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# Microrobot Assisted Elderly Care using Advance AI Technology

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**Abstract**
Although several robot deployments for in-home help of senior citizens have been tested during the past one decade, most of these ideas are still in the prototype stage and are not employed in realtime situations. This study examines the past and present studies and attempted to comprehend why robots haven't yet become successful personal helpers in daily life. The capabilities of the physical platform and the deployment logic are the two complimentary features that formed the focus of this study. Various earlier researches identified application-level capabilities of robots by scrutunizing hardware setups and functions which examine how robots influence users' daily lives and deduces the use of robots in three cayegories of healthcare treatments such as: support, mitigation and reaction. Despite, the value of healthcare interventions is constrained by a functional standstill and a gap between the robotic platform and the intervention's design, we attempted to provide an innovative co-design toolkit that makes use of an integrated approach for robot initiatives in the healthcare industry. This strategy combines robot capabilities to recognized geriatric characteristics to produce a comprehensive perspective that takes into account both the deployment's physical platform and its logic.
***Keywords:*** *Smart Healthcare, Artificial Intelligence, Microrobot, Robotic assistant and Home Automation.*

## INTRODUCTION

Reduced motor capabilities in old adults restrict their motion and feature an unfavorable impact on their niche life apart from mobility problems, social prejudice, intellectual health troubles and different issues are not unusual. Age-associated brain differences in relation to motor performance are less studied [1]. As a way to lower the psychological load on individual and society, it is crucial to discover a strategy to the trouble for those with mobility troubles. Such patients run the threat of falling and hurting themselves while attending different day to day works and it is also cumbersome to walk on moist floor by an elderly person before and after attending to personal works [2]. The presence of nursing staff is inevitable for providing assistance and thus, the patients will be placed on extremely good deal of emotional angle. So it is practically crucial to introduce a safe and dependable equipment such as wheelchair that allows sufferers to attend personal and sensitive works independently [3].

Loss of physical mobility in aged adults makes it difficult to participate in desired activities and in the worst cases fully prevent them from participation. In such instances, a wheelchair can be a useful assistive tool while dealing with fundamental movement and transportation for those who suffer from mobility impairments. Technology upgrades have brought about an increase in the adoption of shrewd wheelchairs with a diffusion of auxiliary capabilities, and

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this place is ripe for research [4]. Subsequently, impetus is given to the wheelchairs' realistic designs in various studies [5]. The Scalevo electric-powered wheelchair and the ToPChair-S electric-powered wheelchair from France are wheelchairs specifically made for avenue visitors as also designed after crawler drivers and have the capability to alternate roles mechanically as they ascend a steep slope even as retaining a steady center of gravity. An electric-powered wheelchair advanced in South Korea that regulates wheelchair movement with the aid of accumulating eye motion records and an electric-powered wheelchair advanced by using Iwate university in Japan that regulates wheelchair motion by detecting tongue movement facts are examples of this form of chair that makes a specialty of sensible manipulate for severely paralyzed human beings. A patient might not be capable of use a wheelchair independently if a nurse has to bodily flip a handle to modify the placement of a wheelchair [6,7].

The wheelchair can reduce the consumer's operational difficulty due to the fact that the mechanism involves fewer additives and takes up much less area under the seat of the chair, leaving enough room without exceeding the total width of the wheelchair [8,9]. It may be moved manually through pushing the wheels with one's palms or routinely with the aid of computerized gadgets like electric cars that may be operated by using the wheelchair person (the individual seated in the chair) or by a person strolling next to or at the back of the wheelchair if the wheelchair consumer desires assistance shifting their wheelchair [10,11]. The maximum advantage is among power wheelchairs ("power chairs"), whose propulsion is given by way of battery cells (rechargeable) and electric motors and manual wheelchairs ("dynamic and self-propelled"), whose propulsion is supplied both via the wheelchair patron operating the wheelchair by hand or by an attendant pushing from the rear side. The use of a wheelchair as an assisting tool could make daily routene less complicated in case of physically challenged individuals, specially for those with extreme disabilities [12,13].

The wheels of the primary wheelchairs were manually turned by using the patient and have been self-powered. In general, wheelchair systems are utilized in a extensive range of settings, such as but no longer restrained to hospitals, assisted residing centers, and sports activities. Wheelchairs are extremely useful in exegencies such as road accidents, fire accidents, aircraft crashes, critically ill people and medical illnesses [14]. Various elements have been considered, along with athletic prowess, opponent and participant protection, comfort and dependability [15]. Main bioengeenering characteristics of a wheel based mobility equipment mincluding those having propulsion techniques, severe injuries, support technologies, and body design, have been mentioned in this article. Furthermore, based on the information that is currently available, this study attempted to examine the field's past and present works so as to comprehend that why robots haven't yet become successful personal helpers in daily life sine a wheel chair is helpul to bodily deprived and elderly people besides giving them a few forms of mobility that significantly improve their psychological domain [16, 17].

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## METHODS AND METHODOLOGY

In this case, ergonomics is the technique of designing the wheelchair to in shape the users under study. It's far a area of research that attempts to higher human interaction with goods, approaches, and the environment by using first know-how approximately human abilities and limits [18,19]. The primary idea of a secure seat, consistent with blanketed within the device in which pelvic bones (sitting bones) absorb the body weight and thus, spine attains erect function. The product's trendy layout, shape and hardness of the seating floor, degree of deformity of the seat and backrest [20, 21].

The current method involved a selection of assessment standards and alternative possibilities from which to select and it's far important to note that, due to the fact some of the standards may be in war, it isn't always continually authentic that the most excellent choice is the only that maximizes each individual criterion as a substitute, the right option is the only that achieves the quality change-off between the criteria in accordance with the decision maker's pair-wise comparison of the evaluation criteria, the advised layout generates weight for every criterion [22]. The gadget then awards a rating to each choice depending at the choice maker's pair-wise checks of the possibilities based totally at the set up criterion (Fig.1). The overall performance of the choice when it comes to the thing being taken into consideration is inversely correlated with the rating [23].

Powered chairs are appearing as a potential equipment for coping-up with decision making approaches, and it might assist the decision-maker set up priorities and attain the most fulfilling picks. The suggested layout enables to seize both subjective and goal additives of a choice by means of breaking down complex judgments into a sequence of pair smart comparisons after which synthesizing the records. Moreover, the suggested layout (Fig. 2) carries a beneficial technique for examining the consistency of the selection maker's tests, consequently minimizing bias [24].

## RESULTS AND DISCUSSION

Utilizing the advised design strategy, the ergonomic rating of the created smart wheelchair has been effectively evaluated. The proper weight turned into assigned after every criterion, along with the returned relaxation, arm rest, leg relaxation, and hand rest, turned into computed. the load of each performance goal, together with the returned relaxation, arm relaxation, leg relaxation, and hand relaxation of the smart wheel, changed into decided using the recommended layout approach whilst evaluating the performance targets framework of the layout, the verbal judgment and numerical values are the pair-smart evaluation criterion [25]. The four (4) performance objectives have been contrasted, forming a 4x4 matrix as proven in desk four, and their relative relevance become decided by the extent of comfort by using the use of the pair-clever evaluation criteria. for instance, the arm rest-lower back relaxation contrast cell can have a price of four if we firmly agree with that the arm rest is more full-size than the lower back rest. In terms of math, this suggests that the arm rest's relative relevance to the again relaxation is equal to four (arm relaxation/lower back relaxation = four). In keeping with the lower back relaxation-arm rest cell within the

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evaluation matrix [26], the inverse contrast, which compares the significance of the again relaxation on the subject of the relevance of the arm relaxation, will result in the reciprocal of this price (back relaxation/arm rest = 1/4). The input value for a criterion's importance while as compared to itself is 1, which equates to the depth of equal importance on the dimensions of values for criteria like seat vs seat, leg rest versus leg relaxation, or back rest versus back rest. This makes intuitive experience because the fee of a selected standards in relation to its own importance will constantly be same. Then, after summing the values in every column and dividing each cellular via the sum of the columns, comes the normalized matrix [27]. The consistency is then tested; usually, some discrepancies might appear when numerous pair-clever comparisons are made. If it's miles found upon evaluation that the second one criterion is appreciably more important than the 1/3 criterion, however the first criterion is simply quite less critical, If the decision-maker mistakenly determines that the third criterion is similarly big to or more critical than the first criterion because of wrong computation, there is an obvious discrepancy [28]. The manner for figuring out the load sum vector is the first step in making sure that the findings are steady and it appears that the rating is constant [29]. The wheelchair's ergonomic assessment turned into ultimately determined, and the effects indicated that the designed clever wheel chair within reason great [30].

## CONCLUSION

A wheelchair offers help to elderly and handicapped people so that they can navigate their various duties with minimum problems. Indigenous wheel chairs are lightweight as also power-efficient. Despite, Intuitive decision-making methods predominate in several countries, Analytic Hierarchy Process (AHP) method should receive more attention than in the present because of flexibility and low complexity. The ergonomic grade of 62% prove the user-friendly nature of a wheelchair because of easy operation and benefit people who have lost independent motion. Ultimately, modern algorithms like fuzzy logic and ANFIS can be utilized in future studies.

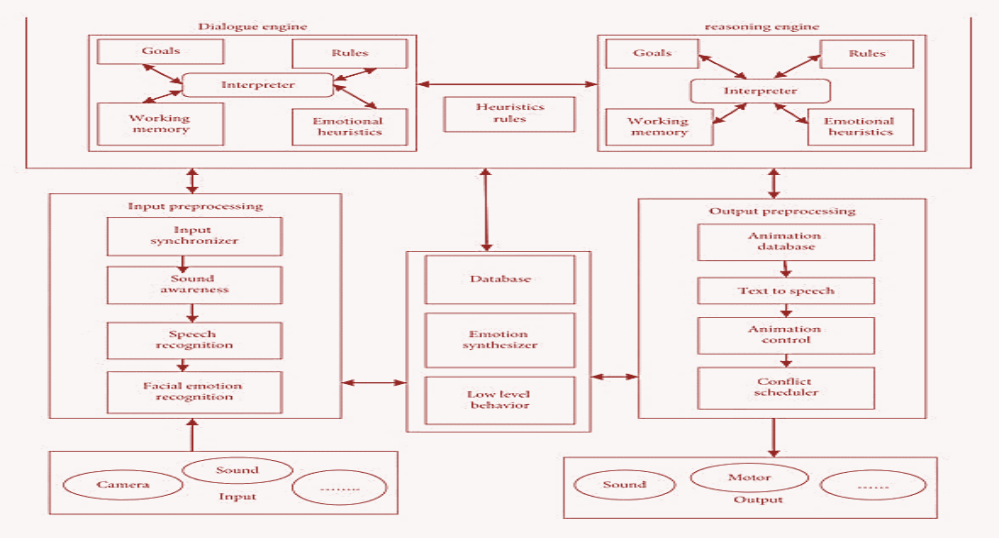


Fig. 1. Designing of smart wheelchair

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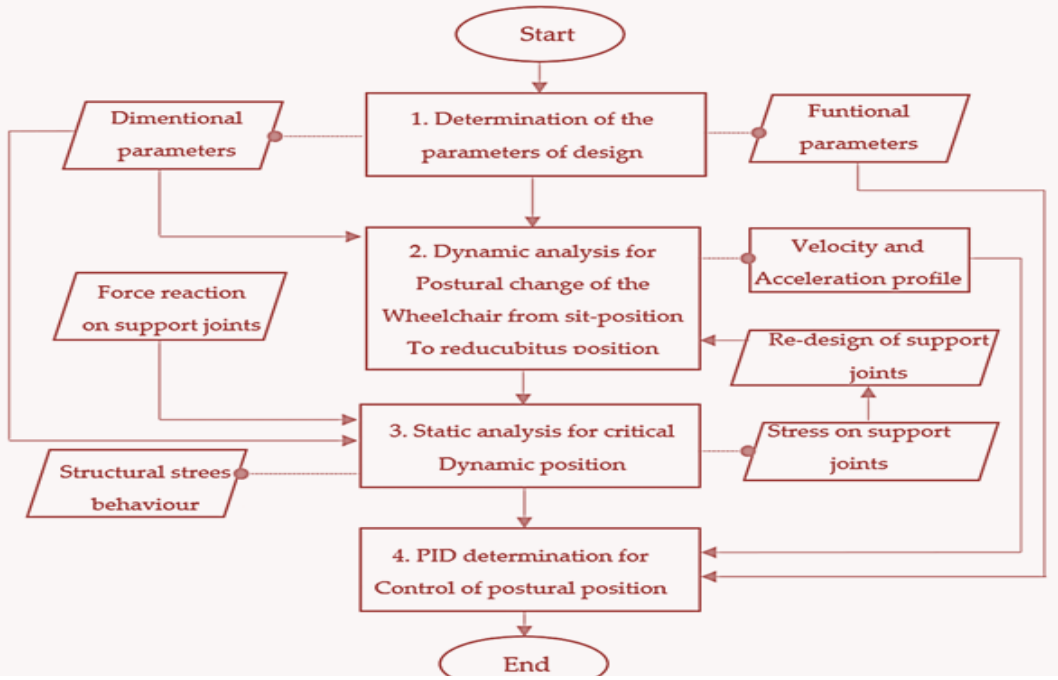


Fig. 2. Overall proposed design flowchart

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