Approximately $1500.00 - The cost of a commercially available Windows-based laptop with touch-screen capability and simple audio/speaker output. The software is free!

**Will I sound like a robot?**
To be honest, yes, although, our product incorporates the latest in speech synthesis technology and incorporates an emotional speech component (not found in the competitors products). The emotions component can mimic normal speech, anger, happiness, excitement, and sadness.

**Can a child use it, even one too young to read and write?**
Yes, selecting the pictured icons can access phrases, although, if your child can read and write, the UB Talker will offer unlimited speech capabilities.

**How can I get one?**
Encourage your child’s handicapped care center to contact us here at the University of Buffalo Computer Science Department under the direction of Mike Buckley.
impairments to “speak” audibly. Our system improves on current technologies in accelerating the thought to action to speech process and provides more human or emotionally appropriate speech through current speech-synthesis technologies. In addition, our system offers an alternative to the cost-prohibitive systems currently available in the market.

Our ultimate goal is to drive down current inflated market prices and encourage further development of augmentative communications technologies by current and new developers.

Our target client, David, has generously denoted his time and energy to assist in the research, development and testing of our device. David, a man in his forties, is unable to speak due to a stroke at a young age. David is non-ambulatory with severely limited gross motor skills; David is able to point to 1-inch flat targets with accuracy. He is an intelligent and mature adult and has been a great help in the initial development of our product.

Currently, David uses a rather crude communications system whereby David points to letters on a board while the person with whom he is communicating watches over David’s shoulder and recites back the intended words and phrases.

Other augmentative communications systems currently on the market include the Dynavox system - a complete hardware/software system, and the Gus-speak multimedia speech system - a Windows-based software system with hardware enhancements. For complete systems, either product costs in the range of $6,000-$12,000.

### Cost To the User:

~ $1500.00

Our objective is to offer our system for the cost of a commercially available Windows-based laptop with touch-screen capability and simple audio/speaker output. Our intention is to offer the software for free. Our initial target audience will be Child Handicapped Centers.

**Cost To the Client** (Government Grant or Corporate/Individual Contributions): $207,870.00. Complete functionality in 29 total weeks with a team size of 7.

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### The Database

Major sub-modules of the database are as follows:

The **Phrase Completion** module will implement a java-package for text auto-completion in conjunction with a Content Prediction database module. The module will build phrases by selecting out frequently used phrases according to category choice and if necessary text-on-screen-keypad entry. In screen-keypad mode, text is selected by first-in-the-list selection rather than by frequency for individual words, but by frequency for phrases.

The **Content Prediction** database module stores an initial set of phrases plus previously user-built phrases categorized by frequency of usage, time-of-day, and topic. Eventually, a sub-module for linguistic prediction may be added.

An **Update** module will reset frequency, topic, and time-of-day information for each phrase as phrases are reused and created anew.

### The Output

The **Output** module will include sub-modules for final text-to-speech and audio processing. The three major sub-modules of the Output section are the following:

The **Emotion** module will set basic audio processing functions such as equalization (treble-mid-bass), volume and tone functions to desired levels dependent on the emotion data received from the GUI. If no emotion data is received, that is, no emotion selected by user, the audio will be set to a default standard emotion.

The **Translator** module will implement java packages to take text in the user’s native language (English) and translate into other languages such as French, Spanish, and etcetera. Java packages for text translation and speech syntheses for alternate languages will be added as they are found.

The **Text to Speech** module will implement a package for speech syntheses. The module will take text as input and convert it to audio.

### Backup

The Backup module will backup data from the Database module. The Backup module will be activated to backup data automatically at a specific and convenient time of day. Of course, the talker laptop will be expected to be plugged-in and powered-up at this time.
activate text-to-speech output, a miss or undo button to back track, a settings button to reconfigure categories and basic functions, a Keypad button to enter text directly, and a set of emotional text formatting buttons to alter audio output parameters.

A **Frequent Buttons** panel will include a set of perhaps ten most frequently used phrases used in a particular time-of-day to be updated automatically as the day progresses. An initial set of these buttons might include phrases such as “I’m hungry”, “I’m going to bed, now” or “I need to go to the bathroom”, etcetera. The user will be able to update these by choosing the Settings button in the Standard Buttons panel. The set of phrases can be updated automatically by choosing the most frequently used phrases sorted by time period or by user-override; that is, if the user chooses to keep a certain button in the frequently used set even if it is not a most frequent phrase, he may select out such buttons to remain even when overridden. Note, the frequent sets are to be saved and maintained in the database modules, the display will pull its text from the database.

A **Display Text** panel will simply display the currently built phrase. On initial boot, or following selection of the speak button, the panel will display highlighted text for the most frequent phrase for that particular time of day. The highlighting indicates that the text will disappear or be replaced if any other choice is made, but will allow the user to progress immediately to the speak button if the phrase is appropriate. If another choice is indicated the Display Text panel will display the text as the user progresses. Unhighlighted text will be text that has been accepted while highlighted sections of text will be suggested or possible completions of the text. The accepted/unhighlighted text and the not-yet-accepted/highlighted text will be held in the GUI until the speak button is activated, at which point the display text memory will be reset and appropriate text and category information will be sent back to the database for an update of categorization and frequency information.

A **Categories** panel will display on initial boot a set of categories for phrase selection. This will be the largest panel, although, the buttons will not necessarily be the largest in this panel. The initial set will likely include categories such as Food, Shopping, Entertainment, Toiletries, Emergency, and etcetera. On selection of a category, a sub button menu will pop up with a set of sub-categories and/or icons for actual phrases; note, selection of a category will also update/append to the current text in the Display Text panel. On selection of the Standard Keypad button, the categories panel will display a set of icons for letters (or perhaps a keypad that closely resembles the templates David has used for the past 20 years). The Categorizes panel will draw its data, as do most of the panels in the GUI, directly from the Database module.

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**Example of the initial interface**

- Large Buttons for ease of use
- Sensible Phrase Categories placed in center
- Easy Control Buttons placed at the edges

**Note:** functionality and graphics will be expanded including Illustrative Icons, etc...
Our design incorporates four core modules: GUI-interface, Output, Database, and Backup. Each of these includes the following sub-modules as depicted in the following diagram which define it’s features. See following pages for detailed explanations.