Mendoza, Christian Mark B.

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Study of Accessibility Guidelines of Mobile Applications

INTRODUCTION

The need to ensure that all advancements in technology are accessible to every individual on the spectrum of ability is a pertinent issue. According to the World Health Organization, it is estimated that over one billion members of the global population are affected by some form of disability [4]. The unique needs of these individuals and their right to participate in the digital age cannot be ignored by developers. Most research on the topic of accessibility guidelines has focused on the Web and its sites, but the equally important topic of accessibility guidelines in mobile applications have not been as thoroughly scrutinized. As mobile apps operate within multiple form factors with varied interaction modalities, it becomes difficult to impose the same website accessibility guidelines as a standard on them. Mobile use has its own challenges and therefore the apps that run on them call for a dedicated set of accessibility guidelines. Applications that are not accessible or only partially accessible are a hindrance to an

individual as well as commerce. For a business, the fewer the users that are able to use their mobile application, the smaller their translated revenue streams. On the other hand, for an individual user, an app that is difficult to use will be either a source of stress and frustration, or it would be tossed aside entirely in favor of a more accessible alternative. The obstacle of mobile inaccessibility prevents a society from reaching its

full potential in the digital age. Responding to the critical nature of the topic, we developed a study to determine the current state of accessibility in the mobile app industry. This intention was realized by compiling an exhaustive list of accessibility guidelines dedicated to mobile app space using previously established research and guidelines, followed by an expert heuristic's evaluation of selected popular Android applications based on the surveyed guidelines. Our research aims to illuminate the attitudes towards accessibility within the industry, identify common pitfalls often overlooked by designers and developers, and provide a view of the current state of mobile accessibility through heuristics evaluation of a variety of mobile applications.

ABSTRACT

With the increased ubiquity of mobile devices around the world, it is imperative to ensure that these devices and their applications (apps) are accessible to users with disabilities. Although design style guides are undergoing a paradigm shift with the promotion of 'mobile-first' ideology, we have yet to witness a concrete step being taken towards the establishment of universal guidelines for mobile app accessibility. To address this issue, we compile an exhaustive list of guidelines to gauge mobile app accessibility. We present a mobile-specific framework to categorize the guidelines. We then underline the importance of these clearly defined guidelines by putting the most popular 25 apps from the Google Play Store under their lens. The results indicate low rates of violations of accessibility guidelines at the system level, and a high rate of violations at design and content levels. We highlight the most

and the least violated guidelines. We discuss in detail the
overall accessibility of evaluated apps and identified patterns
in violations of established rules

Most violated accessibility guidelines by tested apps

Accessibility Guidelines	Level	Category
Live videos have captions	Content	Video
Videos have either text transcript or audio description	Content	Video
Audio files have text transcript	Content	Audio
Live Audio has text transcript; either real-time closed captioning or a prepared script that is linked to from the Audio contents	Content	Audio
Users are offered a range of presentation options. Users can select from foreground and background colors	Design	Flexibility and Efficiency
Videos have extended audio description that gives the narrator adequate time to de-	Content	Video

scribe what is happening in the video		
Videos have a full text transcript and audio description that is linked to from the original content	Content	Video

Mobile accessibility" refers to making websites and applications more accessible to people with disabilities when they are using mobile phones and other devices. WAI's work in this area addresses accessibility issues of people using a broad range of devices to interact with the web, including:

- phones and tablets

- digital TVs

- wearables such as smart watches

- devices in car dashboards and airplane seatbacks

- devices in household appliances

- other "Internet of Things"

It addresses a wide range of issues:

- touchscreens

- small screen sizes

- different input modalities, including speech and 3D touch enabled by pressure sensors

- device use in different settings, such as bright sunlight

- and more

W3C WAI Addresses Mobile Accessibility

WAI's accessibility standards address mobile accessibility:

- Web Content Accessibility Guidelines (WCAG) covers web pages and web applications, including content used on mobile devices.

- To learn how WCAG 2.0 can be applied to mobile web content, mobile web apps, native apps, and hybrid apps using web components inside native apps, see Mobile Accessibility: How WCAG 2.0 and Other W3C/WAI Guidelines Apply to Mobile.

  - A more general resource that also includes mobile apps is WCAG2ICT: Applying WCAG 2.0 to Non-Web Information and Communications Technologies.

  - WCAG 2.1, published in June 2018, includes new requirements ("success criteria") addressing mobile accessibility. They are introduced in What's New in WCAG 2.1.

- User Agent Accessibility Guidelines (UAAG) covers web browsers and other "user agents", including mobile browsers.

  - For examples of how web browsers that follow UAAG benefit people with disabilities using the Web on mobile devices, see Mobile Accessibility Examples from UAAG.

  - For those wanting to explore the issues more, see Applying UAAG to Mobile Phones.

  - Authoring Tool Accessibility Guideline (ATAG) covers software used to create web pages and applications, including for mobile.

- WAI-ARIA (Accessible Rich Internet Applications)
  defines ways to make web content more accessible,
  especially dynamic content and advanced user
  interface controls. It applies to web applications
  and to accessing websites with mobile devices.

W3C addresses mobile accessibility. WAI ensures that the core
W3C technologies support accessibility, including those that are
essential for the mobile web. All W3C work is reviewed for
accessibility by WAI's Accessible Platform Architectures Working
Group (APA).

W3C work on mobile includes Mobile Web Application Best
Practices and Mobile Web Best Practices. For a summary of
technologies developed in W3C that increase the capabilities of
web applications and how they apply specifically to the mobile
context, see Standards for Web Applications on Mobile.

RESULTS

Several guidelines were identified as having notably low rates
of conformance after the data was totaled from all applications.
Table 2 shows the guidelines that were mostly violated by
tested apps, where violation rate was more than 90%. The
violation rate is the total percentage of screens (across all
applications) that were found to be in violation of the
particular guideline.

The majority of the most frequently violated guidelines across
applications are related to video content. In 93% of the in-
stances where live video was observed during our evaluation,
captions were not provided, resulting in a 93% violation rate.
On the other hand, the least violated guidelines included pre-
recorded video having an audio description along with the use
of clear sensible fonts and presentation of important content on
top.

https://www.w3.org/WAI/standards-guidelines/mobile/

https://www.researchgate.net/publication/329494003_Study_of_Accessibility_Guidelines_of_Mobile_Applications