THE EASY CHAIR
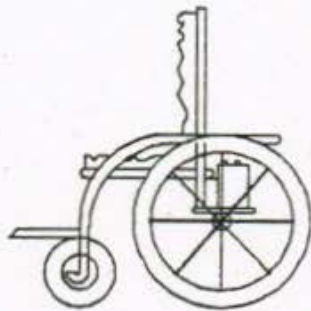
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E.E.T. 490/491 SENIOR DESIGN PROJECT

THE EASY CHAIR

INDEX

E.E.T. 490/491 SENIOR DESIGN PROJECT

THE EASY CHAIR

FIGURE LIST

ABSTRACT

The following report is a general synopsis of ideas and designs used in the development of the Easy Chair, a microprocessor controlled wheelchair for small children with muscular disorders.

The initial wheelchair comes equipped with a Damaco D88 Add-On power unit. This unit comes complete with batteries, the drive units (motors and controllers), and a proportional joystick controller. The touch-pad, ultrasonic kit, and the computer are the three extra components to be added for additional control and safety.

Specifications for the Easy Chair were outlined by an Occupational Therapist, Physical Therapist, and a classroom teacher from The Wabash Center in Lafayette, Indiana. This outlining was assisted by George Karlin, Special Education project coordinator at Purdue University, Lafayette, Indiana.

The original idea for the wheelchair was conceived by George Karlin, while working with small handicapped children both at Purdue University and The Wabash Center. George Karlin also acted as a go-between for the designers and therapists, throughout the design.

The touch-pad is valued at around $213, the ultrasonic system at around $342, and the computer at around $363, with a total cost of around $1053. All of the development components are being being paid for by The Wabash Center, with the final prototype being released to them.

The three sections reported on hereafter, all work very well seperately. The ultrasonics presently convey perimeter information, the touch-pad can be used to configure the system, and the computer is running, controlling the other systems.

What remains in the project is basically to complete the motor control system, to combine, test and modify the seperate components, to package the resulting hardware, and to polish off the system software so that it will allow the users to configure the chair for their specific needs.

INTRODUCTION

For many years, small children with muscular disorders have had severly limited opportunities to acquire any amount of mobility. Because of this lack of mobility, they have also had limited opportunities to initiate communication with others, limiting further their learning capabilities.

The idea behind a microprocessor controlled wheelchair (the Easy Chair) is to provide a mode of transportation for very young children with muscular disorders. Because the users will be so young, typically two to six years old, the chair should be equipped with a variety of devices which will not only allow them to control movement with limited muscular force, but will also protect them from any undesireable circumstances.

Such devices include a method of input such as a touch-pad, (requiring minimal or no muscular force to actuate), an ultrasonic ranging system to monitor the chair's perimeters, and a computer to control these devices in a fashion which is transparent to the user, (see Figure 1).

From this point on, there will three major sections to the report. The first section will cover the touch-pad, the second will cover the ultrasonic ranging, and the third will cover the computer and the motor control.

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