



A LEARNING APPROACH TO ENABLE LOCOMOTION OF MULTIPLE ROBOTIC AGENTS OPERATING IN NATURAL TERRAIN ENVIRONMENTS

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ABSTRACT—This paper presents a methodology that utilizes soft computing approaches to enable locomotion of multiple legged robotic agents operating in natural terrain environments. For individual robotic control, the locomotion strategy consists of a hybrid FSM-GA approach that couples leg orientation states with a genetic algorithm to learn necessary leg movement sequences. To achieve multi-agent formations, locomotion behavior is driven by using a trained neural network to extract relevant distance metrics necessary to realize desired robotic formations while operating in the field. These distance metrics are then fed into local controllers for realizing linear and rotational velocity values for each robotic agent. Details of the methodology are discussed, and experimental results with a team of mobile robots are presented.

Key Words: Locomotion, Multi-Robot System, Legged Robots, Neural Networks, Genetic Algorithms