Reader Animated Storybooks

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## What's a Reader Animated Storybook?

An animated story is meant to be read as well as watched. Text appears on the screen, the mobile device waits for the reader to speak it, and then the scene visually unfolds.

The Problem

Americans on average watch two hours of television each day. They read for about seven minutes. Books are actively consumed, whereas television is passively consumed. We need active engagement to learn and remember, but how can books compete with the flashiness of television?

A Solution

Mobile technology can marry active engagement and visually-appealing digital media. By putting interactive books on mobile phones and tablets, we can bring the next generation of readers into their stories. In fact, by using voice recognition made capable by mobile devices, we can let a story unfold only as the reader reads aloud the narrative!
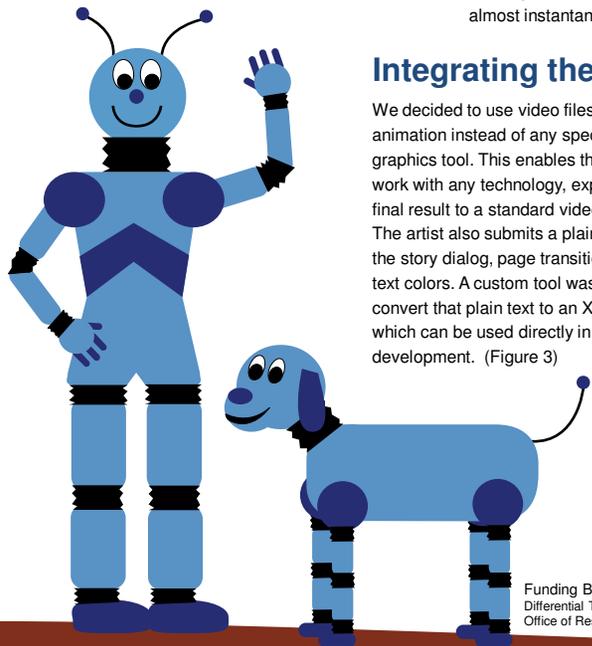
Development Process

Software Design

The Android platform was chosen for ease of development and publishing. Initially, there were open questions about which animation and speech recognition technologies would be most appropriate. A core set of states and transitions (updating text, recognizing speech, animating, etc.) would be needed regardless of implementation. A reusable design was devised to accommodate this. (Figure 1)

Speech Recognition

Our first prototype used Android's cloud-based speech recognizer. This provided accurate results but was slow, sometimes taking up to five seconds to submit the recorded audio, generate results on Google's servers, and send them back to the device. When a user's speech did not match the target text, the delay was discouraging.

A better option was Pocket Sphinx, an open source toolkit for speech recognition that could run entirely on the device. While not perfect for all applications, we could provide a language model limited to only the words that were in our story. This made result matching more forgiving and increased speed, enabling us to provide word-by-word visual feedback to the user almost instantaneously.

Integrating the Story

We decided to use video files for the animation instead of any specialized graphics tool. This enables the artist to work with any technology, exporting the final result to a standard video file format. The artist also submits a plain text file with the story dialog, page transition times, and text colors. A custom tool was written to convert that plain text to an XML format which can be used directly in Android development. (Figure 3)
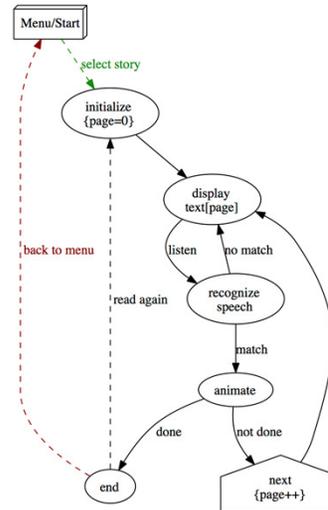
What's Next?

Our next step is to obtain feedback from Android Market by testing our application on readers young and old. Based on our results, we will improve our application and write more.

Figure 1

Figure 2

Figure 3

Animation Process

Brainstorming

Brainstorming is not just an accumulation of ideas, it is also a decision making process. Artists and designers have to decide from the initial conception of ideas, which one will be the best solution for the problem. For this project, we decided to create our own story rather than utilize an existing one. This allowed for more creative freedoms with how the story could progress as well as the complexity of the animations that would result.

Storyboards

From numerous brainstorming sessions came the idea of a robot named Tell and his robot dog Digger. Snapshots of their life quickly came to mind, like playing fetch and gardening on Mars. Therefore the next step in the animation process was to create storyboards. (Figure 2)

Storyboards are sketches of the key frames of animated sequences. They help to logically process how the animations will play out because key frames indicate the starting point and end point of any sequence that requires a smooth transition. By drawing out the necessary key frames first, the animator is able to get an idea of whether the sequence needs to be animated frame by frame or if the sequence can utilize a tween. This also is when the compositions of scenes consisting of the layout and color schemes are decided upon. Because the process of animation is tedious and time consuming, it was important to make sure the storyboards were well thought out before beginning to integrate the scenes into the animation software.

Animation

Adobe Flash was utilized to create the animations, and Adobe Illustrator was used to create individual graphics. Flash contains features known as tweens that when added to the frames create smooth transitions between the key frames. This enables some animations to take less time to create, for example, making an object go across the screen. Other animations, like making Digger's tail wag, needed to utilize frame-by-frame animation because the action was too complicated for tween animation.

To create a finalized movie once the animations were complete, the artist exported the movie file from Flash as .mov file. From there, we utilized the Adobe Media Encoder software to write the .mov file to a H.264 format that could be more easily incorporated into the software.