

AUTOMATIC WHEEL CHAIR CUM BED

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Introduction:

Wheel chair has become a boon for most of the movement impaired individuals right from its earlier introduction. As time changed the requirement of the wheel chair also changed to make out the needs of different classes of patients. Lots of research has been going on this field and which are aimed at fulfilling these requirements. So many problems are faced by the bed ridden patients sometimes they feel lonely and will be craving for a change in their ambience. Ordinary wheel chair is used by them but this wheel chair moves by manual means. This is where the significance of Automatic wheel chair cum bed arises as this doesn't require a caretaker. The recent developments in robotics, artificial intelligence and sensor technology promises enormous scope in development of advanced wheel chair. In order to overcome the problems an automatic wheel chair cum bed having adequate features need to be designed. The automatic wheel chair cum bed comprises of a wheel chair which can be converted into a complete bed. Automatic wheel chair cum bed can be controlled by joystick, remote control etc.

A motorized wheel chair or electric-powered wheel chair is a wheel chair that is propelled by means of an electric motor rather than manual power. Motorized wheel chairs are useful for those who are not able to impel a manual wheel chair or who may need to employ a wheel chair for distances or over terrain in a manual wheel chair. They may also be used not just by people with conventional mobility impairments, but also by people with cardiovascular and fatigue based conditions. Electric wheel chairs have enhanced the quality of life for many people with physical disabilities through the mobility they afford. The selection of power chair will rely on many factors; including the kind of surface setting the chair will be driven over, the need to settle thresholds and curbs, and clearance widths in accustomed environment. The most fundamental job of the chair is to take input from the user, usually in the form of a small joystick, and to move the person in the preferred direction. The last few years have seen abundant improvements and models that give the user unmatched control of the wheel chair in terms of both user effort and vehicle aptitude.

Problem Formulation:

- Difficulty in transferring patient to bed from wheel chair.
- Uncomfortness felt by the patients when sitting for a long time.
- Paraplegic patients.

Objective:

- The objective of this project is to analyze and prototype an automated wheel chair cum bed, based on an existing smart wheel chair with extensive fact findings and research on existing models, technology used, market scenario and customer requirements.
- It improves the balance and postural stability of old age people. It can convert sleeping position from sitting position easily.

Methodology:

- The course of our work begins with the planning phase involving initial research, literature survey and background study.
- It is followed by concept generation phase that includes evaluating existing wheel chair, customer requirements and concept designs.
- Prototyping the wheelchair into complete bed using pneumatic system by means of 2-5 bar pressure and we progress towards testing a feasible model.
- Collection of all the equipment's and materials required for overall wheel chair cum bed enhancement setup.
- Forming of a light weight wheel chair cum bed structure which would carry up to 80-90 kg.
- Successfully coding of a specific program, which would run the device directionally by using joystick, head motion.
- Implementation and connection of all the equipments like motors, micro-controller, joystick, accelerometer and other sensors together.
- Implementation of pneumatic cylinders, which would convert the Wheel chair into Bed and lift the wheel chair into adjustable height.

Scope for improvement:

Automatic wheel chair cum bed has a wide range of scope in following areas:

- Physically Disabled People can use it as per their purposes. People who are able to use their hand can use Joystick.
- People suffering from certain paralysis can use either head movement or Bluetooth module as per requirement.
- Patients in the Hospitals
- People at old age homes can use this chair as per their requirement
- Focusing on mobility assistance for bedridden persons

Further Enhancements:

- We can attach a mini compressor in the wheel chair itself that leads to easy movement and comfortness of the height and bed adjustment of the wheel chair.
- Solar panel roof can be used as alternative power source and also it can be a protective layer from rain and sun.
- By this system wheelchair will move to the destination given by the patient by using GPS technology. This technology is currently used in driverless cars in various countries.
- By using suitable sensors we can predict the nearby objects and that makes the easy movement of the wheel chair.

- Controlling wheelchair by electric signal coming from brain. As our brain contains thousands of neuron, there is certain potential difference between each neuron. When we think something neuron emits 0 to 50 HZ electric signal. By interpreting the signal by modulation/demodulation, we can control the chair.
- We can control the wheel chair movement by combination of head and voice control system.

Conclusion:

The main objective of this product is to make the helper life easy and to make sure the patient is not hurt during the process of treatment. This product eliminates the step of shifting patient from bed or stretcher to wheelchair and vice versa as handling of old age people is very difficult. It makes the patient comfortable when sitting for a long time. This will reduce the effort of the caretaker and provide a safer transfer for the patients in hospitals. . Most modern day technologies use sensors such as accelerometer, gyroscope, to take interactive input and in this project we also have tried to make the robot interactive and close to human. Also we wanted to know about the accelerometer, android app, Joystick, and its working in detail and also wanted to develop a fast and real time project that can help others people. These conditions made Automatic wheel chair cum bed a suitable project for us .Completion of this project needed sheer determination as there were many things that could go wrong. As the electronic circuits meant a lot in this project, creating the programming & circuit proved to be a difficult task being mechanical student. Though some difficulties aroused and many remodeling was needed and the chair had some limitations which we learned while building it, at last the Automatic wheel chair cum bed created very close to the adapted design philosophy.



