Existing Robot Analysis

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[1] Abstract

The purpose of this document is to showcase analysis done on pre-existing robots that satisfy the design criteria. The goal is to gain a deeper understanding of what already exists (functional or mechanical) in order to make a more informed decision when designing one. The analysis will tackle general design analysis, points of interest, etc.

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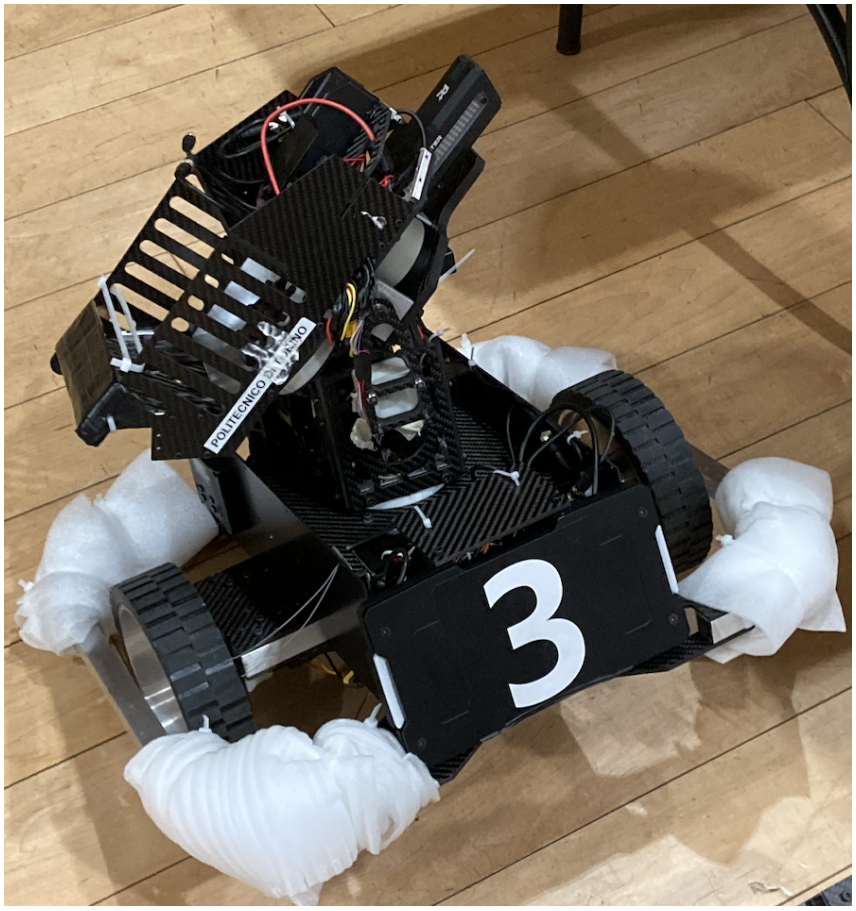
[2] Politécnico De Torino



This robot was designed by Politécnico De Torino. The chassis consists of plates and square tubing where electronics are mounted. There is no suspension system and the wheel treads have an alternating pattern. A turntable is used for the yaw mechanism and the turret follows a standard linkage pitch mechanism with a top-feeding turret that uses flywheels. A slip ring is used to connect the turret electronics to the chassis electronics. A square tubing frame was used to protect the chassis with foam at the corners.

While the wiring is neat, there may not be enough room for electronics. There is not enough protection when the robot is offline and no longer has balancing capabilities. This is evident with the foam corners. There is also a high chance of tipping. Efforts should be made to have the center of gravity as low as possible to avoid tipping during high acceleration situations.

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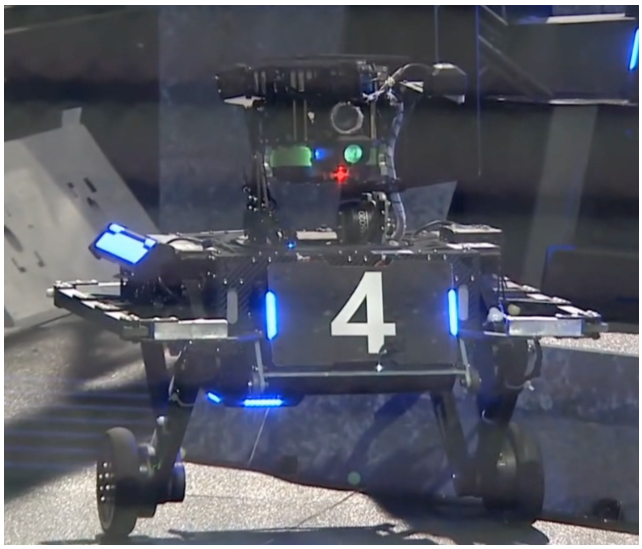
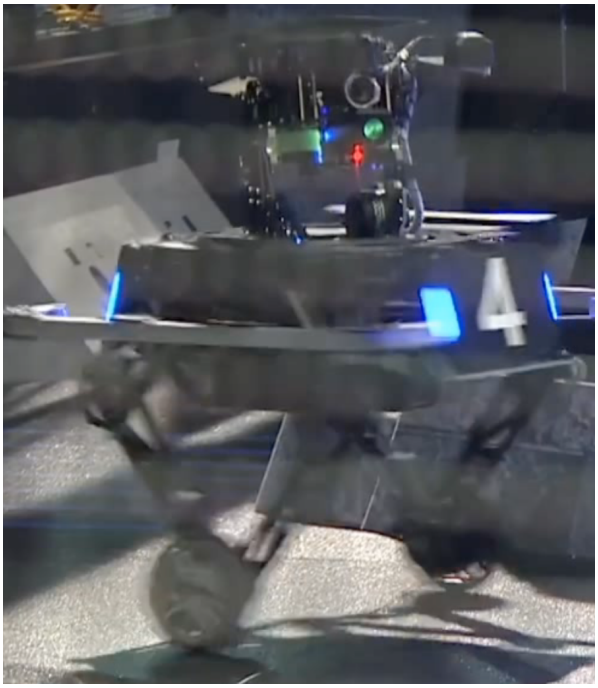
[3] Noooploop University





This robot was designed by Noooploop University in China. The finer design details are difficult to see. The most significant design interest is the expansion and contraction of the chassis, which allows the robot to move vertically. It looks like a motor directly turns the wheel and a scissor lift-like mechanism allows the robot to vertically move. A square tubing frame protects the robot and a linkage is used for the pitch mechanism. Based on the image, smooth wheel treads are being used.

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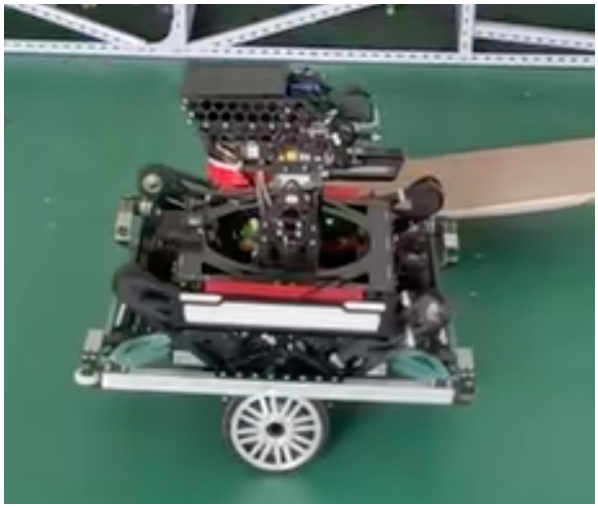
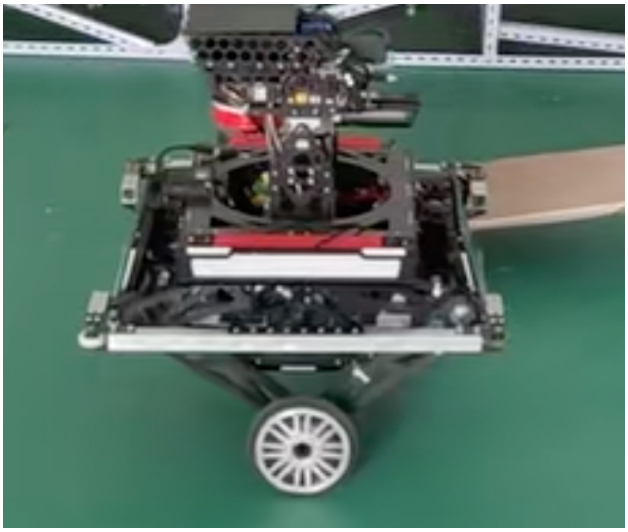
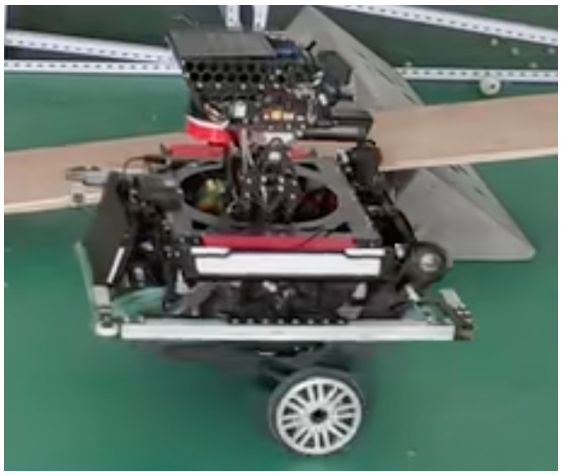
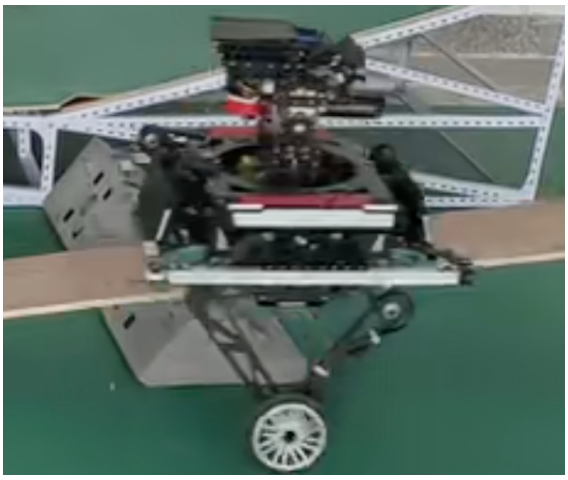
[4] Robot 3



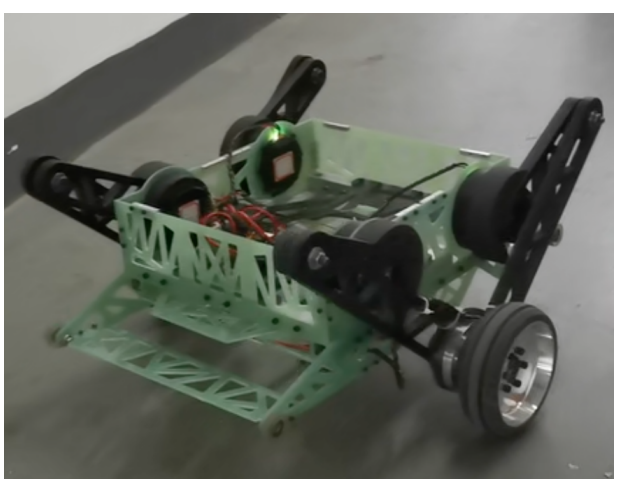
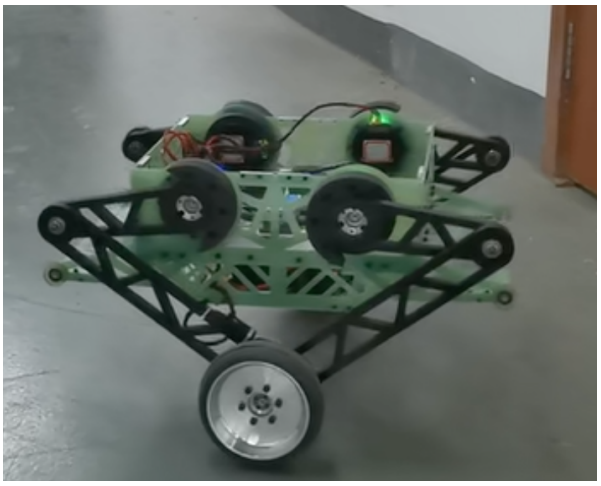






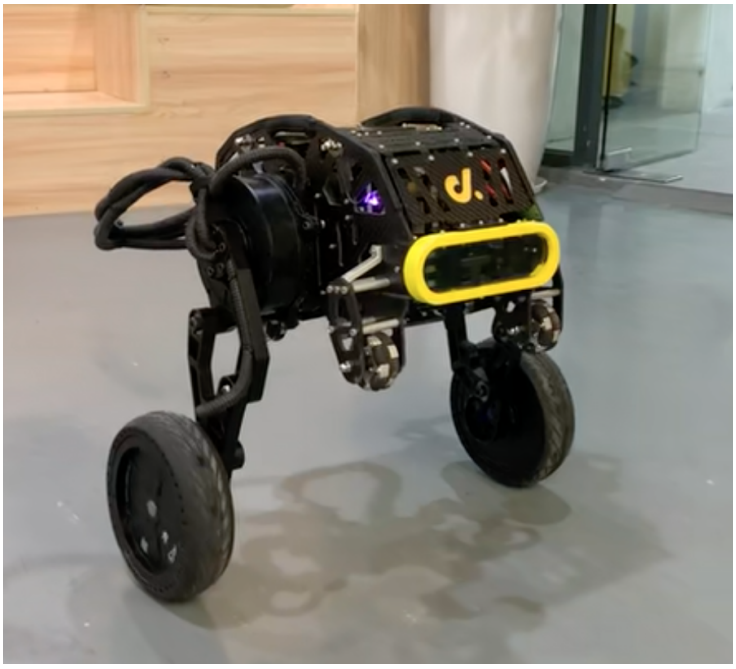
The owner of this robot is unknown. The finer design details are difficult to see. Much like Noopoop University's robot. This robot uses linkage mechanisms to lift the robot vertically. These links also move when the robot is trying to balance, acting like a counterweight to help balance the robot. When the wheels are not one the same surface, the links expand effortlessly to make the robot stable, demonstrating a strong suspension system.

[5] Robot 4

The owner of this robot is unknown. While this robot is incomplete, it showcases the barebones design of the chassis and balancing mechanism. Like similar designs, a linkage mechanism is used to lift the robot. It is clear that one motor turns the wheel and four motors total are used to lift the robot. Based on the image, a striped wheel design is being used where the middle strip extends farther out than the others.

[6] Robot 5



The owner of the robot is unknown. The robot is mostly similar to the previous designs. The design of the links is very different and doesn't utilize a truss structure. It appears that only one motor is used to lift the robot but this assumption is uncertain. A standard tire design is being used.

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[7] Robot 6

The owner of the robot is unknown. The robot is similar to previous designs. Based on the image, it looks more compact. The wheels look like a standard tire tread.