

Lazaro Creates an Adaptable and Flexible Programming Environment for the Visually Impaired

Application allows the visually impaired and sighted to share the same Smalltalk programming experiences

Lazaro Smalltalk Project

Student-Created App Solves Challenge for Blind Students

At Universidad Nacional de Quilmes in Buenos Aires, Argentina, two students, along with the backing of their professors, elected to tackle a challenge that was affecting their visually impaired classmates: integrating screen readers with Smalltalk.

For students **Ángeles Tella Arena** and **Matias Melendi**, the project was about ensuring that their blind classmates could interact with the tool in the same way as all of the other students. Their professors, **Gabriela Arevalo** and **Maximo Prieto**, were supportive. According to Ángeles, "They showed a real interest in the project and encouraged us to keep pushing it forward."

The Challenge – and the Vision

As Smalltalk is virtualized, the windows that it generates are objects. They are not native windows that are accessible to the screen readers, since everything is inside the image.

According to Matias, "The purpose for Phase One was to allow our blind classmate to have the same experience the rest of his classmates had when learning object-oriented programming. Thanks to this, the project evolved, and Lazaro came to life, with the intention to make live interaction with objects available for every blind person who would like to learn."

A Solution in Two Phases

- **Phase One:** The work done in this initial phase was developed based on the needs of their blind classmate, Miguel. The goal was to make it possible for him to experience a first-semester lecture on the object-oriented paradigm within the same conditions as the rest of the students. The students adapted a web distribution of Smalltalk in order to be read properly by a screen reader.

Project Creators: Object-oriented programming students

Project Location: Universidad Nacional de Quilmes in Buenos Aires, Argentina

Project Goal: Enable visually impaired university students in object-oriented programming classes to learn under the same conditions and have the same experiences as their sighted classmates

Project Solution: Smalltalk

"The project was not only interesting for the challenge represented as a student project, but also because of the impact on our university community. Using this tool, blind students can study with minimal adaptations to the software and in the same timeframe as other students."

– Professor Gabriela Arevalo

- **Phase Two**, named Lazaro, came about when Miguel became a teaching assistant. With the Phase One app, he was not able to check exams or exercises. Lazaro was implemented to read the code for non-web Smalltalk distributions. In fact, the application opens a process that connects to text-to-speech systems.



Details

In Phase One, the students added features to the web Smalltalk distribution platform and made some enhancements that made it possible for a blind student to use this version of Smalltalk with a screen reader properly. Some of these were changing HTML tags, serving it on an external IP and customizing the way projects are created, among others. For Lazaro (Phase Two, another non-web Smalltalk distribution), they additionally developed a set of adapters for text-to-speech synthesizers.

Main Benefit

The users of Lazaro are blind people who are interested in learning object-oriented programming using common tools based on Smalltalk. The main benefit is that any blind person who uses Lazaro can integrate text-to-speech tools with Smalltalk—something that is not possible without some Smalltalk platforms because of the platform virtualization. With Lazaro, the student can read the content of the Smalltalk environment and also be able to develop applications using a real object-oriented environment. Thus, the blind person can now interact with the tool just as any other person can.

Moving Forward

Lazaro is a work in progress that has application within academia; however, Lazaro could easily be extended to other uses in the future. In business, for example, it could be used at organizations looking to add support for the visually impaired with a new application that integrates with their existing applications.

According to Suzanne Fortman, Cincom's Director of Smalltalk Global Operations:

"I had the privilege to experience the students presenting the Lazaro application at a recent conference and immediately recognized that their project would add value to several of Cincom's Enterprise customers. These customers are looking for an application to support the visually impaired which also seamlessly integrates with their Cincom Smalltalk applications."

Of course, people with disabilities are already benefitting from adaptive technologies, however, there is a need for much more. According to the International Labour Organization (ILO)¹, of the current 785 million people of working age with disabilities, just 160 million are currently participating in the workforce. With additional adaptive technologies, it's estimated that up to 350 million more could enter the workforce.

Gartner's 2016 Hype Cycle for Human-Machine Interface² is predicting that many of the most crucial technologies will reach mainstream status within 10 years. If that proves to be correct, there could be 510 million people with disabilities in the global workforce—a number rivaling the general population's workforce participation rate.

Lazaro is an example of one of those adaptive technologies reaching the mainstream soon that will help to fulfill Gartner's prediction.

Footnotes

¹ <http://ilo.org/global/topics/disability-and-work/lang-en/index.htm>

² <https://www.gartner.com/doc/3368017/hype-cycle-humanmachine-interface-World>



World Headquarters • Cincinnati, OH USA • US 1-800-224-6266 • info@cincom.com • cincom.com/contact-us

Cincom, the Quadrant Logo and Cincom Smalltalk are trademarks or registered trademarks of Cincom Systems, Inc. All other trademarks belong to their respective companies.

© 2017 Cincom Systems, Inc. Printed in U.S.A. All Rights Reserved