

# **The TaskTracker: Assistive Technology for Task Completion**

Victoria E. Hribar

Biomedical Engineering Department

Virginia Commonwealth University

## **Problem and Motivation**

The most common cognitive impairment following brain injuries is an attention deficit which can be characterized as a “tendency to drift from intended goals.” A study, where traumatic brain injured (TBI) patients completed self-evaluations, identified the most frequent patient complaint from this group is decreased attention and concentration rate [2]. Attention deficits also characterize such cognitive disorders as Attention Deficit Disorder (ADD) and Attention Deficit Hyperactive Disorder (ADHD) [1]. Selective attention is particularly important in executing everyday tasks, and those with attention deficits will often need assistance with focusing on one stimulus, the chosen task, and filtering out distractions [1].

Assistive technology for cognition (ATC) aims to help individuals compensate for cognitive impairments by allowing increased independence and making everyday task completion more manageable. Two categories of ATC are time-management devices and prompting systems. Time management devices are meant to aid in executing daily, time-dependent tasks, and prompting systems provide feedback to help a user accomplish a task [1]. However, there are no existing devices that combine these two components to specifically aid in daily, time-dependent task completion.

In addition, the greatest predictor of whether a new user will adopt various ATC is how well suited the device is for the user and their ordinary environment [5]. With the exponential rise in portable and handheld technologies, rehabilitative devices no longer need to exist as a separate entity from popular devices an individual may already carry. Mainstream devices such as smart phones can provide a user the rehabilitative applications they need as well as the standard programs they desire such as internet, email, and games [3]. This is more convenient and cost-effective for users.

## **Background and Related Work**

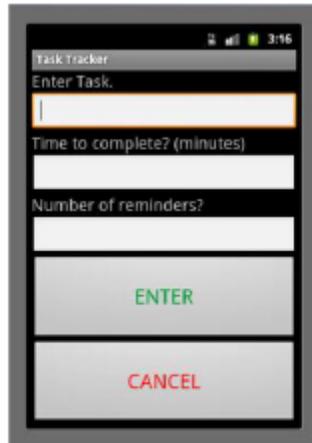
Currently, a few systems exist as stand-alone devices. One stand-alone prompting system, the MotivAider, costs nearly sixty dollars and provides the user with motivational reminders to change their behavior [4]. While a useful aid, the MotivAider may also inconvenience the user as a separate device must be carried. The WatchMinder was designed for people with attention deficits and utilizes a reminder system with 30 programmable alarms for remembering tasks. Personalized messages can also be programmed to help with behavior change and self-monitoring [1]. This system not only exists as a separate device, but it also contains no progress system for tracking time during a task. Some smart phone applications like Comprehensive Project Management allow users to plan their projects in advance by estimating a finish date and updating the current progress of the project which can be viewed at any time [4]. This, and similar applications, provide users the opportunity to track progress of long term goals but do not focus on progress of short term goals such as completion of a current task. Many smart phone applications exist to keep to-do lists or appointments such as the 2 Do smart phone application [4]. This program, and others like it, give the user alarms and reminders to remember to do tasks but will not help with time management during the task.

## **Approach and Uniqueness**

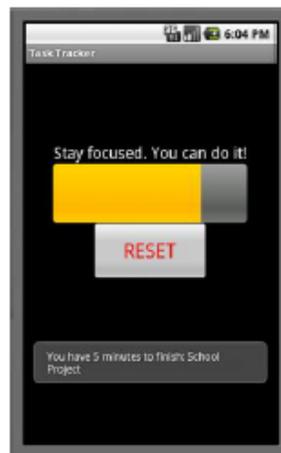
As discussed above, ATC smart phone applications and stand-alone devices already exist, but current ATC does not provide a comprehensive solution for aiding those with attention deficits in task completion. The TaskTracker utilizes smart phone technology to create a unique rehabilitative application. This system was designed to track everyday tasks with an alarm and motivational progress system to aid in time management and maintain the selective attention of an individual throughout a given task. This application has currently been developed for an affordable, multifunction Android™ smart phone. This also provides the user the opportunity to use a single device to combine their rehabilitative needs with their everyday needs.

The TaskTracker is novel in its combination of several key features of time-management and prompting systems which would be most useful to those with attention deficits, specifically those struggling with selective attention during daily tasks: 1) a progress bar to visually represent time passed and time remaining, 2) alarm reminders to get the user's attention in case they have become distracted, and 3) a motivational message to urge them to keep working towards task completion. These combine uniquely into one application aimed at tracking a specific task that the user is currently working to complete. With a single task in mind, the interface was designed based on other ATC smart phone applications but with a simple, single screen to prevent users from becoming distracted or lost in the complexity of the program. While the technology was designed with those with cognitive impairments in mind, this application will prove useful to any individual who desires assistance and motivation in completing time-dependent tasks.

When the user starts the TaskTracker application, they immediately view the intuitive user interface screen where they are asked to input the task, time to complete the task, and the number of reminders required, as seen in Figure 1. For example, a student might input: Study for Math Test, 1.5 hours, 6 reminders. At the appropriate alarm time, the reminder screen pops up with the progress of the current task in pictorial form, a motivational message which can be individualized by the user or caregiver, and a pop-up message which reminds the user of the amount of time remaining to finish the task. This information can also be presented orally using text-to-speech, according to user preference. An example of this can be seen in Figure 2. In the above example, the student will receive these reminders with feedback every fifteen minutes while they study until the hour and a half has passed or until they have finished the task. The purpose of the application is to provide several useful features of other ATC: repeated reminders, a progress system, and motivation throughout a period of time to aid in task completion. All of these features are thought to promote task completion and keep the users attention on their current task.



**Figure 1. TaskTracker User Input Screen**



**Figure 2. TaskTracker Progress Screen**

### **Future Work**

Validation tests will be performed in order to assess the usefulness of this application in assisting task completion in a given amount of time. Subjects will be asked to perform several tasks with and without the use of the TaskTracker. Time to complete the tasks in each case will be compared. Participants will also be asked a number of questions regarding the helpfulness and convenience of this technology. Individuals with cognitive impairments will be recruited as subjects in order to judge the usability of the application by the targeted group. In the future, an iPhone® version of this application will also be developed in order to increase availability of this technology.

## **References**

[1] Cook, Albert M., and Jan Miller Polgar. *Cook & Hussey's Assistive Technologies: Principles and Practice*. 3rd. St. Louis: Mosby Inc., 2008. 337-369. Print.

[2] Dockree, Paul M., Simon P. Kelly, Richard A.P. Roche, Michael J. Hogan, Richard B. Reilly, and Ian H. Robertson. "Behavioural and physiological impairments of sustained attention after traumatic brain injury." *Cognitive Brain Research*. 20. (2004): 403-414. Print.

[3] Hart, Tessa, Regina Buchhofer, and Monica Vaccaro. "Portable Electronic Devices as Memory and Organizational Aids After Traumatic Brain Injury: A Consumer Survey Study." *Journal of Head Trauma Rehabilitation*. 19.5 (2004): 351-365. Print.

[4] Ostergren, Jennifer, Jerica Montgomery, and Megan Carey. "Assistive Technology for Impairments in Attention, Memory, and Executive Function: Current Technologies and Available Evidence." *California Speech-Language Hearing Association*. CSHA, 25 Mar 2011. Web. 28 Jun 2011. <<http://www.csha.org/pdf/2011Convention/Friday/OSTERGREN-SC3.pdf>>.

[5] Sohlberg, McKay Moore. "Assistive Technology for Cognition." *The ASHA Leader*. American Speech-Language-Hearing Association, 15 Feb 2011. Web. 28 Jun 2011. <http://www.asha.org/Publications/leader/>