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| Legged Robots In The WildDespina-Ekaterini Argiropoulos, Michael Maravgakis, Manos Papadakis, Markos Sigalas, Dimitrios Papageorgiou and Panos TrahaniasInstitute of Computer Science, FORTHPresenting author: Despina-Ekaterini ArgiropoulosCorresponding author: Despina-Ekaterini Argiropoulos, email: despinar@ics.forth.gr  |

abstract

Legged robots, particularly quadrupeds, have rapidly advanced in recent years, offering new possibilities due to their unique design. Unlike drones or wheeled robots, quadrupeds tackle complex, uneven terrains, even with additional payloads, giving them a significant advantage in challenging environments. Their four-legged structure helps them overcome obstacles and navigate rugged terrains, making them versatile for both indoor and outdoor applications. This design allows them to reach areas that other robotic systems simply cannot access, while also carrying equipment and tools. As a result, quadrupeds are ideal for tasks such as inspection, surveillance, search and rescue, and other critical operations in difficult-to-navigate environments.

At the Computational Vision and Robotics Laboratory (CVRL) of ICS-FORTH, significant strides in advancing quadrupedal robots through innovative designs and cutting-edge technologies are underway. Our research focuses on adaptive controllers [1] that enhance their capacity to maintain stability and control while traversing slippery or hazardous terrains. In addition, sophisticated systems capable of detecting and responding to foot slippage, ensuring the robot remains robust even in unpredictable environments have been developed [2]. Furthermore, our work has led to groundbreaking designs enabling quadrupeds to climb vertical surfaces and even navigate negative-sloped terrain, greatly expanding their operational capabilities [3]. These technological innovations make quadrupeds particularly well-suited for demanding tasks and facilitate the development of real-life applications and operation in hazardous or inaccessible areas, thereby pushing the boundaries in legged-robot deployments.

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