

AutoBraille – a single-source Braille publishing solution based on DAISY

Originally a joint development project by the Danish Library for the Blind, The National Centre for Visually Impaired Children and Youth and Sensus, AutoBraille is a single-source Braille publishing solution based on DAISY XML files. AutoBraille exploits the multi-lingual SB4 Braille translation library also used by the RoboBraille service to produce contracted and uncontracted Braille. In addition, AutoBraille features hyphenation, pagination, formatting and volume management allowing publishers of Braille material to use or reuse documents in the DAISY Talking Book format to be automatically translated into Braille, formatted according to national Braille publishing guidelines and rendered electronically or on a variety of Braille embossers. AutoBraille can be used as the foundation for on-demand Braille production or as the backbone of traditional Braille production.



Traditionally, Braille production is a costly and complicated process requiring highly skilled staff to prepare, layout, translate, convert and emboss material. The sup-

porting technologies are often outdated and standards defining how to layout a text are non-existing. In many cases, Braille production is an entirely separate activity from producing accessible material in other alternative formats such as DAISY structured talking books or large print. As a result, Braille-output is limited and much delayed compared to printed titles.

AutoBraille challenges the traditional approach of Braille production. Using the DAISY Talking Book format published by the DAISY Consortium (www.daisy.org) as the foundation, many if not all of the tasks associated with Braille production can be automated. Similarly, source files for producing accessible material in various alternative formats can be shared and quality issues resolved at the source. The solution can be used to automate the traditional Braille production or it can be the foundation for a user-driven, on-demand Braille production service.

Based on more than 20 years experience with automated Braille production, the overall aim of AutoBraille is to increase capacity, reduce cost and improve quality when producing Braille on paper.

An AutoBraille Project

Adapting AutoBraille to a new language and/or Braille publisher involves the following key activities:

- An exploratory study aimed at scoping fundamental aspects of the project (Braille contraction levels, Braille formats, Braille character sets, document types, current tagging practices, production environments) as well as setting the expectations for the project (level of ambition, project phases, time frames).
- Development of a Braille style guide defining how each of the tag elements (e.g., headings, lists, tables) in the DAISY specification is to be interpreted by AutoBraille.
- Adaptation of language specific Braille translation components in the SB4 Braille translation library (text → contracted and/or uncontracted Braille, contracted Braille → text, Braille hyphenation).
- Adaptation of AutoBraille to the local Braille production environment, including development of project-specific functions (e.g., preview functions, spell-checking).
- Implementation of AutoBraille in the local Braille production environment, including definition of production workflows and staff training.

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- Pilot test amongst selected users prior to production.

An AutoBraille project can typically be completed within 9-12 months.

Braille Translation

The SB4 Braille translation library supports translation to and from Braille at various contraction levels. Furthermore, SB4 supports both 6-dot and 8-dot Braille. Using a combination of rules and exceptions, the accuracy of SB4 is exceeding 99%.

As some tag elements influence the Braille translation, SB4 provides support for processing of a range of tags and tag attributes including the following:

- <abbr> for handling abbreviations.
- <acronym> for handling acronyms.
- for handling emphasis.
- for handling string emphasis.
- for handling roman numerals.

In addition, the lang/xml:lang attribute is supported to handle changes in the natural language throughout a document.

Sensus provides the tools and methodology for implementing new languages in SB4.

Formatting Regimes

Formatting rules for printed Braille material differ between countries and Braille producers. In many cases, these Braille rules are based on tradition rather than on agreed standards. The AutoBraille formatting methodology is based on the tag elements included in the DAISY specifications (major structural elements, block elements, inline elements, tables, meta data) and allows for variants as well as for varying levels of rigidity (loose, rigid).

Hyphenation

To allow for the most efficient use of paper, contracted Braille must be hyphenated prior to formatting and rendering.

The SB4 Braille translation library includes a hyphenation module for contracted and uncon-

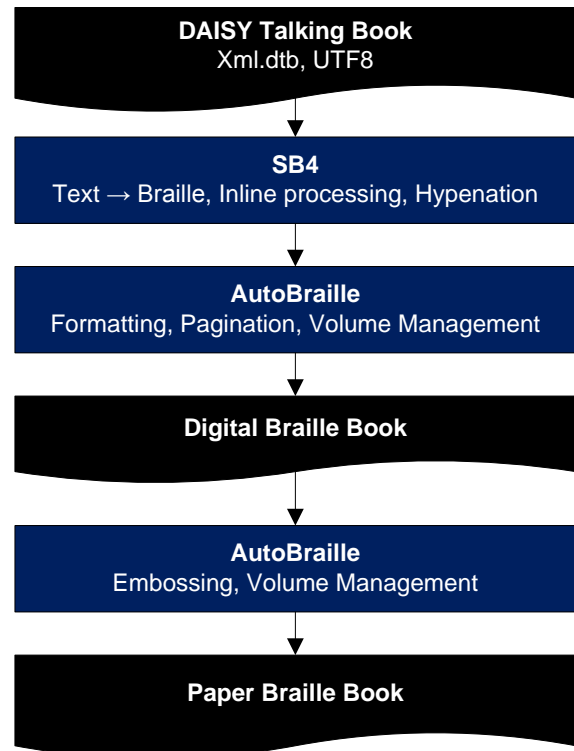
tracted Braille as well as for standard text. Whereas hyphenation patterns for contracted Braille need to be developed for new languages, such patterns exist in many languages for uncontracted Braille and standard text.

In addition to the hyphenation module of SB4, Sensus provides the tools and methodology for developing hyphenation patterns for contracted Braille.

Pagination and Volume Management

Keeping track of two sets of page numbers in a Braille publication can be tricky, yet of crucial importance when producing text books and other material shared by the blind and the sighted. AutoBraille includes the option of pagination, marking print and Braille page numbers. AutoBraille is furthermore capable of managing page numbers written as roman numerals.

As Braille material usually spans several volumes, AutoBraille also includes layout capabilities for multi-volume productions, including volume breakpoints, volume page layout and volume cover page production.



Character Sets and Export Filters

AutoBraille is based on the Unicode UTF8 character set.

As the Braille character sets differ widely amongst Braille embossers, AutoBraille includes export filters to map the resulting Braille documents to the character set of a particular Braille embosser or Braille device.

Sensus provides the tools and methodology for developing new export filters.

User Control, User Improvements

AutoBraille can be used as the foundation for on-demand production of Braille material. In a fully-automated scenario, the user may select a title from an electronic library and order a Braille rendition according to personal preferences. Such preferences may include the Braille format (6-dot or 8-dot), contraction level (e.g., Grade 1 or Grade 2), pagination (on/off setting of print and Braille page numbers) and formatting rigidity (loose or rigid). The user may also specify the paper size in terms of lines per page and characters per line as well as the Braille character set of the target Braille device or embosser. The Braille document is then produced and shipped according to specification.

Typos, tagging errors and incorrect contractions can later be reported by the user to the Braille producer responsible for the AutoBraille service. Typos and tagging errors are corrected in the DAISY source file whereas the contraction errors are resolved by adding to the exception lists of SB4. As the quality of the system as well as the correctness of the source files continues to increase, subsequent users will benefit from these improvements.

RoboBraille and AutoBraille

RoboBraille and AutoBraille share the same Braille translation engine, SB4. Although the two solutions benefit from each other in terms of reuse of functionality and competencies, they are entirely independent. The award-winning RoboBraille service is available in Danish, English, Italian, Portuguese, Greek, French and Lithuanian.

RoboBraille is an email-based service capable of translating electronic documents into either synthetic speech or contracted Braille. The service is available free of charge to all non-commercial users, and users do not need to register before using it.

RoboBraille attempts to solve a universal problem – making otherwise inaccessible electronic documents accessible to people with visual or reading impairments.

Originally a Danish service, RoboBraille has been validated in Ireland, Cyprus, Italy, Portugal and Great Britain with financial support from the European Commission. Currently, RoboBraille receives financial support from the Danish Government and

A positive side-effect of adapting SB4 for a new language as part of an AutoBraille project is that the new language can be easily added to the RoboBraille service.

Terms of Use

The AutoBraille software suite is released as open source under the GNU Lesser General Public License (LGPL) license and is available free of charge.

The SB4 Braille translation library is the property of Sensus ApS and available to commercial users subject to a commercial license agreement.

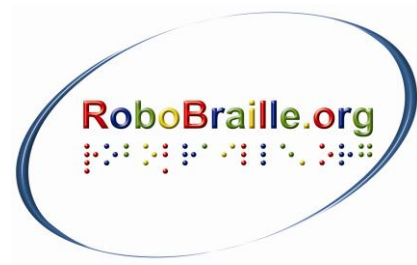
In an AutoBraille project, all software is typically made available free of charge. Hence, the only costs are those associated with developing and adapting the solution.

About Sensus

Sensus is a research-based consultancy organisation specialising in accessibility, inclusion, information technology and disability. Founded in 1987, Sensus has more than 20 years experience in automated Braille translation and production of material in alternative formats. Sensus' core values are professionalism, independence and unpretentiousness.

Based on experience from international AutoBraille and RoboBraille projects, Sensus works with clients worldwide as facilitators, project

managers, system integrators and trainers to deliver projects on time and within budget.



Contact

Sensus ApS
Torvet 3-5
DK-3400 Hillerød
Denmark

Telephone: +45 48 22 10 03
E-mail: sensus@sensus.dk
Web: www.sensus.dk

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