



Northern Arizona University

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SCHOOL OF INFROMATIC COMPUTING AND CYBER SYSTEM

Go-Baby-Go Wild Thing

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Client: Dr.Cole Galloway

Instructor: Dr.Kyle Winfree

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Dr. Cole Galloway

Physical Therapist

Director of the Pediatric Mobility Lab and Design Studio

Dear Dr. Cole Galloway,

As a group we would like to thank you for sponsoring this project to successfully complete this undertaking within the time that have been agreed upon. We are determined to doing all that we can in order to meet your requirements. We have selected this project because we realized that children with limited mobility often do not receive the much-needed exposure to socialization. On the issue of interaction of people not using Wild Things It will stay within the distance needed to receive a signal from the app. This will allow the parent to come up to it, restart it, and the child can go. The goal of this team is create a design interface with a mobile phone or a notebook computer so that different games can be designed and loaded into the system and synchronized across two or more Wild Things.

Sincerely,

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Introduction

Our project is to help the disabled children achieve independence and socialization even feel unconstrained by their disability. In addition, these kinds of projects would benefit the sponsor and stakeholders of the business. There are many children around the world struggling with limited mobility disabilities with such conditions as spina bifida and Down syndrome.

Project /Problem Definition

It is known that the mental, social, and emotional development of children is intimately linked to their physical and social exploration of the world [1]. The need to fill

this gap elicited the need for this project with a goal of building a gaming system on top of a real world mobile platform. This design interfaces with a mobile phone or a notebook computer so that different games can be designed and loaded into the system and synchronized across two or more Wild Things.

Project goal

The purpose of this project is creating a special training technology that will allow children with special needs to become wild, and the whole family discovers the engine within their children. The materials used in making the external body of the car are mainly hard plastic or light metal. The use of these materials allows the car to be light and easy to move. Children with limited mobility often do not receive the much-needed exposure to appropriately and cognitively develop [1]. Existing research shows that enabling young children with self-control of their own environment can have meaningful impacts on the long term outcomes given such impairments as cerebral palsy or muscular dystrophy[2]. These cars have been designed on commercially available ride on toy car platforms and have been deployed worldwide by the GBG team.

Constraints

A list of constraints has been developed to ensure the final product meets the requirements set forth by the client. The constraints include Budget, time constraint, project completion, and the ease of use by the end user. Another constraint in this project includes inappropriate designs and settings. There may be inappropriate design and settings. To avoid this problem it should be clear to every group member, that an idea should be offered with regards to the propriety of the setting. Another challenge would be there might be restricted assessment. Another constraint is that, steering the toys is becoming a challenge since some of them are difficult to maneuver due to their weights.

Description and features

There are assortments of armrests to look over that will help make your wheelchair address your issues.

Work area Length: This style armrest enables you to fit agreeable under a table or work area. In addition, you can modify the stature and have arm bolster from the back of the seat to around three-fourths of the seat.

Full Length Armrests: These armrests bolster your arms from the back to the front of the seat and they have a settled tallness. This likewise applies to settled and removable armrests.

Swing Away Armrests: This kind of armrest is ideal for simple exchanges since the armrest swings back behind the seat and to the side.

Tubular: This armrest is cushioned for solace and flips down or bends descending for comfort.

Space Saver Arm: This armrest enables you to convey it nearer to the body with because of its internal bend. These cars have shown to be a cost-effective means of enabling young children to move and interact with their peers. These cars, though very effective, have missed the mark for older and more able children. The goal of this project will be to design and build a new version of the GBG retrofits specifically to design a universal control for children with limited mobility.

Research Survey

What are the problems and constraints of the current solution (if any) versus a new solution?

Is there a more creative. Cost-saving or efficient way of solving this problem?

The toys are quite cost effective ways of allowing children to be able to move as well as interact with their peers. However, they are also limited in various ways because the retrofits are designed to be cheap as well as DIY for parents. The current designs are based on an on/off mode of movement where the on button allows the car to move and stop instantly. There have been little changes to the original design. Our team seeks to design a more effective and better performing go-baby-go design.

Are there barrier, do to patents, market conditions or cost?

There are but a few barriers that relate to patent. Nevertheless, market condition and cost is a huge barrier as they form the basis of acquisition of material for this project.

What technology is used and available now?

One technology that exists is cloud technology. The evolution of cloud technology in the auto industry has led toy companies to try to exceed these expectations by delivering proactive connectivity on levels the average driver has not yet been able to imagine.

How are the technologies applicable to your project?

When a car starts to function like another connected device relying on easily available and economical bandwidth, connectivity and cloud compute automotive engineers can start to rethink the entire driving experience. The toy's fuel cell, like those envisioned for real cars, relies on an electrochemical reaction to generate the current that powers the gadget's electric motor. Unlike a gas-powered internal combustion engine, the only byproducts are electricity, heat and water.

When researching ports or software, what are the key features you need

One of the features to look for is compatibility with other components of the device. The second important feature is to look for software that can aid bread boarding and wiring. Moreover, the software should aid debugging.

Status of Art

The current designs are effective and serve their intended purposes. However, better designs would further improve on the effectiveness of these cars in order to benefit children in a great way. The original structure of the car is made to suit children of different sizes. The cars come in sizes that are able to meet the needs of the disabled children. The materials used in making the

external body of the car are mainly hard plastic or light metal. The use of these materials allows the car to be light and easy to move. In addition, the materials cause less harm to the children in cases of accidents, such as falling off or hitting each other.

The general concept of the design is aimed at ensuring safety, comfort, and effectiveness in operations. The current designs use joysticks and steering wheels, which allow for steering and making turns. In addition, the use of joy sticks and steering wheels are not meeting the needs of all the children, where those with upper body difficulties tend to be less effective in using the cars. The lack of control for the upper body impairments makes it where the cars that are made with the steering wheels have limited access to changing directions.

These cars are easily portable which means that they can fit in the trunk of a car, which makes it easier to run errands such as hitting the grocery store or the park for an easy ride along for the child. There is a rechargeable battery pack within the car for easily rechargeable fun. A parent with any form of education can easily assemble the car in case there is a malfunction and a part needs to be fixed. The performance of the Go-Baby-Go cars is acceptable but there are a few deficiencies. If the family decides to go on a day trip or a camping trip with the car and the child decides to use it the entire time, there will be a point in which the car needs to be recharged.

Requirement and Specifications

Based on the project description and the design requirements of the GBG project, there are various customer requirements that shall enable the design to fully satisfy the clients. The customer requirements include a durable product that has a longer life span compared to the current cars, easy instruction manual progressive speed control to let the children control the speed without the jerking motion, easy to use, easy to build, safe for the users and those around the cars.

One of the heavier weighted customer requirements that the client focused on the greatest is to have 12-volt power battery instead of 6-volt power

battery because 6 volt battery cars have shown to produce energy in the past. The second priority requirements are the use of a battery of 12-volt power and to design progressive speed control. Life span, easy to use, low cost, and steering for upper and lower body limited mobility obtained 3 on the scale of weighting; this makes them a lower priority to obtain.

The first major engineering requirement is an extended battery Life. This requirement involves the use of a battery that is capable of storing a charge for a long time; one possibility would be a battery that could be used for a period of 3 days without needing to be recharged. The next major requirement that was discovered from the customer requirements is the need for clear and simple instructions: The use of clear instructions is important to ease the learning curve upon the use of a product for the first time. Providing a more successful and smooth transition into the next stage in the customer's lives.

The next engineering requirement is a control system for the product that is not overly complicated. The target users for this product are young children who may have various forms of disabilities and may find it difficult to use more complicated system. Keeping the system simple will enable the customer to begin utilizing the product sooner and enjoying their new found mobility. The design for the product should be easily modified to fit the needs of the customer including but not limited to the potential customers having limited movement and control of hands and legs so that the customer has the best experience when using the device. The appearance of the product should be aesthetically appealing to the customers. In addition, it should be structurally sound so that in the event of an accident the device would still be usable and keep the operator of the product safe.

Finally the last engineering requirement that was created from the customer requirements is low cost: The cost to purchase and maintain the product should be reasonable to encourage low income families to make the purchase to help less mobile members of their family be capable of enjoying the same freedom of mobility that the rest of their family has. The testing procedures will be conducted on the size and weight of the car, which includes a scale and a measuring tape.

Marketing Requirements

The user needs are best met when there is a range of models from which to choose. The cushion should be understood as an integral part of the Toy Car, so it should be in all of them. People who have spinal injuries or similar pictures need cushions that relieve pressure and prevent the formation of pressure sores, which are a vital threat.

Mechanical

A Toy Car should be strong enough not to suffer a sudden failure while in use. The Toy Car must be constructed in such a way that it has the longest life possible and requires the least number of repairs. Should be designed Toy Car so that if it fails to repair around the home user and should be easy to obtain spare parts.

Documentation

Toys must not antagonistically influence the security or strength of clients or outsiders when utilized as planned or predictably, remembering the conduct of youngsters. Consider the capacity of the client or manager especially for toys expected for kids less than three years.

Electrical

Toys, which fit in with the pertinent blended measures, which have been distributed in the Official Journal of the European Union, are attempted to fit in with the basic wellbeing prerequisites.

Software/GUI

Today programming languages are much more visual and micro programmable systems more modular and friendly. We will learn how to program the versatile and well-known ARDUINO plate, in order to develop very interesting robotics projects, using its own software and helping us with tools for its development.

General

At a minimum, the Toy Car should enable the user to take a more active life without causing a negative effect on their health or safety. Comfort and safety are two important factors affecting the quality of life of the permanent members. A Toy Car should be designed to ensure health and safety.

Environmental

Toy Cars should be appropriate for the environment in which they will be used and for the people who will use them. Quality control of components used in the creation of this design ensures that a minimum of repairs is necessary throughout the lifetime of the car.

Deliverables

At the conclusion of this project, the client will be given a set of deliverables. The deliverables for this project are the following: the final document, outlining all work done, a set of drawings including analysis done in the design stage, and the prototype result.

References

- [1]G. Paleg, E. Rodby-Bousquet and H. Huang, "Go baby go! Solutions for maximizing augmented mobility for children", *Physiotherapy*, vol. 101, p. e18, 2015.
- [2]G. Roger, F. Denoyelle and E. Garabedian, "Disorders of laryngeal mobility in children", *Pediatric Pulmonology*, vol. 23, no. 16, pp. 105-107, 1997.