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Wearable Cleaning Robot

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Wearable Cleaning Robot

ABSTRACT

Clothing stains and spills often go undetected by the wearer of the clothes. A clothing spill usually prompts an urgent trip to swap clothing, which is an inconvenience. This disclosure describes a portable miniature cleaning robot that can detect spills or stains on clothing using computer vision, dispense cleaning fluid, and dry the clothing to remove the stains even as the user continues wearing the clothes. The robot, which is detachable and wearable, can be attached to an article of clothing whenever needed. The robot moves up and down the clothing and detects stains based on discrepancies in color or patterns. The robot can be filled with cleaning fluid that can be dispensed on stained or covered areas to remove the stain.

KEYWORDS

- Stain removal
- Stained clothing
- Cleaning robot
- Wearable robot
- Spill detection
- Stain detection
- Robotic cleaning
- Wearable computing

BACKGROUND

Clothing stains and spills often go undetected by the wearer of the clothes. A clothing spill often prompts an urgent trip to swap clothing, which is an inconvenience.

DESCRIPTION
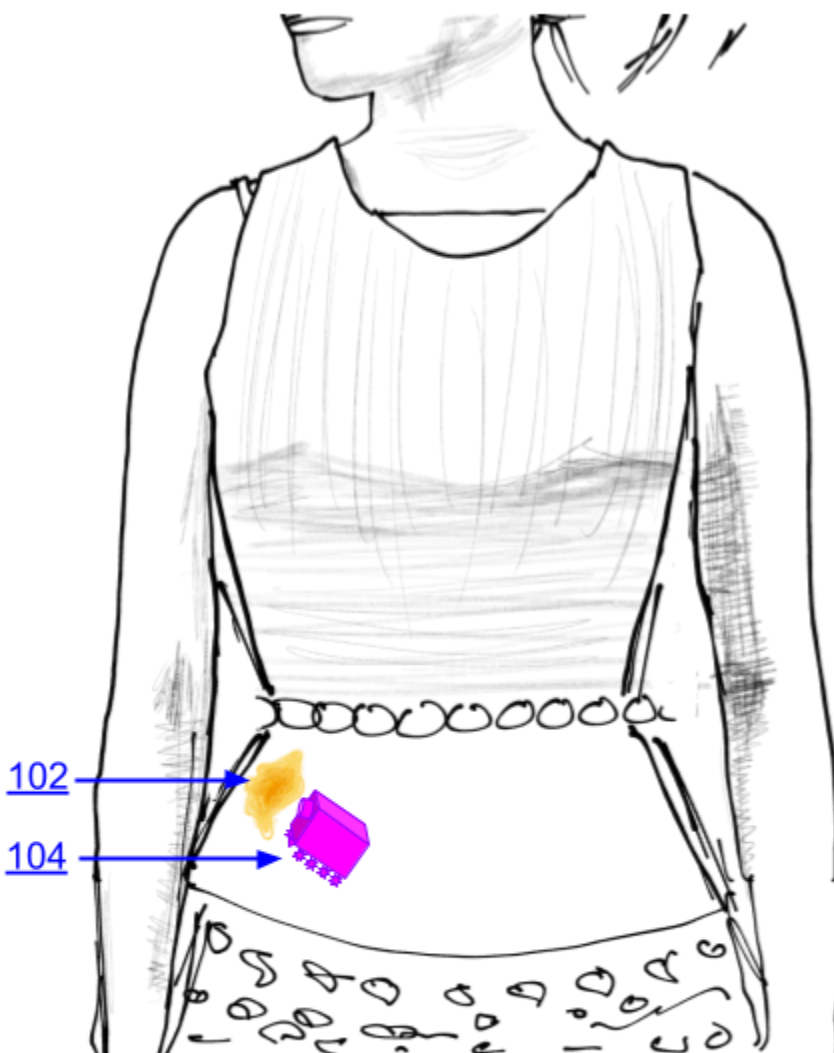
Fig. 1: Wearable cleaning robot

Illustrated in Fig. 1, this disclosure describes a portable, miniature, cleaning robot (104) that can detect spills or stains (102) on clothing, dispense cleaning fluid, and dry the clothing to remove the stains even as the user continues wearing the clothes. The robot, which is detachable and wearable, can be attached to an article of clothing whenever needed. The robot moves up and down the clothing and detects stains as discrepancies in color or pattern. The robot can be filled with cleaning fluid that can be dispensed on stained or covered areas to remove the stain. Similar
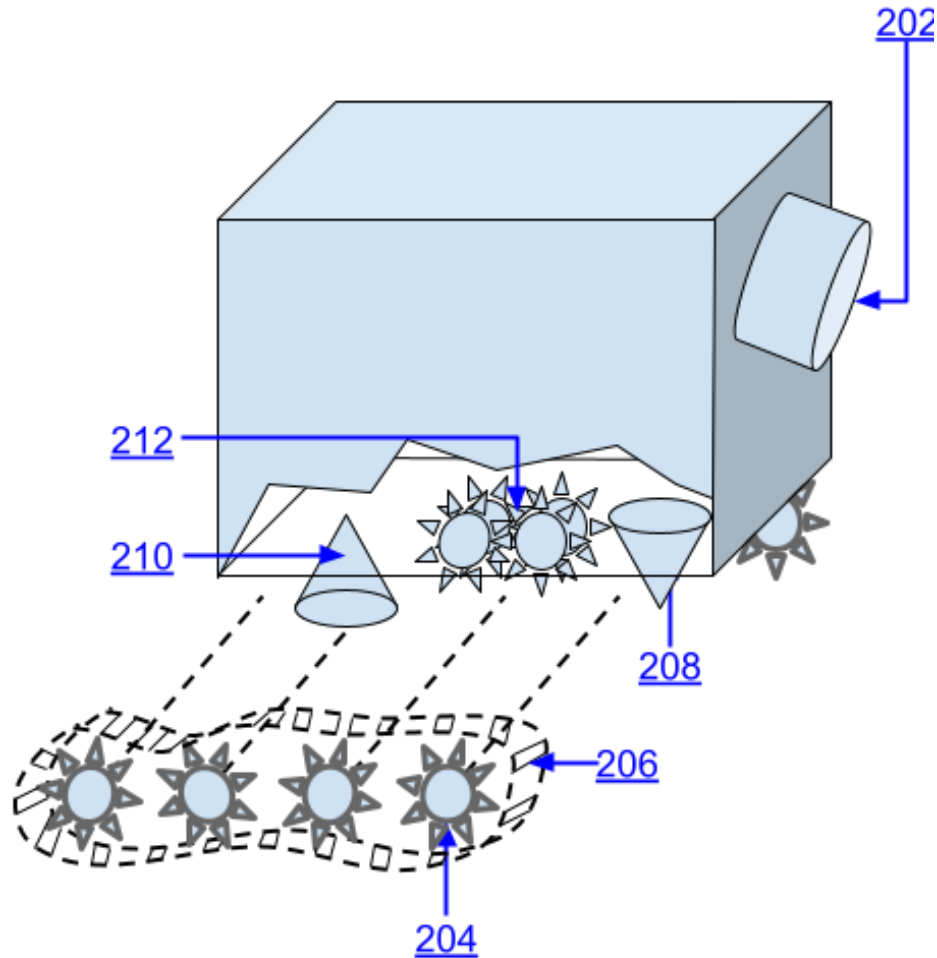
to autonomous floor-cleaning robots, the described stain-removing robot uses computer vision to map sections of the article of clothing that have already been cleaned and targets regions yet to be cleaned, performing an initial dimension mapping as necessary.

Fig. 2: Cutaway view of the cleaning robot

Fig. 2 illustrates an example cutaway view of the cleaning robot. Some components of the robot include a computer vision module including a camera (202); wheels (204); a detergent dispenser (208); a particle agitator (212); a suction mechanism (210); etc. Computer vision procedures can be used to recognize and isolate the stained region, causing the robot to move back and forth over the stain while dispensing detergent and vacuuming out the stain. Computer

vision can also be used to recognize regions of the clothing that have already been traversed and regions that are yet to be cleaned.

To enable the robot to move around the clothes as the wearer stands, e.g., move against gravity, the robotic wheels can be augmented by tracks (206), which increase the friction between the wheels and the fabric and enable the robot to adhere to the fabric. Alternatively, as illustrated in Fig. 3, magnetically coupled wheels can be used to enable the robot to maintain its grip on the fabric as it moves around the clothing.
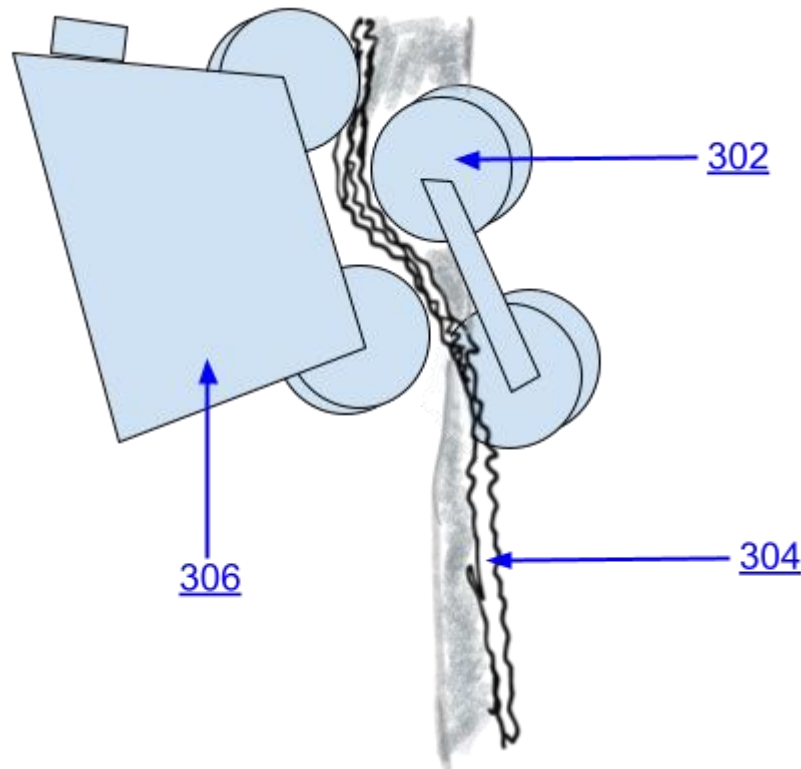
Fig. 3: Magnetically coupled wheels to enable the robot to grip the fabric

As illustrated in Fig. 3, magnetic wheels (302) can be used in the underside of the fabric (304, shown in cross-section), such that the robot (306), which traverses the exposed sections of the clothing, can grip the fabric.

CONCLUSION

This disclosure describes a portable miniature cleaning robot that can detect spills or stains on clothing using computer vision, dispense cleaning fluid, and dry the clothing to remove the stains even as the user continues wearing the clothes. The robot, which is detachable and wearable, can be attached to an article of clothing whenever needed. The robot moves up and down the clothing and detects stains based on discrepancies in color or patterns. The robot can be filled with cleaning fluid that can be dispensed on stained or covered areas to remove the stain.

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