

Accessibility of Mobile Platforms

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Abstract. This paper compares accessibility features of two popular platforms from a user perspective. The comparison is based on accessibility features for different kinds of disabilities such as vision, hearing or physically challenged users. A section on accessibility in mobile applications follows. According to a survey [1], the use of mobile platforms by people with disabilities is dramatically increasing. New accessibility features are introduced for each release of these platforms which makes them an affordable assistive technology.

Keywords: Accessibility, mobile devices, screen-readers, people with disabilities, assistive technologies, accessible apps.

1 Introduction

The use of mobile devices is growing rapidly, and the way we use mobile devices continues to evolve. Use of mobile devices for shopping, banking and other apps is to increasing and opening more opportunities to how we use mobile devices in daily life.

The advantages to people with disabilities are potentially more effective than those for the general population. Accessible mobile devices increase the ability of people with disabilities to shop, communicate, study and do other activities. Commercially available mobile devices can replace specialized hardware that many people with disabilities rely on for applications such as way-finding, reading and others.

The use of accessible mobile devices has recently increased dramatically, according to the last survey carried out by WebAim Screen Reader Survey 4, which reported that 71.8 percent of respondents indicated they use a screen reader on a mobile device, a 600 percent increase in mobile screen reader usage since the first survey was conducted just over 1 year ago.

There are a number of mobile devices on the market which offer accessibility features, including as Apple iOS, Google Android and BlackBerry. This paper considers the most popular mobile platforms, namely Apple iOS 7 and Google Android 4.4 [2,3,4,5].

2 Comparing Accessibility Features of iPhone and Android

This section compares accessibility features of two popular mobile platforms: Apple iOS 7 and Google Android 4.4. The comparison is based on different senses such as

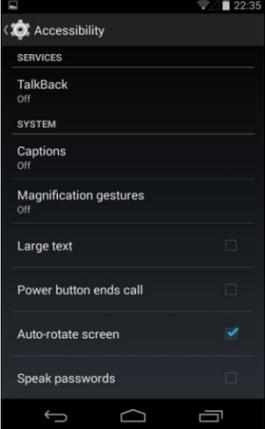
vision, hearing, and physical and motor. The comparison is probably not complete and might be extended to other features.

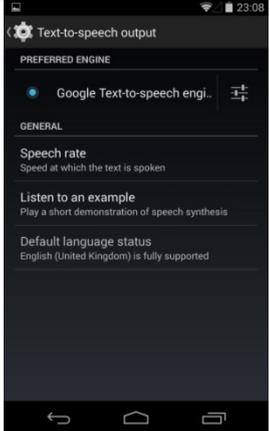
Apple provides a strong base of accessibility features just out of the box. With the release of the iPhone 3GS in 2009, Apple developed the first mobile screen reader for touch-based devices. The VoiceOver [6] screen reader which is built into the Mac desktop platform was introduced into the iPhone. Apple provided a unique set of gestures to allow a user to nonvisually control the iPhone using VoiceOver. As a user’s finger moves over or taps an element, the name of the element is spoken. Double tapping on the screen then activates the element.

Google, on the other hand, has an open source philosophy and this had led to adoption of a more “wild west” model of accessibility where developers are expected to create accessibility solutions rather than having them provided centrally.

2.1 Vision

Feature(s)	iOS	Android
Screen Reader	VoiceOver	TalkBack
Zoom	Zoom	Magnification gestures
Text magnification	Large Text <ul style="list-style-type: none"> • 20pt • 24pt • 32pt • 40pt • 48pt • 56pt 	Font Size <ul style="list-style-type: none"> • Tiny • Small • Normal • Large • Huge
Bold Text	Bold Text	
Colors	Invert Colors <ul style="list-style-type: none"> • White/Black • Black/White 	
Contrast	Increase Contrast	
Speak Selected Text	Speak Selection	
Speech Rate	Speaking Rate	Speech Rate <ul style="list-style-type: none"> • Very slow • Normal • Fast • Faster • Very fast • Rapid • Very rapid • Fastest

<p>Navigation</p>	<p>Rotor</p>	
<p>Handwriting</p>	<p>Handwriting</p> <ul style="list-style-type: none"> • Writing • Navigation 	
		
		

		<p>Saving screenshot...</p> <p>Magnification gestures OFF</p> <p>When this feature is turned on, you can zoom in and out by triple-tapping the screen.</p> <p>While zoomed in, you can:</p> <ul style="list-style-type: none"> • Pan: Drag two or more fingers across the screen. • Adjust zoom level: Pinch two or more fingers together or spread them apart. <p>You can also temporarily magnify what's under your finger by triple-tapping and holding. In this magnified state, you can drag your finger to explore different parts of the screen. Lift your finger to return to your previous state.</p> <p>Note: Triple-tap for magnification works everywhere except the keyboard and navigation bar.</p>												
														
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Type	Public													
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	NASDAQ-100 Component													
	S&P 500 Component													
Industry	Internet													
	Computer software													

2.2 Hearing

Feature(s)	iOS	Android
Flash Alert	Led Flash Alert	Led Notification
Audio Balance	Mono Audio and Balance	Sound Balance <ul style="list-style-type: none"> • Adjusting sound Left/Right
Audio/Stereo	Mono Audio and Balance	Mono Audio <ul style="list-style-type: none"> • Mono/Stereo
Video Calls	FaceTime	Hangouts
Subtitles/Caption	Subtitles and caption option	Captions <ul style="list-style-type: none"> • Language • Text size • Caption style
		
		

2.3 Physical and Motor

Feature(s)	iOS	Android
Touch Assistant	Assistive Touch	
Incoming Calls	Incoming Calls <ul style="list-style-type: none"> • Default • Headset • Speaker 	Answering/Ending Calls

<p>Accessibility click speed</p>	<p>Home-click Speed</p> <ul style="list-style-type: none"> • Default • Slow • Slowest 	<p>Touch and hold delay</p> <ul style="list-style-type: none"> • Short • Medium • Long
		

2.4 Additional Features

Feature(s)	iOS	Android
<p>Speech Input</p>	<p>SIRI</p> <ul style="list-style-type: none"> • Send messages • Place phone calls • Schedule meetings • Set reminders • Look up movie times • Etc... 	<p>GoogleNow</p>
<p>Speak Password</p>		<p>Speak Password: When explored by touch is enabled, characters entered in password fields read out by the device</p>
<p>Answering/ending calls</p>		<p>Answering/ending calls:</p> <ul style="list-style-type: none"> • The home key answers calls • Answer calls by tapping • Voice control • The power key ends calls
<p>Enable/Disable Accessibility</p>		<p>Show shortcut: Press and hold the power key to use the shortcut of accessibility menu under phone options</p>

<p>Manage Accessibility Setting</p>		<ul style="list-style-type: none"> • Export: Save the accessibility settings as a file • Update: Update your accessibility settings by importing the saved file • Share via: Share the accessibility settings • Android Beam: send the accessibility settings file via NFC
<p>Accessibility Shortcut</p>	<p>Accessibility shortcut</p> <ul style="list-style-type: none"> • VoiceOver • Invert Colors • Zoom • Switch Control • Assistive Touch 	<p>Accessibility shortcut</p> <ul style="list-style-type: none"> • Press and hold the power key until you hear a sound or feel a vibration • Tap and hold with two fingers until you hear audio confirmation
<p>Simultaneous use of Screen Reader and Zoom functionality</p>	<p>This feature is provided</p>	
<p>Support additional external devices</p>	<p>Bluetooth refreshable braille display</p>	
		

2.5 Accessible Best Practices for Mobile Development

Many fundamental accessible best practices will apply to mobile applications. Here are some examples:

- Text and images must meet relevant requirements for sufficient color contrast
- Screens must be laid out in an order that permits intuitive sequential navigation
- User interface controls must respond to multiple modalities of input
- User interface components must communicate correct information about the name, state, role and value of each component.

For a comprehensive description of the best practices see [7] for iOS and Android.

3 Conclusion

This paper presented a comparison of accessibility features from two popular platforms. The presented features are not comprehensive, but it gives a good overview of currently available features. New trends and modalities such as force feedback [8] will provide good new accessibility features for users with disabilities in the future.

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