

MODULAR ROBOTS: A REVIEW AND COMPARISON

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ABSTRACT

Modular Reconfigurable Robot (MRR) systems are robotic systems that are composed of many recurring modules that can be reordered or that can rearrange themselves into diverse configurations depending on the job required to be performed at the time. Modular robots can be categorized as chain-type, lattice-type, or hybrid-type architectures, truss systems and free-form systems. Self-reconfiguration, self-assembly and self-repair are the main characteristics of modular robots. They have numerous applications including disaster relief, planetary exploration, inspection in hazardous environments, adaptive furniture, biomedical uses in surgeries and reconfigurable factory lines.

This paper offers an in-depth review of the types of modular reconfigurable robots, their characteristics of self-reconfiguration, self-assembly and self-repair, their applications in various industries especially disaster relief and planetary exploration, and challenges in their development and use. It also undertakes a comparative analysis of four types of molecular reconfigurable robots viz. FreeBots, M-Blocks, Roombots and SMORES.

KEYWORDS: *molecular robots, reconfigurable, applications, challenges, comparative analysis*

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