For Proposal investigates the challenge of sorting LEGO bricks, and proposes the development of an automated sorting system.

ToroLUG, a Toronto-based community of Adult Fans of LEGO (AFOLs), frequently encounters this challenge, with members reporting that sorting consumes more time than building. Existing solutions, including the official LEGO Sort and Store, fail to meet their needs due to limited sorting capabilities and a reliance on manual labour [1, 2]. Other available designs have larger dimensions and weight than ToroLUG AFOLs would want, hindering the usability of the design [3, 4].

Based on stakeholder input, the design must be a compact, automated system that can sort LEGO bricks by type, colour, or size according to user preference. To ensure safety, it must not have exposed moving parts, must include an automatic shutoff and must not have any sharp edges. Additionally, the sorting shall also require no user's help during operation, provide sorting for 4 feature specificities, have a maximum cycle time of 3 seconds and a minimum accuracy of 80% for the usability and performance of the design.

The design requested by this RFP shall fill the gap between the users' needs and the existing solutions, with a design that prioritizes the usability, performance, and safety of the user, enabling them to spend less time sorting and more time building.

Reference List

- [1] R. Stewart, "LEGO sort and store head review," Parenting Central, <https://www.parentingcentral.com.au/LEGO-sort-store-head-review/> (accessed Feb. 15, 2025).
- [2] "Product page," Amazon, Feb. 15, 2025. [Online]. Available: <https://amzn.asia/d/3XyBS4D>. [Accessed: Feb. 15, 2025].
- [3] J. Mattheij, "How I Built an AI to Sort 2 Tons of LEGO Pieces," IEEE Spectrum, Jun. 23, 2017. [Online]. Available: <https://spectrum.ieee.org/how-i-built-an-ai-to-sort-2-tons-of-LEGO-pieces>. [Accessed: Feb. 15, 2025].
- [4] "Multifunction Color Sorting Machine," Grotech Color Sorter, Feb. 15, 2025. [Online]. Available: https://www.grotechcolorsorter.com/multifunction-color-sorting-machine_p98.html. [Accessed: Feb. 15, 2025].