



Cutting-Edge Robotic Intravenous Pole: Preliminary Design and Survey in Academic Medical Center in Lebanon

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Abstract

Intravenous poles are biomedical healthcare supportive tools that aid in holding and delivering medications to patients through intravenous injections. Intravenous infusion relies on the weight of the Intravenous tubing fluid. Continuous follow-up of the intravenous bag is required to replace the fluid when emptied. Also, mobilization of the intravenous pole is required from patients and nurses. This leads to discomfort and inconvenience for both patients and hospital staff. Despite the existing intravenous poles have solved their difficulty, however, they were either not feasible, or couldn't hold a lot of weight in the bag. Moreover, they lack any alarm system which indicates an empty bag. To improve current intravenous poles, we aim to develop a cutting-edge robotic intravenous pole mounted with an alarm system. The robotic intravenous pole comprises motors to hold large weights, sensors and wireless joystick technology. Experimental results dedicated to the design showed that the novel designed pole mobilization is improved by the use of stepper motors, omni wheels, micro-controller, and a joystick. Also, the alarm system has added alert to patients and nurses when the intravenous bags were emptied. Moreover, the robotic intravenous pole moved in all directions and rotated, with a press of a button. This design surpasses the movements and weight tolerance provided by alternative designs, and it is mechanically and electrically safe on the patients. Survey results highlighted the acceptance and motivation of having and using and Robotic IV pole as compared to alternatives.

Introduction

Intravenous poles are medical verifactory tools wide used in attention practices. IV poles carry baggage and deliver the required medications to patients. IV medication are introduced to the patient through AN IV injection. All IV pole styles are apparently similar with hook at the highest and wheels at the bottom. These styles disagree by the accessories hooked up to them. Despite the prominence use of IV poles, they were subject to a small improvement over the past decades. Analysis studies and practices rumored that one amongst the essential shortcomings of IV poles obtainable within the market is their problem to mobilize freely. Once patients need to maneuver on the far side a confined space, they have to tug their own IV pole or get the assist from the nurse. Consequently, the nurse can consume time incidental to the patient and dragging the IV stand. The previous and latter steps are inconvenient for each the patient and also the nurse.

beat the IV poles that arise in daily medical practices of old patients, Wiederhold et al. planned many general robotic solutions for patients' in their every-day's activities within and out of doors hospitals. This issue power-assisted in increased patient's acceptance of AN assistant robotic system was increased.

Methods

Survey Results on the nurse's population showed that the very best profit visited the extra edges (including the upkeep services and therefore the service that guides the Robotic IV pole user and answer his queries etc). Extra edges are followed by the Health edges, and at last the monetary edges. This is often because of the very fact that the upkeep and coaching services (91.66 nada) are of preponderant interest for the nurses. Additionally to the health edges from the alarm to the patient-dependent quality of the Robotic IV Pole, because it doesn't depend upon the nurse and reduces his/her time progress by every patient. Results on the patient's population associated the very best profit to "health" followed by the "additional benefits" and at last to the "financial" ones. This is often because of the very fact that the health edges are the first issue that considerations patients, particularly aged ones UN agency are incapable of maneuvering the IV pole or those going out of a surgery. Of all the population that we've explored, the bulk gave a lot of price to the health and alarm edges as compared to the monetary edges. Knowing that a mean of ninety three.26 to check out least in agreement on the calculable worth of the novel system. Once exploring the Human Resources (HRs) and doctors, the applied math results associated the very best profit percentages to the "health" followed by the "additional benefits" and at last to the "financial" ones. This is often because of the very fact that the health edges are the first issue that considerations patients particularly aged ones UN agency are incapable of maneuvering the IV pole or those going out of a surgery.

Conclusion

A cutting edge robotic IV pole was developed, successfully maneuvered and underwent a statistical survey on 108 personnel from Lebanese population. The population was divided into 3 groups according to their profession. Survey results revealed that 100% of the people were volunteering to facilitate the progress of the research and development of our Novel Robot. Survey results on the health, financial and additional benefits of the Robotic IV Pole showcased that the 'Agree' feedback was exterior to 80% in the explored Lebanese population. The novel robotic IV pole is maneuvered electronically by the nurse or escorts, since the robotjoystick communication holds for a large range. Another crucial finding of this development is reflected by the capability of the novel robot to hold a weight up to 15 kg while maintained balanced. Furthermore, wireless communication was possible due to the use of Radio frequency and an antenna. As per any novel technology, there are some electronic drawbacks as a perspective we have few recommendations that have to be considered