

Taking the RoboBraille Service to the Next Level

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RoboBraille is an email-based service capable of translating documents in various popular formats to and from contracted Braille, to visual Braille and to audio files. Available free of charge to all non-commercial users and with no registration requirements, the RoboBraille service attempts to solve a universal problem as it makes textual information accessible to people who would otherwise find it inaccessible due to visual impairments or reading difficulties. Originally a Danish invention, the service has been operational in Denmark since the summer of 2004. From July 2006 to December 2007, the RoboBraille service was validated in Cyprus, Ireland, Italy, Portugal and the United Kingdom with financial support from the European Commission under the eTEN programme in order to verify its technical, commercial and cultural viability. The purpose of this paper is to provide an up-to-date status of the RoboBraille service, and to set expectations for the future of the service.

Introduction

In Denmark, software to translate to and from contracted Braille in multiple languages has been available since the mid 1980s. Although the systems are fairly easy to use, fast, accurate, well-promoted by the support system and available free of charge as downloads from websites, they are not being widely used amongst teachers, Braille readers and others with a need to produce contracted Braille. Why? Traditionally, translating documents into contracted Braille is a time consuming process that requires a wide range of different skills: In addition to mastering the Braille translation software, translators must have a high level of proficiency in handling various document types, document conversion technologies, Braille devices and Braille character sets. And since Braille translation is a niche with limited resources, software is constantly being updated with software patches. For professional Braille translators, these issues may not pose a problem. However, for the occasional translator – e.g., a primary-school teacher with an integrated blind pupil or a blind Braille reader – they do.

RoboBraille was introduced by Synscenter Refsnæs as an alternative to the decentralised, user-centric Braille translation systems used widely to produce Braille at varying levels of contraction. Based on experience from developing automated Braille translation solutions during past 20 years, RoboBraille is a centralised, e-mail based translation service that automates the translation process, including any pre- or post processing steps required to convert between document types, formats and character sets. Since the RoboBraille interaction model exploits e-mail, the solution is platform-independent and the only skill needed to use the service is the ability to send and receive an email with a document attachment. The RoboBraille architecture is based on standard internet technologies and can be managed centrally. Consequently, the solution is robust, highly scalable, always up to date and can be operated by a minimum of efforts.

The general business idea of RoboBraille has been on the one side to provide a free high-quality public translation service to print impaired people, while on the other charging institutional and/or commercial users a reasonable amount for using the service. In order to be sustainable, the RoboBraille service must have a critical mass of users. As it is unlikely that a critical mass of users can be found in any single country and amongst members of the primary target audience (the visually impaired), the RoboBraille must be offered on an European or Global scale and be promoted to a wide range of user groups: Visually impaired, dyslexic, poor readers, illiterates and – potentially – the general public.

The eTEN RoboBraille Market Validation Project

In order to venture beyond the borders of Denmark, Synscenter Refsnæs approached the European Commission in 2005 with a proposal that was subsequently accepted under the eTEN pan-European market validation programme. Consequently, an eTEN RoboBraille market validation project was conducted from June 2006 until December 2007 in Cyprus, Ireland, Italy, Portugal and the United Kingdom with financial support from the European Commission.

As part of the eTEN RoboBraille market validation project, the RoboBraille services was prepared for a multinational market environment in a number of ways:

- The technical platform was scaled up from two to 10 RoboBraille agents; the current platform has a current maximal capacity of 600 requests per hour or 14,400 requests per 24-hour cycle. During the pilot tests, the architecture proved scalable and additional agents can be added to increase capacity should the need arise.
- The RoboBraille service was stress-tested with a large number (2,000+) of users, both registered pilot test users and other users with a variety of document types, document sizes and translation processes. The service proved highly stable and capable of servicing the users without undue delay.
- The RoboBraille service was adapted to English, Portuguese, Italian, Greek, French and (partially) Lithuanian, making it directly usable in a number of countries. In addition to the actual adaptation, the development team gained valuable experience in adapting the RoboBraille service to new languages, and developed a framework for doing so.
- The RoboBraille service was adapted to support Braille devices and Braille embossers used in many European countries.
- The RoboBraille partner organisation gained experience in providing end-user support in Ireland, United Kingdom, Italy, Portugal and Cyprus.
- Dissemination activities and the pilot programmes created awareness of the existence and capabilities of RoboBraille amongst potential individual and commercial users.
- The RoboBraille service was awarded the 2007 Social Contribution Award by the British Computer Society in recognition of importance of the service to the print impaired.

As part of the project, the RoboBraille service was piloted by more than 1,500 users in two pilot tests. Following each pilot, users were asked to complete questionnaires devised to collect quantitative ratings as well as qualitative information. In terms of quantitative information, the studies were designed to measure the following indicators on a scale of 1-5 (5 being best):

- Overall satisfaction with the service
- Quality of the service
- Accuracy of the service
- Relevance of the service

In terms of qualitative information, the studies were designed to capture information within the following areas:

- Concerns with the service (e.g., privacy, confidentiality, Intellectual Property Rights (IPR))
- Suggestions, recommendations and ideas for improvements

Based partially on user suggestions from the first pilot, the service was improved slightly between the two pilots. The numeric ratings confirmed the user satisfaction with the RoboBraille service; they furthermore proved beyond doubt that the RoboBraille service is relevant, easy to use and of high quality.

The table below summarises the numeric ratings of the questionnaire surveys following both pilots:

	Overall satisfaction	Support	Accuracy	Ease of understanding	Ease of use	Relevance	Quality	Appreciation of improvements
Pilot 1	3,8	4,2	3,9	4,4	4,4	4,0	4,1	N/A
Pilot 2	3.9	4.2	4.1	4.3	4.6	4.3	4.3	4.3

As can be seen from the table above, users have rated the service higher in all but one category in the second pilot compared to the first pilot. Only in terms of Easiness of understanding the concept of the service has the rating dropped from 4.4 to 4.3,

which can be considered insignificant. On rating the appreciation of the improvements introduced between the two pilots, these reach an approval rate of 4.3.

In addition to the numeric ratings, users provided a host of important information on suggested improvements and perceived concerns of the service. Whereas the suggested improvements mainly included suggestions for functional improvements, the perceived concerns concerned privacy and copyright issues.

RoboBraille – The Next Steps

From a technical, support and marketing point of view, RoboBraille is now running as a fully supported service in Cyprus, Denmark, Ireland, Italy, Portugal and the United Kingdom. Furthermore, the RoboBraille Consortium is well-prepared to enter other European countries such as Greece (existing Cypriot solution can be reused), Lithuania (advanced contacts have been made and a speech synthesiser already donated and integrated) and France (advanced contacts have been made, a speech synthesiser has been donated and integrated, and assistance with the French Braille adaptation has been agreed).

Likewise, the RoboBraille Consortium is prepared to offer the service to speakers of English (e.g., Australian, the US, Canada, New Zealand) and Portuguese (e.g., Brazil, Mozambique, Angola). Finally, with assistance from the World Health Organisation and the International Telecommunications Union, the RoboBraille Consortium has made contact to a number of interested parties through the Arab world, adding the illiterate to the target audience.

In the spring of 2008, the RoboBraille service is expected to be granted a multi-year subsidy on an amendment to the Danish State Budget ^[1] allocated to support social purposes. These funds are expected to be used to finance the ongoing operation of the service, for dissemination, and to improve the services currently offered by RoboBraille. In terms of functional improvements, these are expected to include the following:

- Adding formatting capabilities to the RoboBraille service, enabling the service to adequately format Braille output prior to rendition on Braille embossers.
- Adding support for new document formats including docx (new Microsoft Word format), ODF and OpenXML. RoboBraille currently supports Microsoft Word, RTF, HTML, XML and text documents.
- Adding full support for multi-byte Unicode documents, paving the way for support for multi-byte languages such as Russian, Chinese and Hindi.
- Complementing the current email-based interaction model with an interface based on web-services, thus enabling institutional users (e.g., public sector institutions, banks, pension companies, utilities) to exploit RoboBraille themselves in order to provide documents in alternative formats for the benefit of print-impaired citizens.
- Adding Braille and speech support for a range of popular foreign languages including German, French, Spanish and Russian, thus enabling print impaired Danish foreign-language students (and foreign-language students from elsewhere) the ability to access Braille and speech material in these languages.

The RoboBraille service is furthermore expecting one-off financial support from the Danish Ministry of Education in order to develop the service to better support the dyslexic and people with poor reading skills. In addition to dissemination, this funding will be used for the following functional improvements:

- Adding support for the creation of structured talking books in the standardised DAISY format.
- Adding support for complex document formats such as Adobe PDF
- Adding support for scanned images such in formats such as GIF and TIFF

Finally, Synscenter Refsnæs has received a private grant that will enable it to add support for Arabic speech to RoboBraille, and is in negotiations with a private foundation in order to secure funding for support for several Eastern European languages.

[1]

Satspuljen