



**Article Title: Revolutionizing Adult Walker Mobility: A Contemporary Upgrade Approach**

## **Revolutionizing Adult Walker Mobility: A Contemporary Upgrade Approach**

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### **ABSTRACT**

A walker is a device which makes easier to get around after surgery or fracture in your foot or leg. A walker allows to keep weight off users feet and legs. It encourages physical activity which helps to maintain muscle strength, balance, and coordination. Walker is one of the helpful device for old age people also. This work presents an innovative walker for adults designed to meet the changing needs of people with mobility impairments. The walker has state-of-the-art features such as an adjustable glucose stand, a foldable seat and an advanced alert system, all connected together via micro and IFTTT tool. The adjustable glucose stand base offers users a unique solution for on-the-go health management, while the foldable seat adds versatility and comfort during use. The alert system integrated with IFTTT, activated by a simple push button, ensures timely help in emergency situations. This walker for adults represents a leap forward in healthcare innovation and demonstrates the possibilities of IoT and connectivity solutions. At the end, it is recommended to make improvements based on user. The featured points to the intersection of technology and healthcare, offering a promising tool to improve the daily lives of a diverse user base.

**Keywords:** Adult Walker, Adjustable Glucose Stand, Foldable Sitting Platform, Alert System, Esp8266, IFTTT, Healthcare Innovation, IoT (Internet of Things), Mobility Challenges.

### **1 Introduction**

Now a days old age people face more locomotion problems, which requires experts to work together to find better ways to help them. In that way walker is a one of the useful device for mobility impairments peoples. People with mobility impairments are get benefits by a walker that enables them to move on their own and feel good about themselves. Moreover, it can be used to relieve depression and provide freedom and empowerment and they can now face the world at their pace.

Wheelchairs might be chosen by financially rich individuals as their preferred mobility aids because compared to walker wheel chair have more features. Nevertheless, for aged people who all are financially weak, this can be very expensive. As such, a conventional walker has become their favorite one. On the other hand, traditional walkers are often limited in terms of



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functionalities despite being cheap. This may present some challenges specifically to individuals that have long distances to cover thus causing pain and fatigue in the legs.

An innovative idea is proposed to address these challenges and affordable for everyone. In this, seating provision is provided with the existing walker. It helps the users to relax while walking hence reducing strain and discomforts. This walker therefore aims at adding convenience by giving a place where people can sit down and regain energy if they are tired before continuing with the journey thereby leading to improved mobility and health status of people who rely on it for transportation purposes alone.

In hospitals, patients often require intravenous (IV) drips for their energy purpose. But during their basic needs and refreshment purpose this drip bottle is carried by human support. However, managing a drip bottle while walking is a challenge one. Patients typically find themselves in the predicament of having to hold the drip bottle in one hand, impeding their movement, or relying on assistance from another person. A built-in adjustable glucose stand, which is a significant improvement. This stand is particularly helpful for individuals with special health needs. This glucose stand is a removable one. It offers a convenient and user-friendly way to monitor glucose levels while on the go.

This innovative solution also incorporates an alert system which helps the users to seek help during the emergency situation. A Push button mechanism is used to active buzzer to attract attention. Simultaneously, the system triggers SMS notification to the designated caretaker, ensuring immediate assistance to be provided. This dual functionality enhances the safety and security of users.

## **2 Related Works**

The mobility assistance walker is a wheeled structure designed to support individuals while walking, featuring an enclosable space housing a chair for seated rest. Constructed with multiple side structures, rear trusses, and a gate, it provides stability and support during mobility. The configuration facilitates seamless movement for users who require assistance in walking [1].

The mobile walker features a frame with at least two wheels for ground mobility, alongside hand grips providing support for users. Additionally, it incorporates a measured value recording unit to monitor vital parameters, linked to a processor unit for assessment and potential transmission of data to a separate control center. The integrated design enhances user safety and enables remote monitoring of health metrics [2].

The collapsible wheeled walker features two side frames and adjustable upper body supports, complemented by a sliding seat for user convenience, transitioning between walking and sitting positions effortlessly. Designed with an X-folder mechanism, it ensures compact storage and portability. Furthermore, integrated left and right forearm gutters promote an upright posture,



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enhancing user comfort and health benefits during mobility [3].

Dimensionally adjustable spinal prostheses feature adjustable coupling between first and second portions, allowing variations in height through an adjustment assembly. Endplates at the ends aid in spinal attachment, while adjustment mechanisms like rotational, screw and gearing, or rack and pinion assemblies facilitate axial adjustments, ensuring optimal fit and functionality within the spine [4].

The significance of arc behavior in various welding processes, emphasizing its role in weld prediction, quality enhancement, and cost reduction. Through a comprehensive analysis of arc types, their characteristics, and applications, it offers valuable insights into optimizing welding practices [5].

The advancements in gas metal arc welding (GMAW), emphasizing the integration of software into power sources, wire feeders, and gas regulation for improved process control. The study underscores the significance of optimized welding parameters, particularly in waveform deposition, to achieve desirable weldability, mechanical properties, and process efficiency, offering insights for waveform prediction and advocating for further algorithmic developments to enhance control over current, voltage, gas flow, and wire motion [6].

The transformative impact of Internet of Things (IoT) technology, particularly in home security solutions, healthcare exemplified through a prototype encompassing intruder and gas leak detection modules. Utilizing MQ-5 and PIR sensors for gas and intruder detection respectively, coupled with IFTTT Web-hooks service for real-time notifications, the system aims to enhance safety measures effortlessly [7].

The pivotal role of data in IoT solutions, emphasizing the significance of accessible and cost-effective cloud storage for data analysis. By introducing Google Sheets as an alternative to expensive platforms like Azure, the paper provides a practical approach for individuals seeking to deploy scalable IoT solutions within budget constraints [8].

Wheeled walkers are commonly equipped with hand brakes to enhance user safety and control. Integrating push-button mechanisms, each side of wheels has separate controls connected to a microcontroller, ensuring user-friendly operation and efficient braking functionality. The design improvement enhances the overall usability and accessibility of wheeled walkers, prioritizing user comfort and safety [9].

### **3 Proposed System**

A walker allows to keep weight off users feet and legs. It encourages physical activity which helps to maintain muscle strength, balance, and coordination. Walker is one of the helpful device for old age people also. This work presents an innovative walker for adults designed to meet the changing needs of people with mobility impairments. Welding plays a crucial role in this work. The most of the steels are join in gas welding because arc welding is not supported



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and also because it does not hold as much weight as need.

The main features of this work, such as seating stand and adjustable glucose stand, are joined in the walker using the tee joint and lap joint methods. Tee joint welding joints are formed when two pieces intersect at a 90° angle. Tee joint is used at the sitting stand for permanent weight bearing for the user. Lap joints are formed when two pieces of metal are placed in an overlapping pattern on top of each other. In this work, the lap joint is introduced in the adjustable glucose stand and the lock of the seating stand.

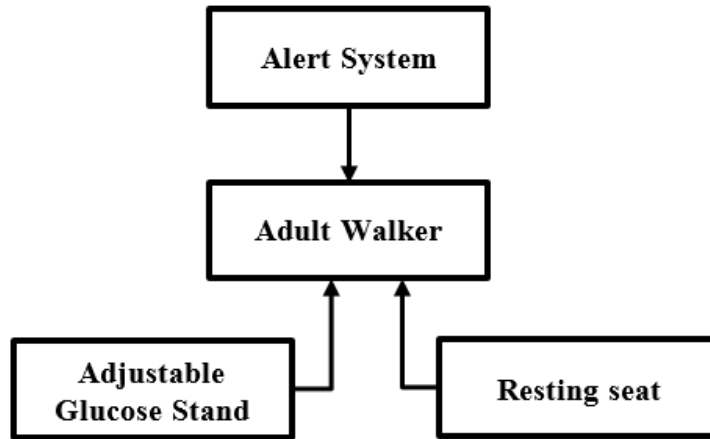
In the seating stand, round steel pipe is used. These pipes are separated by a fixed distance. This gap will reduce material usage, and at the same time, it will reduce the weight of the walker. This seating stand has four edges. In these four edges, two edges are permanently welded by gas welding, and the other two edges are attached with a simple latch lock. Whenever the user wants to sit, they simply take the seating arrangement upside down and lock these two edges with the walker holes.

The glucose stand is another feature of this work; it is completely removable and adjustable. In this work, hollow steel pipe is lap-jointed with walker permanently. The adjustable screw is attached to hollow steel, which will help adjust the stand.

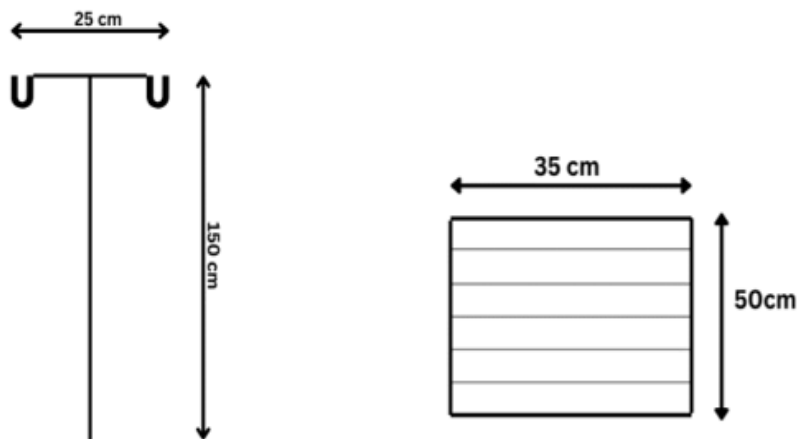
On the other hand, in the alert system, the microcontroller (ESP8266) is the brain of this system. ESP8266 is commonly called Nodemcu. This system is activated by a 3.3V power supply. In this work, a 9V battery is used, so a buck converter is needed here to convert 9V into 3.3V because the ESP8266 operates on 3.3V. The reason for choosing this network is because of its built-in WiFi and cost-effectiveness. So, no external peripheral is required for WiFi connectivity.

On the software side, Arduino IDE is used to dump a program into Nodemcu. The code used for Nodemcu is embedded in C. IFTTT is used for alert purposes. IFTTT is a website that provides automation by triggering the URL of a programmed event. The event that is used by IFTTT is a webhook. A webhook is an HTTP-based callback function that allows lightweight, event-driven communication between two application programming interfaces (APIs). Whenever the user presses the push button, IFTTT will send an alert message via email or SMS (short message service). In an emergency situation, if the user presses this button, it will send an SMS to the caretaker.

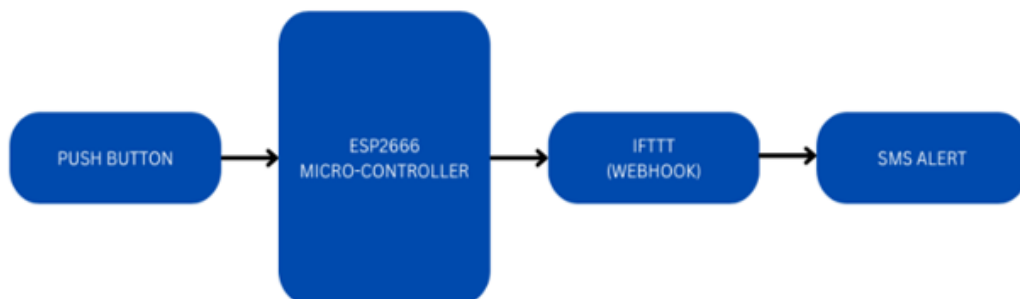
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**Figure 1: Block Diagram - Overview**



**Figure 2: Dimensions of adjustable glucose stand & resting seat**



**Figure 3: Alert system flow diagram**



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**Figure 4:** *Smart Adult Walker*

#### **4 Results and Discussion**

In this generation, walkers are evolving with advanced features and accessibility for users of all ages. In particular, the adjustable glucose stand has become a key feature, offering users a practical solution on the go. User feedback highlighted high satisfaction with the foldable seating platform, highlighting its contribution to the walker's versatility in various daily activities. The outstanding achievement is the push button alert system integrated with Microcontroller and IFTTT. This system has demonstrated consistent and reliable performance and has successfully triggered timely warnings in simulated emergency situations. User comments emphasized not only ease of use, but also the system and its effectiveness, which is essential for people with mobility impairments. Collaboration with health professionals has strengthened the ability of adult walkers to meet the specific needs of users facing mobility challenges and health problems. The integration of IoT technologies, especially Microcontroller and IFTTT, has proven to be key to achieving real-time connectivity, promoting advanced functionality and ensuring a seamless user experience.

#### **5 Conclusion**

This work introduces an innovative adult walker that is intended to tackle the various problems encountered by people with special health needs and mobility impairments. The possibility of fusing assistive technologies with healthcare innovation is demonstrated by the combination of an enhanced alert system, a foldable sitting platform, and an adjustable glucose stand. The low-cost components are used in this work so that makes the walker affordable as a final



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product. Test findings and user comments support the walker's usefulness and ease of use, highlighting its beneficial effects on day-to-day living. This project is at the forefront of assistive device innovation, providing a comprehensive solution that improves health management capabilities in addition to promoting mobility. The walker is further positioned as a promising instrument for enhancing the quality of life for a varied user population due to its successful integration of IoT technology.

## 6 Future Work

Further studies are needed to improve the adult walker's functioning and design are part of its continuous development. The switch to lightweight aluminum is a crucial step in the right direction since it reduces the walker's total weight without sacrificing its structural integrity. With this modification, the user's comfort and mobility will be enhanced throughout prolonged use. A water bottle holder, a drug handling tray, temperature and blood pressure monitoring are the further proposed improvements that will improve user convenience even more by meeting hydration needs and making medication administration easier. These suggested changes demonstrate a dedication to user-centric design and the adult walker's ongoing evolution to meet a wide range of user needs, enhancing its standing as an innovative and flexible healthcare support tool.

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