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# ENVIRONMENT-ADAPTIVE AND MULTI-MODAL MOBILE ROBOT

**Abstract**

The objective of this paper is to present a mobile robot that will surmount any obstacle that could hinder the progress of the robot in a preset path. The prototype is equipped with artificial intelligence and neural network to analyze the physical properties of the obstacle and select best locomotive system to avoid the obstacle and proceed further.

The robot is equipped with two locomotion options, primary and secondary. Primary locomotion is a chained tracked wheel type motion system with independent suspension. This offers better traction against rough terrain patterns and the independent suspension system helps control of individual wheels and gives additional support in amorphous terrain areas. Also, the primary locomotion offers a good gravitational balance, which is capable of climbing slopes of 30-70 degrees with ease.

The secondary locomotion system is equipped with four independent and flying supporting arms. Each independent supporting arm is installed with small tracked suspension activated chain locomotive unit. This enables the robot to move in uneven terrain, where a high coefficient of friction is required for motion. The secondary locomotion system acts as a self-recovery unit, which is deployed based upon the environmental conditions to which the robot needs to adapt. The secondary locomotion is also capable of rotating the robot 360 degrees vertically and horizontally.

Currently the work is in a prototype stage; it can be further customized based on a mission-specific requirements.