

An Interactive Approach to Backward Compatible Modular System Configuration

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Abstract

This research introduces an innovative approach to enhance modular system configurations, focusing on the critical aspect of backward compatibility. By employing human involvement in the component selection process, the study aims to efficiently solve the compatibility challenges between new and legacy components within modular systems, a prevalent issue in computational design. The core of this research is to optimize the configuration process, ensuring that systems can seamlessly integrate both current and legacy components without sacrificing performance or flexibility, and uncover concealed solutions that are not identifiable when backwards compatibility is not considered. An interactive user interface is developed and integrated into the approach, allowing users to customize system configurations to their specific needs and preferences by incorporating advanced web interfaces. A user-friendly web application is developed using TypeScript for a responsive and intuitive frontend, coupled with a robust Python-powered backend. These web interfaces facilitate a highly interactive user experience, enabling users to not only specify initial and final configurations but also to select intermediary components or interfaces. This feature empowers users to explore a wide range of configuration pathways, including those that might not be immediately obvious, thereby discovering the most efficient and compatible system configurations. This user-centric design ensures that the proposed approach is not only theoretically sound but also practical and user-friendly.

Keywords

Modular Product Design, Backward Compatibility, System Integration, Interactive User Interface.

Biographies

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Hari Elangeswaran is a graduate student in Data Science & Analytics at Bradley University, with a diverse background in Mechanical Engineering, Software Development, and Supply Chain Management.

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