Breakthrough design opens door to 'full screen' Braille displays for the blind

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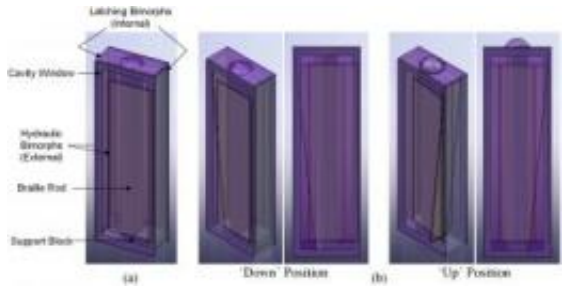

The researchers have developed a concept called a "hydraulic and latching mechanism," which they expect to form the basis for a full-page, refreshable Braille display system. Credit: Dr. Neil Di Spigna, North Carolina State University

Imagine if your computer only allowed you to see one line at a time, no matter what you were doing - reading e-mail, looking at a Web site, doing research. That's the challenge facing blind computer users today. But new research from North Carolina State University is moving us closer to the development of a display system that would allow the blind to take full advantage of the Web and other computer applications.

"Right now, electronic Braille displays typically only show one line of text at a time. And they're very expensive," says Dr. Neil Di Spigna, a research assistant professor at NC State and co-author of a paper describing the research. In order to develop a more functional, and affordable, tool that would allow the blind to interface with their

computers, Di Spigna and his colleagues are working to develop a full-page, refreshable Braille display. Braille uses a series of raised dots to represent letters and numbers, allowing blind people to read.

Such a display would also translate images into tactile displays, effectively mapping pixels in an image and allowing the full-page Braille display to represent the images as raised dots.

The researchers have developed a concept called a "hydraulic and latching mechanism," which would allow the development of such a display system. The mechanism would be made of an electroactive polymer that is very resilient and inexpensive, when compared to current Braille display technologies. "This material will allow us to raise dots to the correct height, so they can be read," says Dr. Peichun Yang, a postdoctoral research associate at NC State and co-author of the paper. "Once the dots are raised, a latching mechanism would support the weight being applied by a person's fingers as the dots are read. The material also responds quickly, allowing a reader to scroll through a document or Web site quickly."

Earlier this month, the researchers presented their findings on the hydraulic component of the mechanism, showing that it is a viable technology. The next step is to demonstrate a proof-of-concept model of the latching mechanism. "We hope to have a fully functioning prototype of the mechanism within a year," Di Spigna says, "and that could serve as the functional building block of a full-screen refreshable display."

"Reading Braille is essential to allowing blind people to find employment," says Yang, who is blind. "We're optimistic that this technology will give the blind additional opportunities in this area."

"The last 20 years of computer technology have been relatively inaccessible - and today's common mobile computing devices, from

smart-phones to digital navigators and iPads, have been completely nonexistent - to blind people, because the display technology for the blind has not kept pace," says David Winick, a researcher at NC State and co-author of the paper. "We hope to enable the development of applications that will give the blind more complete access to the internet and other computer resources, such as e-books."

More information: The research, "The integration of novel EAP-based Braille cells for use in a refreshable tactile display," was presented March 8 at the 12th International Conference on Electroactive Polymer Actuators And Devices in San Diego.

Provided by North Carolina State University

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