Prototype display uses eyeglass prescription to allow for viewing devices without glasses

25 July 2014, by Bob Yirka

An experimental display technology being developed by Microsoft, U.C. Berkeley and MIT aims to allow users with vision problems to clearly see device screens without the need for glasses. The technology is based on an algorithm developed by the team that accepts a person's eyeglass prescription and uses it to alter the image projected by a smartphone, tablet, computer, etc. allowing for viewing without eyeglasses.

The display technology has two parts, the first involves using an algorithm run on the device to convert eyeglass information to a change in the way light is generated by individual pixels on a screen. The second part is an acrylic light filter laid over the display—it has tiny holes in it, each of which sit directly over a pixel. Together the altered pixels and filter produce an image on the display that mimics what a user would see on a normal screen if they were wearing the same prescription glasses.

The team has built a prototype of just such a system using an iPod Touch smartphone and cameras that are able to simulate vision problems. They note that while the system they've developed thus far works in principle, there is still a lot of work to do before it could be implemented as a commercial product. Currently, the prototype only works when viewed from a set distance, movement by the person viewing the display would result in distortion. The researchers envision an addition to the system that monitors the location of the head and eyes of the person doing the viewing, and adjusts the display in real-time. Another problem is that the display only allows one person (the one whose prescription has been used) to view the device's screen clearly. Thus, it wouldn't really work for a television screen, at least as its configured now. The team believes they could make their technology work for multiple users when applied to higher pixel density devices.

In addition to allowing people to view their devices without their glasses, the researchers note that it might open up new possibilities for people with other vision problems—those that have trefoil and spherical aberrations, for example.

The team will be presenting their prototype at this years' SIGGRAPH computer graphics conference next month in Vancouver.