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Short Communication

Powered Floor Framework with Integrated Robot Localization

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INTRODUCTION

The issue of power delivery is a prominent challenge in the realm of mobile robotics. In the past, a powered floor-based solution was suggested as a potential solution. However, in this article, we propose an innovative system that integrates a powered floor with a robot pose estimation system. The powered floor is constructed using a series of interdigitated conductors that provide a direct current power supply. These conductors are interwoven, akin to the weaving of a carpet, creating a checkerboard pattern of positive and negative pads. The robots are fuelled by sliding contacts, and the voltage supply is changed with a paired encoding that explicitly distinguishes every guide striped power line. Each robot can self-localize using this technique by examining the data obtained from the contacting pins.

DESCRIPTION

We provide a detailed explanation of the theoretical framework that enables simultaneous power delivery and localization. Additionally, we showcase the results of an experimental evaluation we conducted using a prototype of our powered floor system. Delivering electrical power to mobile systems, including robots, is a complex task in various fields, such as transportation, automation, and logistics. Sliding contact-based power supply systems are an effective solution for powering multiple robots, particularly in swarm robotics applications where manual battery recharging is a time-consuming process. These systems are also straightforward to implement and cost-efficient. Generally the floor is comprised of interdigitated stripes; these are positive and negative guides. Versatile robots are furnished with a progression of pins in touch with either the floor guides or the encasing. The condition for the robot to be controlled is that no less than one pin must be in touch with a positive voltage stripe and essentially another pin must be in touch with a negative voltage stripe. Numerous pins could be in touch with positive or negative guides. Likewise, it might happen that a few pins are in touch with the protecting band that is mediated between a positive and a negative director. Ordinarily, the directing stripes are organized lined up with one another; their size is picked by the quantity of pins and their separation from the focal point of the robot [1-4].

CONCLUSION

In this work, we propose to take advantage of the fueled floor not exclusively to convey power yet additionally to speak with the robot to give confinement data; i.e., we utilize a one-way correspondence starting from the earliest stage to the robot. To be sure, the powerline correspondence issue has been addressed since the mid 70 with the meanings of notable conventions. The fundamental commitment and the creative part of our work is the presence of an enormous number of correspondence lines that can convey power and sign information simultaneously. Novel power supply framework for versatile robots. The execution of lengthy experiments with mobile robots when containment is required is a relevant use-case for our system. In our framework, we tell a tale using conductive cushions arranged in a checkerboard pattern. Each cushion transmits both electrical and electronic data, allowing each robot to choose its own posture while experimentally proving our powered floor's ability to give power and pinpoint its location.

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CONFLICT OF INTEREST

The author has declared no conflict of interest.

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