

Transportation of a Large Object by Mobile Robots Using Hand Carts

A mobile robot is expected to perform a work on behalf of the human, owing to its wide range of movement. For example, there are transportation of objects in a factory and arrangement of objects in a house/office as the applications to be considered. Therefore, assuming the works mentioned above, the force needed to complete the work is greater than the force the mobile robot can provide, which is limited.

To transport a large object by small mobile robots, it is important to reduce the load on the mobile robots. As a solution to this problem, this research proposes a new methodology for transportation of objects by mobile robots through using hand carts.

In the proposed method, the object is loaded onto small hand carts by two mobile robots, as explained in the following steps. First, a robot equipped with an end-effector (robot A) tilts the object to provide the space between the object and the floor (Fig. 1). Then the other robot (robot B) inserts two hand carts into the provided space (Fig. 2). The robot A then moves to the opposite side of the object to tilt it again, and the robot B inserts the rest of the hand carts. In this process, the risks upon tilting the object are "fall of the robot by the reaction force of pushing an object" and "slip of the object already loaded onto the cart" (Fig. 3). To address these problems, for the former we proposed pressing the plate (put a stop to slip) against the floor with an air cylinder driving, and for the latter to prevent slippage of the robot (backward) when exerting force on the object, we are still thinking in a solution.

Keywords: mobile robot, transportation, hand cart



Fig. 1 The robots and the hand cart

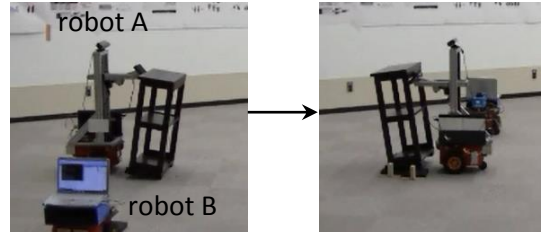


Fig. 2 Operation procedure

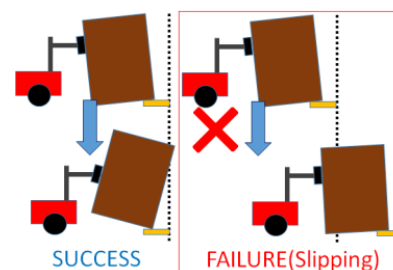


Fig. 3 A problem in tilting an object