

Production of Reading Materials for the Visually Disabled

- The Venturi Approach

J M Gill

Research Unit for the Blind, England

Summary: The use of a computer-based system means that a single text file can be used to create output in a variety of media such as grade 1 and grade 2 braille, grade 1 and grade 2 Moon, and print in a variety of sizes. The text file can be generated by a number of methods such as typists working directly to a main computer, volunteer typists working on microcomputers at home, and digital data (eg floppy disks from computer-based composing systems). The essential feature is that all input data is converted to use a common set of format commands which can be interpreted by all the output formatters (braille, Moon and print). The first printing house to adopt this approach was National Braille Press (USA), but National Library for the Blind (UK) is further developing this concept.

The visually disabled require access to written material, but there is no single medium which meets everybody's requirements. Braille, either in hardcopy or paperless form, is excellent for reference material for those who can read it. Large print is gaining in popularity but there is no optimum size for all potential users; however new technology, such as laser printers, permits the economic fast production of material in a range of type sizes with clear bold characters.

However there are a number of visually disabled whose vision is not good enough to read large print but who cannot cope with braille. The use of audio recorded material does not totally meet their needs; for instance audio tape is not an ideal medium for handling numeric information or reference material such as knitting patterns. In Britain the embossed language Moon has been used to fill some of this unmet need.

Since Moon is little used outside the UK, a brief description of the system is appropriate. The Moon code was developed by Dr William Moon in 1847. The characters are based on the sighted alphabet and are about 6 mm high; the

embossing is about 0.5 mm. Like braille there is both grade 1 and grade 2 Moon, but grade 1 is used a significant amount. The contraction system in grade 2 Moon is simpler than that in grade 2 English braille, but the rules governing word division at the end of a line are more complex. Moon is written in zig-zag fashion down the page eg the first line is written left to right and the second right to left but with the characters in the same orientation. This gives a problem in that some characters feel very different when they are read from different directions. The demand for Moon indicates that there are a significant number of visually disabled persons who want an embossed language which is simpler than braille; however it does not indicate that the design of the Moon code is optimum.

The types of reading material required include books, magazines and documents. The documents vary from items needed quickly such as bank statements to items needed for frequent reference such as telephone dialing codes; some documents are needed for a relatively short time (eg agendas of meetings). These various types of material impose very different constraints on the production systems to be utilised.

Computer-based systems were developed for braille production because of the shortage of skilled transcribers. In many cases the cost of the output was greater than by using manual transcribers. One method of reducing the cost is to use volunteers working at home on microcomputers; the data is then sent to the central production unit on digital cassette or floppy disc.

Tapes from computer-based composing systems provide an error-free method of inputting the data in machine-readable form. However the tapes require pre-processing to convert the data into a suitable format for the braille translation program. National Braille Press developed the POINTS system which is now used for about 40% of their production. The aim was to minimise the number of braille errors which had to be picked up by the proof-readers. The program identifies problem areas and marks them with a flag so that they can be quickly found by a human editor. These problem areas include acronyms, mixed numbers, italics, roman numerals, end-of-line hyphens and combinations of fullstops.

Totally automated processing is often used when the users prefer speed to complete adherence to the rules of grade 2 braille. The problems are more with formatting than with incorrect choice of contractions. Formatting problems are minimised for data which has a fixed format eg bank statements or current awareness services.

Multi-font optical character recognition is still only economically viable for producers with high labour costs. However the cost is likely to come down in the next few years, so making it more attractive for the medium sized production house.

If the data is converted to a standard format, more than one output medium can be produced from the same data file (see Fig 1). This means that there will be some format codes which are not used by some of the translation programs.

Numerous programs have been written for translating text to a good approximation to grade 2 braille; the newer programs take advantage of the new compilers and often incorporate a greater range of formatting facilities (eg roman as well as arabic page numbering in the braille output).

Moon translation is complicated by the fact that Moon is proportionally spaced and justified but not microjustified; the justification is to much closer tolerances than used in print justification software. One method of producing Moon by computer is to output to a laser printer in which the Moon typeface is stored as an additional font. The advantage of using a laser printer is the very clear dense image which can be produced. The printer only produces a print version of the Moon, so the embossing is produced using encapsulated paper (as produced by Minolta Corporation and Rikscentralen for Pedagogiska Hjalpmedel for Synskadade). Tests done by the Royal National Institute for the Blind indicate that users prefer this medium to the conventional one of embossing on paper; this is probably because the symbol definition is better with the encapsulated paper. The cost of the special paper makes this system prohibitively expensive for large quantity production; a further development may be to photoetch plastic plates to use as masters for magazine production.

The laser printer is also capable of producing high quality large print (eg 16 point Kosmos Bold) at speeds of about six pages per minute. One problem concerns formatting in that the producer has to decide whether to use the same format as for ordinary print or to optimise the layout for the partially sighted reader. For instance small centered headings can be missed by someone with a small field of view.

Braille could be produced by a similar method to the Moon but this would only be economically viable for very small quantities. With the present state of synthetic speech technology, the quality is too poor for book or magazine production. However Synskadades Riksforbund in Stockholm demonstrated the possibility of using synthetic speech for the fast production of classified advertisements where speed was more important than quality of speech.

The advantages of using computer-based production systems are increased if the data is available in computer-readable form and/or the output is required in more than one medium.

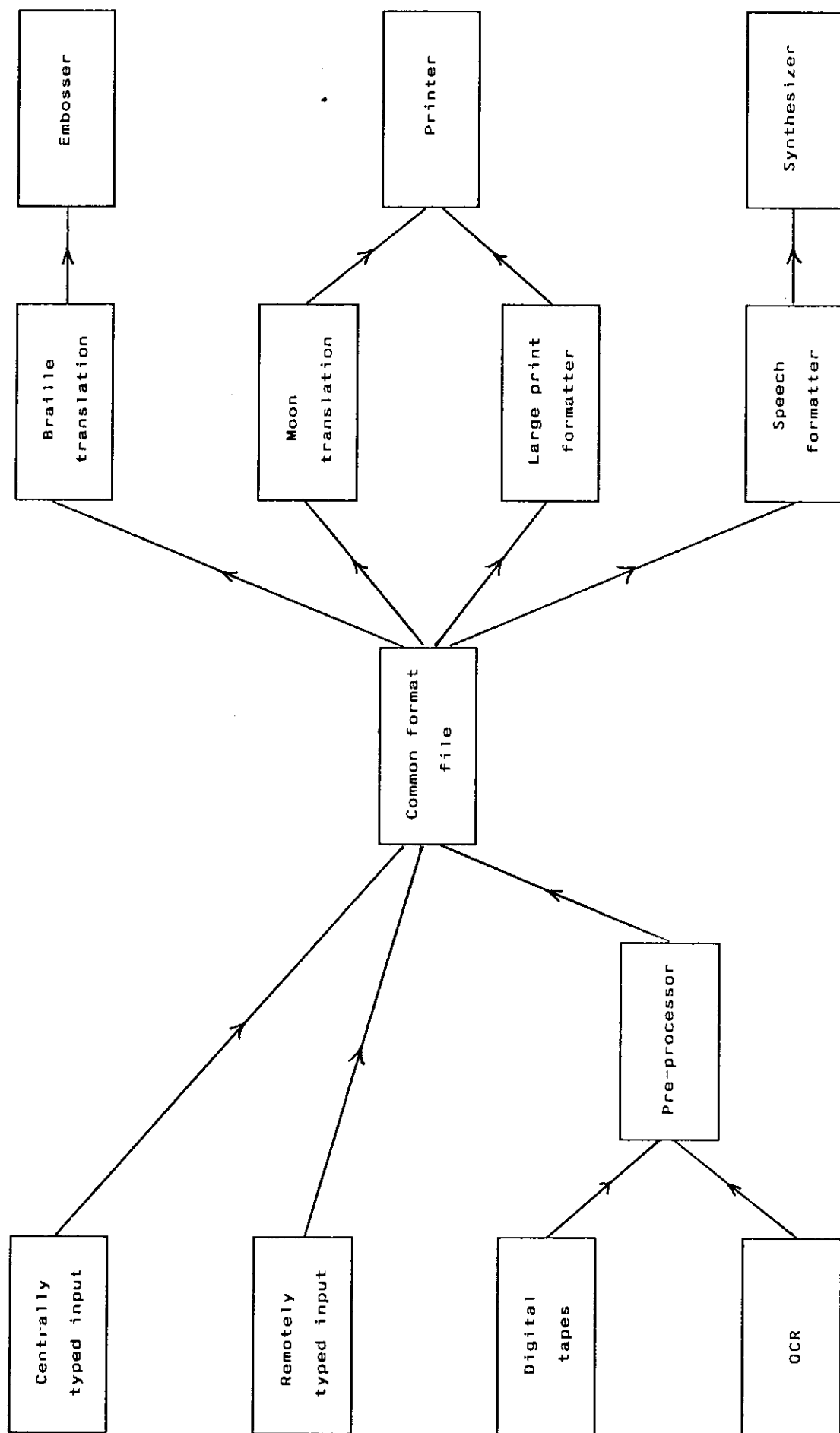


Fig 1 Flowchart for multi-media production system.