Graphical world opens for visually-impaired people

A new tactile device will allow the widespread use of graphical interfaces for visually-impaired people. The tactile graphical display will open up new avenues of employment, communication and personal expression. Conceivably it could do for graphics what Louis Braille did for text in 1824.

Current Braille displays generally show one line at a time using electro-magnetic or piezo-electrical forces to raise and lower the dots that make up Braille letters. Larger multiline displays were developed but never sold commercially because they cost over €200,000 to produce.

The new display uses electro-rheological fluids and will cost about €15,000 when it enters production, a comparable price to current top-of-the-range single line readers.

"Piezo-electrical devices manufacture the dots in pairs, whereas in our system we can manufacture the entire display in one sweep, which keeps down the costs," said Dr Sami Ahmed, managing director of Smart Technology Group the scientific coordinator of the interactive Tactile Interface (ITACTI) project, backed by funding from the European Commission's IST programme.

Smart were responsible for developing the electro-rheological (ER) fluids which change their state from liquid to semi-solid when a charge is applied. Developing the ER fluids was the greatest challenge faced by the project. Smart also was responsible for design and manufacture of the new display unit.

"We use these types of fluid in other applications, but it took quite a lot of work to get the specification we required for this device," says Ahmed. System controls and special software allow dots to raise and lower individually, offering users an entire page of text or graphics.

"Single line devices are fine for simple text, but what if you want to look at a spreadsheet? For that you need a full-screen display, which can also produce text," says Ahmed.

The device could even make reading text easier for users. Current single line systems replace read lines with new lines of text, so users cannot conveniently refer back to something they've just read.

But it is the exciting ability to include graphical elements that really sets the ITACTI device apart. "We're not talking about photos of Tony Blair, but rather practical applications like icons, bar charts and presentations. It will also be very useful for mathematical formula," says Ahmed.

He believes it could also mean new job opportunities, and suggests it could be used to allow visually-impaired people to work in call centres when full screens of data need to be quickly scanned to respond to queries.

Graphics is not the only innovation achieved by the team. Uniquely, the device integrates both input and output, so users can read a Web page and then click hyperlinks if they want. It can also work like a mouse, with the fingers moving the cursor around the screen while the thumb can click or double-click particular elements.

So far the response to the new device is very enthusiastic. "Users loved it and it opened up a whole new world. This is because the Royal National Institute of the Blind in the UK was a member of the consortium. They told us what users needed," says Ahmed. The consortium also had strong links with the Italian charity ANS.

Conceivably the device could create whole new fields for visually-impaired people. With widespread use the system could enable the emergence of new patterns to represent graphical elements.

"Right now we're actively seeking ways to begin commercial production. For that to happen, we first need to produce a pre-production run and extend testing on the device. We hope to raise the investment necessary to tackle that stage. If that's achieved, then we could move to production quite quickly," ends Ahmed.

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