



Balloon Robot

Tech ID: 29350 / UC Case 2016-229-0

SUMMARY

The Hong group at UCLA has developed a bi-pedal robot that incorporates multiple gas-filled balloons to provide support and balance.

BACKGROUND

Humanoid robots with the ability to move have long been part of the entertainment industry. For example, humanoid robots are used in science fiction movies and can be used to interact with members of a live audience. However, there are a number of issues with using current humanoid robots in an interactive environment. One such problem is that humanoid robots are often heavy and require many metal and/or electrical components such as actuators in the knee and hip joints for bipedal motion. Thus, if the robot tips or falls, the robot may harm an audience member or components in the robot may be damaged. Therefore, the entertainment industry would benefit from a lighter, mobile humanoid robot with less sophisticated parts.

INNOVATION

Inventors at UCLA have developed a bi-pedal robot that incorporates multiple airtight bladders containing a gas that is lighter than air, such as helium, to provide support and balance. The suspended body of the robot maintains a neutral level in the air due to balloons. When the body is pulled to a different level due to bi-pedal motion, the body naturally returns the neutral level, and reduces the likelihood of the robot tipping or falling. This robot requires only extremely small actuators and no sensors. Locomotion can be achieved by a number of mechanisms, such as actuators or an external air vortex. As it moves, the robot’s body will maintain equilibrium without additional effort due to the buoyancy of the gas-filled balloons.

See video: <https://www.youtube.com/watch?v=EdSoUbXirVI>

APPLICATIONS

- ▶ Toys
- ▶ Safe human-robot interactions
- ▶ Mobile information delivery
- ▶ Tradeshows, museums, amusement parks, direct advertising
- ▶ Bi-pedal or locomotive robot with minimal metal and electrical components

ADVANTAGES

- ▶ Inexpensive, easy-to-build design that can be scaled to a range of sizes
- ▶ Reduced mechanical complexity while maintaining the ability to move
- ▶ Capacity for various modes of locomotion, including bi-pedal locomotion
- ▶ Motion may be powered by tiny actuators or an external force, such as an air vortex
- ▶ Stability with minimal effort
- ▶ Safe for human interaction
- ▶ Can be configured to walk on water

CONTACT

UCLA Technology Development Group
ncd@tdg.ucla.edu
tel: 310.794.0558.



INVENTORS

- ▶ Hong, Dennis W.

OTHER INFORMATION

KEYWORDS

bipedal motion, locomotive robot,
balloon robot, air bladder

CATEGORIZED AS

- ▶ [Engineering](#)
- ▶ [Robotics and Automation](#)

RELATED CASES

2016-229-0

UCLA Technology Development Group

10889 Wilshire Blvd., Suite 920, Los Angeles, CA 90095

<https://tdg.ucla.edu>

Tel: 310.794.0558 | Fax: 310.794.0638 | ncd@tdg.ucla.edu

© 2018, The Regents of the University of California

[Terms of use](#)

[Privacy Notice](#)

