The Use of Digitally Stored Text for Braille Production

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Summary

This paper describes some of the possibilities for utilising text stored digitally for automatically producing contracted braille. It is suggested that this type of data input could greatly increase the availability of straightforward braille text.

Introduction

In most countries the standard braille code uses contractions and abbreviations which are governed by a complex set of rules. The use of contractions typically results in a 26% reduction in the number of cells required, but it necessitates the use of skilled transcribers, or a computer, to produce contracted braille. The prime motivation for automation, up to the present time, has been the shortage of skilled transcribers rather than the cost saving, either projected or actual.

The automation of the translation process is not simple since contracted braille is a language and not a code; for instance, the use of a contraction is sometimes governed by pronunciation, meaning or the presence of particular adjacent words. This presents formidable difficulties if perfection is required but existing computer programs often have error rates of about one incorrect choice of contraction per five pages, which most users find acceptable.

A current automated translation system with manual input of data includes the following processes:

(i) A typist keys in the text adding a few control characters, for a new paragraph, etc.

(ii) A line-printer listing of the text is produced in order to proof-read for typing errors.

(iii) The text is interactively edited on a visual display unit.

(iv) The text is translated to contracted braille; a translation speed of 5000 words per minute can be achieved on a medium sized machine.

(v) The braille is output on an embosser (a line embosser can output 120 braille cells per second).

Typically, a good typist would take about 44 hours to type, proof-read and edit one hundred thousand words, translation would take 20 minutes and output 1 hour.

Automated Systems

With manual input of material, a large proportion of the total cost of producing the braille-coded data is that allocated to data input and checking. To reduce this component, experiments have been undertaken to investigate the transcription of material available in machine readable form. The current status of some of these projects is as follows:

Telephone Directories:

Many organisations use computers or word-processing typewriters to produce their internal telephone directories. Since many blind employees rely heavily on use of the telephone, a braille directory can be invaluable. The conversion of the digital data to braille is relatively trivial since the data is usually in a fixed format. At the University of Warwick, the internal directory is now computer-based, and the data base is used for both the ink-print and braille editions. A valuable incidental advantage is that this directory can now be produced with both alphabetical and departmental listings.

Bank Statements:

Lack of privacy is one of the most serious deprivations caused by blindness, therefore the availability of bank statements in braille can be very important to some blind individuals. The braille statements can be automatically produced from a digital magnetic tape supplied by the bank. The data is in print-image format but without the customers' names and addresses in order to maintain confidentiality. The main advantages of an automated system are speed, accuracy and cost saving when compared with manual transcription.

Current Alerting Services:

A blind professional has special problems in keeping up to date in his own field. He needs a means of identifying what is relevant to him from the current literature. This problem is particularly acute for blind scientists and computer programmers.

The sighted can use the information services such as INSPEC and Psychological Abstracts to identify articles that are likely to be of interest. Since these services are computer based, it has been possible to run a pilot scheme for automatically producing selective listings, in braille, of abstracts for individual blind programmers and psychologists. This would have been uneconomic by manual transcription which would also have introduced a considerable time delay.

Printers' Tapes

The traditional composing systems involves an operator inputting the text on a special keyboard and the data is punched on wide Monotype tapes. The typing errors are corrected using a pair of tweezers to make alterations to the metal type. However there are some newer computer-based systems which incorporate interactive editing and produce a virtually error-free computer-compatible digital tape.

These tapes contain the control commands for the type-setting machine as well as the text; typically the control commands account for 20% of the data on the tape. The problem is to convert these control commands to the ones needed by the braille translation program or to modify the braille translation program to directly accept these tapes.

For straight-forward text a simple table-driven pre-processor can be written to accept tapes from a variety of printers. However there are some minor problems such as footnotes which are normally incorporated in the main text in the braille edition. Page numbers and running headings can also be handled automatically in most cases.

It is harder to recognize foreign words and phrases which, by convention, are translated into contracted braille. The major problems start when position on a printed page is used to convey part of the information e.g. in mathematics, music and tables. It would be technically feasible to automatically transcribe simple tables but complex ones will always require some formatting instructions from a human operator.

Conclusions

For simple text it has proven possible to automatically produce braille from the digital tapes used for preparing the inkprint version. However it is only now that serious attempts are being made to assemble information on sources of 'clean' text in digital form. In the next few years, as the printing industry gradually changes to computer-based composing systems, the availability of braille could be significantly increased. It is also technically feasible to eliminate multiple typing of material when inkprint, large print and braille editions are required.

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