The SignNet Project: IT Tools for the Written Deaf Culture

Antônio Carlos da Rocha Costa
Escola de Informática
Universidade Católica de Pelotas
rocha@atlas.ucpel.tche.br

Abstract

This paper gives an overview of the SignNet Project. It presents the ideas underlying the Project and gives an overview of the results that were achieved. A bibliography and a siteography, related to the Project, are also included.

1 Introduction

This paper summarizes the final report of the SignNet Project (CNPq/ProTeM, Edital de Informática na Educação, 1999-2001) in joint cooperation between UCPel, PUCRS and ULBRA.

Section 2 gives the background ideas and the general approach towards deaf languages and deaf culture, the first main concern of the Project. Section 3 presents the SignWriting system, the writing system for sign languages that was adopted in the Project. Section 4 gives an overview of Information Technology tools for deaf sign languages, the second main concern of the Project. Sections 5 and 6 present the Project's original goals and its main results. The Conclusion, in section 7, gives a final balance of the Projects achievements. Sections 8 and 9 give a bibliography and a siteography, including both general items and items produced by the Project.

2 Deaf languages and Deaf culture

Deafness is a functional impairment of the body that forces a cognitive detour for the mind. Deafness blocks sounds and with them, the oral communication. Minds of deaf people are forced to seek alternative means to put their communication functions to work. Historically, sign languages are the means that deaf people have found for performing communication functions.

Oral languages are "space-less", in the sense that space plays no role in the constitution of their words and phrases. Moreover, space plays no role in the use of oral languages: time is the essential context that is required for sounds to be organized and transmitted.

Sign languages are space-bound, in the sense that space elements (points, lines, planes, volumes) and space dependent elements (displacements, speed, directions, etc.) are incorporated into the structures of signs and sign phrases, so that they can't be organized and produced out of space.

Those features don't imply just a material difference between the physical contexts for those two kinds of languages, and for the modalities of their generation and perception (oral and auditory *versus* visual and gestural). They imply also an epistemological difference between the ways knowledge may be represented in the words and phrases of the language,

and different cognitive strategies for people to organize knowledge that is to be communicated.

Children develop their cognitive structures while there are growing, and language plays a crucial role in such development. In a way, language shapes those structures. Language acquisition by deaf children should, thus, be carried on with a language that is natural for their physical communication abilities – that is, a sign language – and not with an oral language, as is still today widely supported by the so-called "oralist" approach to deaf children education. Moreover, given the importance of written language for the cultural skills of the individual, alphabetization of deaf children should also be carried on using sign languages.

The latter, however, is a truly problematic point. Even those that take the sign language based approach to deaf children education often miss the point. The problem is that, historically, there has been no spontaneous development of any written form for sign languages. Deaf people, for one reason or another, stayed satisfied with sign languages being only a language for face-to-face communication. They made no historically noticed effort to develop written forms for sign languages.

The consequence is that deaf culture – the sum total of deaf people languages, experiences and history – remained essentially an "oral" culture, in the sense of a culture that is transmitted from generation to generation by face-to-face communication. There are no written records of deaf people testimonies, diaries, reports, tales, jokes, or any other form of writing efforts to record deaf living experience, which have been made by any deaf people by writing in his own language.

Even worst, lacking a writing system for their natural language, deaf people can't communicate between each other in their own language except face-to-face. They can't leave messages, write letters, take class notes, read books and journals, send email, build webpages, caption movies, etc., in sign languages. They can't even write love letters in sign languages.

All that has to be done in the foreign language of the hearing society in which they leave. Historically, deaf cultures have remained oral cultures embedded – most often encrusted – in their surrounding hearing societies.

The social consequence for deaf people should be evident, as soon as one thinks of the role writing systems had in the development of human culture. And, for deaf individuals, the consequence should also be evident, as soon as one thinks of the role written language has on furthering the cultural development of hearing young adults.

The two main concerns of the SignNet Project, whose preliminary results we describe in this paper, are the lack of a widely accepted writing system for deaf sign languages, and the problem of how Information Technology – specially the Internet - can support and help to spread written forms for those languages.

3 The SignWriting system and the MovementWriting approach to sign languages

Valerie Sutton was a dancer and choreographer when she first developed the DanceWriting system, for choreographing classical ballet and jazz dances, around 1973.

DanceWriting is a visual language for representing dance movements of both individual and group dancers. There are symbols for body parts and their various positions (displacements, rotations, turns, contacts, etc.). Dances are represented as sequences of

frames, as in animated movies, with transitions between body positions – due to movements of body parts – encoded by movement symbols.

The development of DanceWriting and its successful application to ballet and modern dance styles, and the fruitfulness of the approach underlying the system – writing movements visually – lead Valerie to extend it to other kinds of movement writing, like sports, mimics and physiotherapy. The general approach was called MovementWriting and its *motto*: write what you see, not what the mover intends to say or transmit.

The approach fitted like a glove to sign languages. SignWriting is the name Valerie's MovementWriting system was given, when it was specialized to writing deaf sign languages, around 1985.

Since then, the SignWriting system was progressively refined and enriched with elements that allows it to be applied to any deaf sign language, in a purely "syntactic" way: signs are represented for the movements and body positions they encompass, not for the meanings they may have, which is exactly the way alphabetic systems represent oral languages (for the sounds they encompass, not for the meanings the sounds convey).

Moreover, the system was developed caring that the writer and the reader should have just a minimal training in order to use it, so it could be really used in everyday life by common people.

This is to be contrasted with several other notation systems developed as technical tools for linguists, for their analytical work on sign languages. Systems like HamNoSys or the Stokoe system are well suited for that end, but require a more extensive training, are less intuitive in their encoding, and so less adequate for common people to use in daily life, then the SignWriting system.

Since it was first made available on the Web, in 1995, the SignWriting system has been steadily growing in popularity, and increasingly being used all around the world. The researchers of the SignNet Project were among the first who were strongly influenced by the system's presence on the Internet. Since then they have continuously worked with SignWriting, to teach deaf people about writing sign languages and taking it as the central concern of their technical work on Information Technology tools for the Deaf.

4 IT Tools for writing sign languages

Many IT tools were developed to help linguists in their analytical work on sign languages. For the most part, such tools are annotation helpers, that help linguists make annotations on features of signs and sign phrases, as they are observed or registered on videotapes. Also multimedia database systems were developed, with the same purpose on mind. Electronic dictionaries, for teaching sign languages, are also very common.

However, in the case of SignWriting - the main practical writing system for sign languages - only one piece of software was ever put into effective use, namely, the SignWriter editor, that Richard Gleaves developed around 1995.

It's a most useful text editor and dictionary-building tool, for IBM-PC compatible computers, extremely well engineered and widely distributed (as usual, the fact that it is a DOS-based system divides people into those that like its keyboard driven way of operation and those that don't like it).

Anyway, the fact is that other IT tools are necessary, if sign languages are to be really used in the various settings of contemporary life: education, business, leisure, personal relationships, etc.

For instance, urgent need exist for:

- ß Criteria for the correct use of sign languages in the interface of computer systems and programs;
- ß Sign language processing systems, like interpreters and translators;
- ß Electronic sign language dictionaries, based on written signs, not pictures or movies;
- ß Windows-based text editors, for those that prefer mouse-driven computer operation;
- ß Handwriting recognition of signs, for use in palmtop computers and for faster input of sign language documents;
- ß Chat systems and electronic mailing systems in sign languages, for sign language conversation over the Internet;
- ß Sign language-oriented webpage editors, for including sign language texts (not pictures, nor movies, nor drawings, nor GIF pictures of SignWriting texts - as it is usual now a days) in webpages;
- ß Movie captioning in sign languages;
- ß Sign language animation of written texts, i.e., text-to-animation programs for sign languages, as the text-to-speech programs for oral languages.

5 Goals of the SignNet Project

The SignNet Project was launched with a wide spectrum of general goals, covering:

- ß The development of software systems and tools to help writing sign languages and to support sign languages on the Web;
- ß The promotion of the SignWriting system in the Deaf communities of the places where the Project was going on;
- ß The integration of deaf students and sign language interpreters in the team, so the sign language texts produced in the Project would be produced by native signers;
- ß Experimenting with written sign languages in real life situations, so both deaf people could feel the real usefulness of the system and the researchers could assess real needs of real users, concerning the tools the Project was developing;
- ß Analyzing the way sign languages convey procedural knowledge, to investigate the way algorithms are/can be expressed in sign languages.

6 Results from the SignNet Project

The mix of goals initially adopted for the SignNet Project was possible due to the diversity the Project's original team, including both Computer Science researchers, Sign Language linguists and Deaf educators.

However, the Project's original team was soon dissolved, in all cases for private reasons, all of them connected to changes in employments and institutional liaisons. The team that remained happened to have a strong Computer and Information Science profile, so the Project naturally leaned towards the more technological goals.

Fortunately, such goals were, in fact, the main goals of the original Project proposal, so the Project was able to reach its end satisfying the most important part of its initial aim.

Specifially, the following results were achieved:

- SW-Edit: a new multi-platform, mouse-driven, text editor for sign language texts written in the SignWriting system;
- SWML: an XML-based language, for the interoperability of SignWriting aware systems;
- SW-WebMail: a webmail system allowing electronic mailing of messages written in sign languages, based on VML and Dynamic HTML;
- sw.ocx: an ActiveX component, allowing the rendering of SignWriting signs in HTML webpages;
- SignEd: an editor for sign written in the SignWriting system, mainly used in the SignTalk and SignSim systems;
- SignTalk: a chat system allowing conversations in both sign languages and oral languages;
- SignSim: a semi-automated sign-to-glosses translator;
- SW-Captioner: a tool to produce sign language caption for web movies, using the SAMI technology;
- First version of a method to index and retrieve sign language documents in document database systems;
- SW-Dic: an online dictionary system, allowing word translations between sign languages and between sign languages and oral languages, using the retrieval method mentioned above;
- First steps of a compilation procedure to allow the use of SignWriting as a programming language for sign language animations;
- Translation, from English/ASL to Portuguese/LIBRAS, of the book “Lessons in SignWriting”, by Valerie Sutton, the main source about the SignWriting system;
- First version of a “LIBRAS-PORTUGUESE-LIBRAS” dictionary, with signs ordered lexicographically according to an extension of the lexicographical order originally defined in the SignWriting system;
- Many didactic stuff, at the school level, to exercise the reading of sign language texts;
- Strengthening of the connections between the Project team and the international SignWriting community;
- The SignWriting Journal: an electronic journal, created and hosted at UCPel, with an editorial board composed of several representative members of the international SignWriting community;
- Training of some 20 deaf students and sign language interpreters at the level of instructors for the SignWriting system, allowing them to effectively disseminate written sign language in the Deaf community;
- Many courses on the SignWriting system, to the Deaf communities of the places where the Project is active, as well as in many other cities and states in Brazil

7 Conclusion

As the results mentioned above show clearly, the SignNet Project ended by taking a strong technological route, leaving aside many of the more scientific and educational problems that were among its initial goals.

On hindsight, it looks that the way followed by the Project was, in fact, the correct one, for it lead the Project to help satisfy many needs: IT tools for the effective use of written deaf sign languages; more extensive appropriation of IT tools, by Deaf people, in their own languages; and the spreading of the writing system for sign languages in Deaf communities, so they can push they culture from the "oral" stage in which it has historically been kept, to the level of a written culture, with all the benefits that can be drawn from such transition.

In that sense, the SignNet Project has been very successful.

8 Bibliography

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9 Siteography

A. SignWriting sites

`http://www.signwriting.org`
: the site of the SignWriting system

`http://www.dancewriting.org`
: the site of the DanceWriting system

B. SignNet Project sites

`http://swml.ucpel.tche.br`
: the site of the SWML language

`http://sw-journal.ucpel.tche.br`
: the site of The SignWriting Journal

`http://sign-net.ucpel.tche.br`
: the site of the SignNet Project

`http://atlas.ucpel.tche.br/~fabinha`
: homepage of handwriting recognition of sign language texts

`http://atlas.ucpel.tche.br/~rubiad/relat.htm`
: homepage of the SignWriting as a sign animation specification language

`http://www.angelfire.com/pq/interpreteLS`
: homepage of the Brazilian sign language interpreters

`http://sign-net.ucpel.tche.br/els`
: homepage of an introductory course on SignWriting, in Portuguese and LIBRAS

`http://sign-net.ucpel.tche.br/legendas`
: homepage of the SW-Captioner

`http://pandeiro.ucpel.tche.br/php/index.php`
: homepage of the on-line "LIBRAS-ASL-Português-Inglês" dictionary