



Fostering More Equivalent Access to Images for Blind and Low Vision Users

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Abstract

Alternative text (“alt-text”) and image descriptions are primarily used by blind and low-vision individuals (BLV) to understand images. However, they are often insufficient. **Providing BLV users with a better understanding of subtle details within images can help users**, particularly within educational contexts. In this work, we developed an **audio-based prototype that communicates material information** to users as they interact with images on touchscreen devices.

Research Objectives

Identify and Understand Challenges: investigate challenges BLV individuals encounter when accessing images

Develop a Prototype: design and create a prototype aimed at mitigating identified challenges by BLV individuals.

Improve STEM Education for BLV Students: explore how to significantly improve accessibility and comprehension of images within STEM education for BLV students.

Formative Interview Key Points

BLV students face challenges within STEM education subjects, such as biology, geology, and engineering

BLV students traditionally learn about images through verbal descriptions and tactile 3D models made with straws

For detailed images, descriptions of the actions and appearances are important

Alt-text is often insufficient in fully understanding images.

BLV users desire to better understand materials, object properties, and people

Microsoft’s Seeing AI is a digital solution currently being used, though it provides limited details

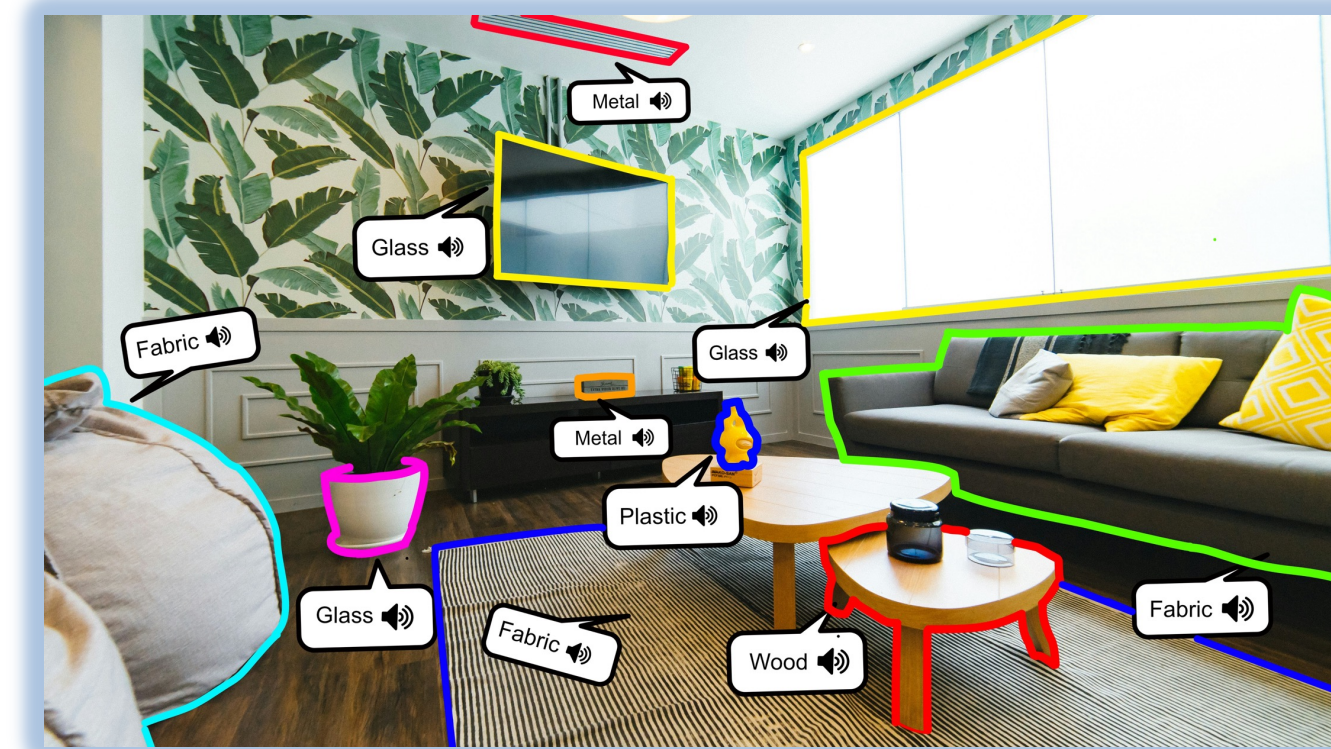


Figure 1: A sample image used to test our prototype. Users move their finger over a certain area to play sounds corresponding to the material at that location

Future Work

Future work will **engage with more members of the BLV community and collaborate with the Hellen Keller Services for the Blind**. We will further identify the needs of BLV users, especially within educational contexts, and we will present our prototypes to our target population to get their feedback. Our hope is to **BLV students’ access to STEM education and thus improve their lives**.

Formative Interview Questions

How do blind students learn subject matter that is typically taught via images?

Which images can be adequately described with alt text, and which need more details?

What image properties are crucial for students to understand the image well?

Is there a digital solution to learning what images are showing that blind students use?

Prototype Development

We built a mobile (Android/iOS) prototype app using the Unity engine. We selected sample images and manually annotated different regions of the image. While using the app, the user can move their finger over a region on the image, and the app will announce details about that region.

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