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Critical review : Humanoid Path Planning over Rough Terrain using Traversability Assessment

The paper presents a comprehensive framework for humanoid path planning over challenging terrain, integrating A* search and optimization techniques to generate traversable paths for legged robots. The authors address key issues in legged locomotion, such as terrain traversability, obstacle avoidance, and smooth path generation, providing a detailed description of the methodology, including graph structure, feasibility checks, terrain traversability assessment, and optimization criteria. The integration with balance control and footstep planning enhances the applicability of the framework for real-world scenarios, demonstrated through testing on a DRC Boston Dynamics Atlas robot.

However, despite its comprehensive approach, the paper lacks clarity in certain aspects. While the methodology is well-described, the evaluation metrics and performance benchmarks are not sufficiently elaborated. The results section provides visual demonstrations of the framework's application on various terrains, but quantitative analysis of the planner's efficiency, robustness, and scalability is limited. Additionally, the discussion on limitations and future work is somewhat brief, especially regarding the "cul-de-sac problem" mentioned, which could significantly impact the planner's performance in practical scenarios. Further exploration of runtime complexity and strategies to mitigate such issues would strengthen the paper's contributions and practical relevance. Moreover, the integration of semantic labels as a heuristic for path planning is mentioned briefly but lacks elaboration, leaving a potential avenue for future research unexplored. Overall, while the paper presents a promising framework for humanoid path planning, further empirical validation and exploration of potential enhancements are warranted to establish its efficacy in real-world applications.