Project Proposal

Software Game to Improve Speed & Accuracy of Name Recall
Sponsor: Ohio University

Design Team 8: 
Robert Blake–Biochemical 
Craig Goliber–Bioinstrumentation 
Alanna Ocampo– Bioinformatics

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A software memory recall game will be designed for people with Alzheimer’s Disease, dementia, or others who suffer from memory loss due to advanced age.

Main cognitive deficits of clients:
- *Short-term memory loss of names and faces of loved ones and friends; causes frustration and embarrassment*
- Loss of basic faculties, disorientation
- Causes of Alzheimer’s Disease/dementia: deposition of beta-amyloid plaque, which interferes with communication between brain cells, entanglement of an essential neuronal protein called tau—damaged neurons

Why design a memory recall game?
- Speech pathologist recommended repeated use of images to improve memory recall
- Studies support this assessment (“Improvement of Picture Recall by Repetition in Patients with Dementia of Alzheimer Type” in the *International Journal of Geriatric Psychiatry*, volume 12)

Overview of presentation:
1) Objectives of Project
2) Implementation of Project
3) Pre-existing Games/Devices and Comparisons
4) Budget
Objectives of Project

- Objectives (Client’s Specifications):
  - Game must be installable on a PC – Microsoft Windows with Vista
  - Must accept digital images and names, specific for each user
  - Must supply a default package of images of celebrities and political figures, relevant to elderly people
  - Must be able to select different lists of names to be worked on in different sets
  - Must prompt the user to say a name into a microphone once the image is presented
  - Must keep score and time
  - Respond to correct or incorrect answers with auditory and visual feedback.
  - Software used for voice recognition must be supplied, along with the microphone
Implementation of Project

- **Possible languages and tools:** Labview, Java, C# in Visual Studio or combination

- **Five main components which must be included in code:**
  1. Code to create the graphical user interface—involves buttons, selection lists, text and image fields
  2. Code to create lists of personal photos from images saved on the computer, which may be ordered by the user and stored for use in the future
  3. Code to select a picture list to be used in the current game
  4. Code to interface the voice recognition software and microphone with the rest of the game
  5. Code to convert the software to an installable game on the users’ computer; use of a Wizard

- **Voice recognition software:** Nuance’s Dragon Naturally Speaking
  - Continuous speech recognition with over 95% accuracy
  - Dictates text into most Microsoft applications and internet; control of mouse and desktop
  - *Custom vocabulary features: add words, which user commonly uses, to pre-existing libraries. This feature, especially, may be useful in exploiting for accurate recognition of proper nouns. *

- **Microphone:** SpeechWare microphone
  - Top-rated for use with voice-recognition software
  - Superior digital sound quality for voice recording & speech recognition
  - Noise canceling technology with manual sensitivity control, filters out background noise
  - Far-away positioning
Implementation of Project (2)

Figure 1: Graphical user interface for game

Figure 2: Voice software

Figure 3: Microphone
Pre-existing Products and Comparisons

- Some pre-existing memory game products:
  - Several computer memory games exist, with various capabilities and prices
  - Ex: Memory Magic for kids by Mercury Learning Systems LLC ($50) & Sharper Brain & Sharper Memory for people with ADD and ADHD by Division of Advanced Cognitive Enhancement ($740), Wii and Nintendo DS word games ($50)

- Problems:
  - DO NOT meet specifications!
  - In general, memory games on the market are not customizable for adding personal images
  - Do not have voice recognition answer input
  - Games do not focus on facial recognition, but are path, sequence or puzzle memory games.

- Proposed Design:
  - Meets specifications!
  - Customizable for personal images
  - Simple interface for elderly people
  - Voice recognition answer input
  - Game will focus on facial recognition

Reasonable marketing price!
  - At 35% of prototype cost, can market game at ~$126
Pre-existing Products and Comparisons (2)

- **Related patents:**

- **Problems:**
  - DOES NOT meet specifications!
  - Not a memory software game
  - Does not focus on face recognition
  - No voice input

Figure 4: 2008/01387783

Figure 5: 2005/0203430
## Table 1: Proposed budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Approximate Cost (US Dollars)</th>
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| Nuance Dragon Naturally Speaking Voice Recognition Software          | Large vocabulary including proper nouns  
Customizable vocabulary libraries  
Able to deal with accents and dialects                                           | $110                          |
| SpeechWare microphone (or other brand especially designed for use with voice recognition software) | Top rated for use with Nuance voice recognition technology  
Superior digital sound quality for voice recording & speech recognition  
Noise canceling technology with manual sensitivity control, filters out background noise  
Far away positioning                                                     | $250                          |
| Total approximate cost of product                                   |                                                                                                                                             | $360                          |
| Total approximate cost of product including testing equipment        |                                                                                                                                             | $720                          |
| Price of product at 35% of prototype value                          |                                                                                                                                             | $126                          |
Questions?