



Speech Recognition and Computer Access for Paralysed Users: a
Case Study

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Speech recognition technology has advanced to the point where it is a useable computer-input technique. At the current stage of development, however, there are rather few applications where positive benefits sufficient to justify the extra expense over conventional input are gained. One such application is as a computer input for severely disabled persons unable to use a normal keyboard (Damper, 1984; 1986).

In this paper, we describe work aimed at equipping a paralysed user with a speech-driven interface to the BBC Master microcomputer. A prime concern is that the interface should be 'transparent' (Dabbagh et al, 1986), so avoiding any danger of memory clashes between the interface software and commercial applications programs. Since the interface is intended to be both rapid and pleasant to use, human factors such as vocabulary design, command syntax, feedback and prompting require attention. We envisage that the final system will prove useful to a sizeable number of severely disabled persons.

The paper describes the general problem of providing transparent interfaces, outlining the possible approaches and issues involved. Next, the particular choice of recogniser is considered, including a review of commercially available recognisers. Although there are a sizeable number of such products, it is shown that very few indeed are suitable for this application. Somewhat reluctantly, in view of its relatively extended product life, we have chosen the SYS300 recogniser from Interstate Electronics Corp. The system configuration is then described with particular attention paid to ways of maximise the machine-independence of the design. The choice of vocabulary and dialogue is also described and justified.

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Finally, experiences with the system are reported. This includes a comparison of speech input with use of an alternative input device (optical head-pointer) from the point of view of speed, error rates and user acceptability.

References

Dabbagh, H.H., Damper, R.I. and Guy, D.P. "Transparent interfacing of speech recognisers to microcomputers". *Microprocessors and Microsystems*, 10(1986), 371-376.

Damper, R.I. "Voice-input aids for the physically disabled". *Int. J. Man-Machine Stud.*, 21(1984), 541-553.

Damper, R.I. "Speech control of assistive devices for the physically disabled". *IEEE ICASSP*, Tokyo, Japan, 1986, Vol. 1, 653-656.