

## Attribute Based Comparison and Selection of Modular Self-Reconfigurable Robot Using Multiple Attribute Decision Making Approach

**Authors :** Manpreet Singh, V. P. Agrawal, Gurmanjot Singh Bhatti

**Abstract :** From the last decades, there is a significant technological advancement in the field of robotics, and a number of modular self-reconfigurable robots were introduced that can help in space exploration, bucket to stuff, search, and rescue operation during earthquake, etc. As there are numbers of self-reconfigurable robots, choosing the optimum one is always a concern for robot user since there is an increase in available features, facilities, complexity, etc. The objective of this research work is to present a multiple attribute decision making based methodology for coding, evaluation, comparison ranking and selection of modular self-reconfigurable robots using a technique for order preferences by similarity to ideal solution approach. However, 86 attributes that affect the structure and performance are identified. A database for modular self-reconfigurable robot on the basis of different pertinent attribute is generated. This database is very useful for the user, for selecting a robot that suits their operational needs. Two visual methods namely linear graph and spider chart are proposed for ranking of modular self-reconfigurable robots. Using five robots (Atron, Smores, Polybot, M-Tran 3, Superbot), an example is illustrated, and ranking of the robots is successfully done, which shows that Smores is the best robot for the operational need illustrated, and this methodology is found to be very effective and simple to use.

**Keywords :** self-reconfigurable robots, MADM, TOPSIS, morphogenesis, scalability

**Conference Title :** ICME 2018 : International Conference on Mechanical Engineering

**Conference Location :** Montreal, Canada

**Conference Dates :** May 24-25, 2018