

Abstract on active scanning, research done in 2001 and 2002.

The report is rather long and can be downloaded.

Keywords:

Scanning, Morse code,

voice output communication aid, user modelling, input method.

Subject Scanning techniques allow speechless people to communicate with electronic switches. With classical passive row-column scanning users wait as first different rows are suggested and then different columns. With active column-row scanning and with active group-wise scanning users move the focus themselves.

Object This study analyses different scanning techniques, models what users have to do to operate them and investigates problems encountered in their design and optimisation.

Method A model is presented of time per keystroke as a function of pause time. Performance was tested in about twenty experiments with pauses of one second and shorter. Ease of learning was documented with several test-subjects. Also switch counts with different techniques were compared based on relative frequencies of characters in printer's lay.

Results With pause times of one second speeds were 12.3 characters per minute (cpm) for passive scanning and 14.7 to 22.0 cpm for different forms of active scanning. When pause times were adapted to individual needs, highest speeds with a single switch were 22 cpm with passive scanning and 25.1 cpm with active scanning. With two switches highest speeds were above 30 cpm with several techniques. With a small subset of two-switch Morse code to guide a shrinking focus and frequency optimised matrices for group-wise scanning, 30.5 cpm was documented with the screen turned off, a copy task maintained during thirty minutes and an error rate of 3% only. This technique is also called two-bit quartering.

Conclusion Active scanning techniques are effective alternatives to passive scanning techniques.