The Name Game, Head and Arm Mounted Art Assistant & Alternative Mouse Input System

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These projects are all sponsored by the National Science Foundation (NSF)

Client Contact:

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Presentation Summary

- Project 1: Game to Improve Speed and Accuracy of Name Recall
  - Introduction – Client, Previous Products
  - Methods
  - Budget
- Project 2: Head and Arm Mounted Art Assistant
  - Introduction – Client, Previous Products
  - Methods
  - Budget
- Project 3: Alternative Mouse Input System
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  - Methods
  - Budget
- Acknowledgements
- Questions
Introduction – NSF has asked for a game to be created to improve the accuracy and recall time of names.

Clients – This program will cater to elderly individuals who have trouble with remembering the names of:
- Family
- Friends
- Famous Personalities

Goal – To eliminate frustration and embarrassment of people with memory problems such as:
- Alzheimer's
- Senility
- Memory loss disorders
Products on the Market

► Product developed by Nintendo for individuals in a much higher age bracket called “Brain Age”

► Designed to stimulate the brain of elderly people

► Uses Voice Recognition Software

► Developers claim that the game will slow onset of:
  ▪ Dementia
  ▪ Alzheimer's

► Has become very popular in Britain and Japan with millions of copies being sold
Methods

- Program will be created using C++ or a software package called Gamemaker
- The game will need to be interfaced with Voice Recognition software for people who have limited fine motor control
Methods (cont.)

- Game will include a Main Menu to either load pictures or begin playing game
- Picture will be displayed on the screen with a timer to measure speed of recognition
Budget

- Must fit NSF sponsored budget
- Software Packages and Microphone will be only costs for the project
- Production Price will need to be comparable to that of other development software

<table>
<thead>
<tr>
<th>Materials</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands Free Microphone</td>
<td>$ 66 – 111</td>
</tr>
<tr>
<td>Gamemaker Software</td>
<td>$ 150</td>
</tr>
<tr>
<td>Nuance Voice Recognition Software</td>
<td>$ 200</td>
</tr>
<tr>
<td>Total</td>
<td>$ 416 - 461</td>
</tr>
</tbody>
</table>
Arm and Head Mounted Art Instrument

Introduction:

►► Client Information: Stacey
  - Cerebral Palsy – Limits head and arm mobility
  - Hydrocephaly – Buildup of spinal fluids which can damage the brain

►► Goal
  - To create an Arm and Head mounted Art instrument, which will allow Stacey to draw on an easel

►► Previous Products
  - This is a redesign of a previous NSF project
  - No similar art assistants on the market
Methods

► Head Mount consists of:
  - Multi-directional motorized lever
  - Extendable / Retractable tube
  - Three pronged grip

► Arm Mount consists of:
  - Multi-directional motorized lever
  - Three pronged grip

► Materials
Methods Continued

- Ligaments will be controlled via joystick
  - Joystick to control 360 degree lever
  - Two buttons to switch the electric motor on or off
  - Switch to change control from two devices
Budget

$750 USD limit sponsored by the NSF

Project needs to be affordable

Variance in prices due to challenge of engineering design

Table 1

<table>
<thead>
<tr>
<th>Components</th>
<th>Estimated Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headpiece</td>
<td>$45-85</td>
</tr>
<tr>
<td>Arm brace</td>
<td>$25-50</td>
</tr>
<tr>
<td>Titanium Tubing</td>
<td>$125-165</td>
</tr>
<tr>
<td>Motors</td>
<td>$45-65</td>
</tr>
<tr>
<td>Spring</td>
<td>$5-15</td>
</tr>
<tr>
<td>Joystick</td>
<td>$45-75</td>
</tr>
<tr>
<td>Wiring</td>
<td>$10-20</td>
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<tr>
<td>Battery</td>
<td>$40-50</td>
</tr>
<tr>
<td>Other miscellaneous</td>
<td>$50-65</td>
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<tr>
<td>Components</td>
<td></td>
</tr>
<tr>
<td>Total Cost</td>
<td>$390-525</td>
</tr>
</tbody>
</table>
Alternative Mouse Input System

Introduction

- NSF has asked for two alternative input devices for adaptive computer interface control.

Clients

- This project will be designed for those who suffer upper extremity disorders.
- The devices will cater to the limitations of the clients’ hand and arm movement.
Previous Products

- There are many products on the market today that resemble our design.
- They include a foot mouse, foot touch pad, track ball mouse, etc...
- Our goal is to create a cheaper, more efficient design that is affordable for the disabled.
Above is the design for the track ball input

The track ball will consist of a rolling ball for cursor control with two buttons for clicking functions

The left shows the foot touch pad for interface control

The touchpad will have directional arrows for cursor movement and two buttons in the center for clicking
Methods (continued)

► To the left is the interactive pong game
► To the right is the hedgehog game
► Both games will be used to measure the speed and accuracy of each input system
► After each game is played for both inputs, a score will be calculated and posted for analysis
## Budget

<table>
<thead>
<tr>
<th>Component</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 sheet plexiglass (24” x 48””)</td>
<td>$75 - $100</td>
</tr>
<tr>
<td>Solid acrylic plastic ball</td>
<td>$80-$100</td>
</tr>
<tr>
<td>2 USB wires</td>
<td>$20 - $50</td>
</tr>
<tr>
<td>Plastic touch mat</td>
<td>$50 - $75</td>
</tr>
<tr>
<td>Mouse components</td>
<td>$40 - $60</td>
</tr>
<tr>
<td>Gamemaker Software</td>
<td>150</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>$415 - $515</strong></td>
</tr>
</tbody>
</table>
Acknowledgments

We would like to thank the NSF and Brooke Hallowell for sponsoring the project.

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Questions?