
The Klagenfurt lexicon database for sign languages as a web application: LedaSila, a free sign language database for international use

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The Klagenfurt online database for sign languages 'LedaSila' (Lexical Database for Sign Languages, <http://ledasila.uni-klu.ac.at/>) is designed in such a way that it is possible to present all the information which can be found in any good monolingual or bilingual (printed) dictionary. It offers the possibility to enter semantic, pragmatic as well as morphosyntactic information. Furthermore, a detailed analysis of the non-manual and manual parameters of a sign is possible. LedaSila offers the possibility to search for any information already contained in it (including single signs or formational parameters), to document a sign language, or analyse it linguistically. The search function is accessible to all internet users. When using the database for sign language documentation and/or analyses, an authorisation from the Centre for Sign Language and Deaf Communication in Klagenfurt is required.

When using LedaSila for documentation and/or analysis of a sign, a user does not have to follow a specific order when entering the data. Furthermore, the user is free to decide whether to enter data only in one field (e.g. semantics or region) or to do a full analysis of the sign. A special feature of LedaSila is the possibility to add new categories and values at any time. This is especially important for an analysis tool which is designed to be used internationally. This feature ensures that all categories and values needed for a specific sign language are available.

LedaSila can be used free of charge for non-commercial deaf and scientific issues. The database is hosted on a server of the University of Klagenfurt. All information (including videos) is stored directly on the web server. This means that using LedaSila comes with zero administration. The international sign language linguistic community is invited to use this easily manageable database.

1. Introduction

A description of the original database on the basis of which the current version was developed can be found in Krammer et al. (2001). From the point of view of the Centre for Sign Language and Deaf Communication (Zentrum für Gebärdensprache und Hörbehindertenkommunikation, ZGH), it was imperative to provide a sign language database which offers free access. With the Klagenfurt database 'LedaSila' (<http://ledasila.uni-klu.ac.at/>), there is now a free tool available for all sign language analysts as well as other interested parties.

2. Technical aspects

LedaSila is implemented as a pure web application which can be accessed via <http://ledasila.uni-klu.ac.at/>. This means that no installation is necessary on the client server; the application can be fully operated on the web browser. The website was programmed in ASP (Active Server Pages). This is a Microsoft technology which enables the programming of dynamic web pages. Server related applications which are needed for automatic notifications have been programmed in Microsoft .NET 2003 (Visual Basic). The system is hosted on a Windows 2003 server of the University of Klagenfurt. All information (including videos) is stored directly on the web server.

2.1. Hardware

For users who will administrate LedaSila – and will thus use the web framework – a computer with a central memory of 256 MB is recommended. The website and additional applications have been developed for a resolution of 1024 x 768 pixels. As for the Internet connection, it is recommended that users who will administrate the application have a broadband connection.

2.2. Software

The design of the database has been optimised for Internet Explorer 5.5 and higher. This browser is recommended for an optimal use of the search function – for the entering of data it is even a requirement. LedaSila uses the Apple QuickTime® video format (.mov) as this seems to provide the best quality compared to size. Although other video formats would be possible, QuickTime videos can be displayed directly within the web page. For other video types, the corresponding player needs to be installed on the accessing clients.

2.3. Multi-language feature

LedaSila is a multi-language application. At the moment, it is possible to switch between the languages German and English. When LedaSila is used in projects in other countries, new languages can be added rather easily. Either a complete translation can be done, or it is also possible to translate only the categories and values and leave labels and application messages in English. This dramatically diminishes the necessary efforts for including a new language into the system and might be sufficient for the use in academic environments, in which English user interfaces should not be a problem.

2.4. Openness of the set of categories

The descriptive values of a sign are not hard coded, and can thus be expanded with new items at any time. New descriptive values can be directly entered in the application by using the web interface, without changing the program. At the moment, new categories and values can only be added or removed by the administrator. The administrator function is performed by a collaborator of the ZGH.

3. Practical Use of LedaSila

In brief, the database consists of two areas which will be described here: a general search function which does not require any registration (i.e. accessible to all Internet users) and a 'restricted analysis area' which requires a log-in. Before choosing one of these functions, a user can select the application languages (at the moment German and English) by clicking on the respective flag icon (cf. Figure 1).



Figure 1. Welcome screen of LedaSila

All help texts in the database are currently available in German and English as well as in Austrian Sign Language (Österreichische Gebärdensprache, ÖGS) and International Sign (IS).

3.1. Search function

The users may search for signs in the database in three different ways: simple search, advanced search or via the number of the sign.

3.1.1. Simple search and advanced search

Clicking on the button 'Search' will lead to the 'Simple search' page. In this search mask, the users may choose between six search options. If a user should need more search criteria than are offered by the simple search, they have to click on the button 'advanced' which leads to the 'advanced search'. On this page, search criteria may be selected and combined in a user-defined way, by clicking on 'add filter' (cf. Figure 2). For each category, the users may choose which values should correspond (=) or not correspond (<>) to it. Additionally, it is possible to combine the search criteria with 'and' or 'or', according to the rule 'and' comes before 'or'.

The screenshot shows the 'Advanced search' page of the 'Leda Sila' database. The page has a blue header with the logo and title. On the left, there is a sidebar with 'Home', 'Search', and 'Login' options. The main content area is titled 'Advanced search:' and contains a table of search criteria. The table has five rows of criteria, each with a logical operator, a category, a comparison operator, and a value. The criteria are: Semantics (Abend), Region (Osterreich - ÖGS), NM components / Facial expression (Augenbrauen hoch), Type (symmetric), and Morphosyntax (Noun). Each criterion has a 'delete filter' button. A 'search' button is located at the bottom of the criteria table.

Operator	Category	Comparison	Value	Action
	Semantics	=	Abend	
and	Region	=	Osterreich - ÖGS	delete filter
and	NM components / Facial expression	=	Augenbrauen hoch	delete filter
and	Type	=	symmetric	delete filter
and	Morphosyntax	=	Noun	delete filter

add filter

search

Figure 2. Advanced search

After the selection of categories and values, the search will be started by clicking on the button 'search'. For both, simple and advanced search, the results are displayed as a list.

3.1.2. Entering the sign number

Each sign is automatically assigned an unambiguous number. This number allows direct access to the sign. For this, the number has to be entered into the input field 'Sign #' (cf. Figure 2), followed by the enter key. The sign will be immediately displayed in a detailed view. Given that the user has the necessary authorisation, it can also be edited. This kind of search is of special advantage for analysts, because this ensures quick access to a sign.

3.2. Input area

In order to be able to work in the input area, the users will need an authorisation assigned by the ZGH. Together with this authorisation, the users will be given a 'role' and the respective rights. In special cases, it is also possible to assign rights which are not originally defined for the role of a user.

3.2.1. General guidelines

After entering their user names and passwords, the users can access the input area for a sign analysis.

3.2.1.1. Elements of navigation in the input windows

There are two different kinds of input windows: the general presentation of a sign (cf. Figure 3), which is opened by clicking on the button 'New Sign' and the specific analysis masks. Hyperlinks lead to these specific analysis masks (cf. Figure 3). By clicking on a link (e.g. Edit Semantics), the respective analysis mask is opened.

The screenshot shows the 'Leda Sila' web interface for 'Sign # 10140'. The header includes the site name and logo, and the title 'Sign # 10140'. The main content area is divided into several sections:

- Sign # 10140**: Edit videos, 5 Links, Print page, Delete sign
- Type of sign:** symmetric
- Signer:** Romeo Seifert
- Region:** Wien
- Comment:**
- Semantics:** der Abend
- Pragmatics:**
- Morphosyntax:** Nomen/Hauptwort
- Semantic field:** Time
- Non manual components:**
- Mouthing:** abend
- Phases:**
 - Phase 1: (Hold)**
 - Hand shape: Five finger hand; Thumb extended
 - Place of articulation: head [in front of]
 - Palm orientation: away from the body
 - Phase 2: (Movement)**
 - Type of movement: arched
 - Direction of movement: downward
 - Plane of movement: frontal (vertical/parallel to the width of the body)
 - Symmetry: symmetric/parallel/mirrored

Navigation links include 'Edit sign information', 'Copy sign', 'Edit semantics', 'Edit pragmatics', 'Edit morphosyntax', 'Edit semantic field', 'Edit', 'Copy phases from sign', 'Edit phase 1', 'delete phase 1', 'add new phase before phase 0', 'Edit phase 2', 'delete phase 2', and 'add new phase before phase 0'.

Figure 3. General presentation of a sign

3.2.1.2. Entering a new sign

There are two ways to enter a new sign: either new data may be entered, or an already analysed sign may be copied with the link 'Copy sign', thereby getting a new sign number. The user may then edit the data for a new sign (using the copy) without changing the entries of the original sign.

3.2.1.3. Entering the data

When entering the data, the user does not have to keep to a certain order. There is also no obligation to fill in a fixed number of entries. Both a single entry and a full analysis are possible. This flexibility allows a quick input of signs into the database where they can be called up again via their number and edited. Through the possibility of a minimal entry, the database can be used either as a simple word list or for a complex scientific description.

3.2.1.4. Adding new categories and values

It is a special feature of this database that new categories and values may be added at any time. This is especially important for a database intended for international sign analysis. It is possible that the existing categories/values are sufficient for the analysis of Austrian Sign Language (ÖGS), but not for a detailed analysis of other sign languages. If a new category or value is needed, the administrator must be contacted by the analyst (cf. also 2.4.).

3.2.2. Sign analysis

The general presentation of a sign is opened by the button ‘New Sign’. This mask is divided into several areas where data may be entered (cf. Figure 3). The following description adheres to this division.

3.2.2.1. Video upload and linking signs

Videos may be uploaded for the areas ‘Sign’, ‘Semantics’, ‘Pragmatics’ and ‘Morphosyntax’. A click on ‘Edit videos’ will open a new window, in which the video file can be selected. Videos are directly uploaded to the web server. Subsequent access to uploaded videos is only available via the application. LedaSila is programmed to store the videos in a way to avoid inconsistencies which might occur when linking videos to different signs.

If a sign has one or more variants, these can be linked to each other, so that their semantic relationship can be displayed. Links can be created by using the hyperlink ‘Links’.

3.2.2.2. Sign information

In order to be able to enter something into this area, the analyst has to click on ‘Edit sign information’, thereby opening the respective selection window. Here, the user may enter general information about a sign: type of sign (one handed, symmetric, asymmetric, and combined), person (name of the signer) and region in which the sign is used. Where necessary, a comment can be added.

3.2.2.3. Semantic and pragmatic information

In the area ‘Semantics’, the meaning of a sign is entered. If a direct translation into the respective spoken language is impossible, the meaning can be described in the field ‘Paraphrase’. In addition, information about ‘Connotative meaning’, ‘Etymology’ and ‘Language change’ may be given. It is important to enter the respective meaning of a sign into the field ‘Semantics’. The search function of the database is designed in a way that the entries in this field are searched for matches with the search word. All other related entries may be filled in later at any time.

The input field for pragmatic entries is similarly designed as the one for semantic information. It only differs in the labels for the entries. Data can be entered for ‘Usage’, ‘Collocation’, ‘Phrase’ and ‘Idiom’.

3.2.2.4. Morphosyntactic information

The morphosyntactic categories are displayed by means of a tree structure. In this way, the syntactic categories can be clearly presented and the structure facilitates the selection by the user. Since signs can often be assigned to more than one word class (e.g. noun and verb), it is necessary that this can also be recorded in the analysis. For this reason, the user has the possibility to select several syntactic categories and transfer them to the general presentation of the sign.

3.2.2.5. Semantic field

A sign may be assigned one or more ‘semantic field(s)’. At the moment, a user can choose among more than 100 semantic fields.

3.2.2.6. Non manual components

In this window, there are input fields for the categories ‘Facial expression’, ‘Mouthing’, ‘Mouth gesture’, ‘Head’, ‘Shoulder’ and ‘Upper part of the body’. Values which are in the selection list can be transferred to the input field by clicking on them; new values may simply

be entered in the input fields. It is possible to analyse only one (e.g. Facial expression) or more categories (e.g. Facial expression and Mouthing).

3.2.2.7. Manual components: Analysis of sign phases

Though the discussion on order/hierarchy of sign parameters is still ongoing (cf. Dotter 2000; 2007), we decided to use a phenomenologically arguable structuring of signs into phases, following the principal observations by Liddell & Johnson (1989). By this solution, the big number of parameters can be distributed into two sets which follow from the observation of the signs rather naturally. This practice is a ‘phonetic’ one which guarantees that the analyses can be read by all linguists independent of their different ‘phonemic’ orientation without obeying any theoretical model.

In order to analyse a sign by phases, the user has to open the editing window by clicking on the link ‘Add phase 1’ (cf. Figure 3). Now the user has to decide whether the sign starts with a hold or a movement phase. The list of categories and values is connected to the selection of the phase. In other words, if the phase ‘Hold’ is selected, the selection list of the input field ‘Category’ contains all categories assigned to this phase. When the analysis of a category is finished, the next category may be added by clicking on the link ‘add new category’. When all desired categories of the phase ‘Hold’ are analysed, the data are transferred to the general presentation of the sign by clicking on ‘OK’. If the hold phase is followed by a movement phase, the user will click on the link ‘add phase 2’ to enter again the analysis area of the individual phases and will choose ‘Movement’ as type of phase. The selections of the categories and the values as well as the transfer of the data to the general presentation of the sign take place in the same way as in the hold phase.

3.2.2.8. Statistics

The last area in the general presentation of a sign contains statistical data, which are automatically generated by the system. They show the assignment of the (analysed) sign to a project, the name of the person who has entered the sign and the name of the person who has last modified the sign (cf. Figure 3). These data cannot be viewed by anonymous users, only by registered ones.

3.2.3. Current status

So far, the database has only been used for the description of ÖGS. At the moment, LedaSila contains about 19.120 sign (videos) of Austrian Sign Language. These are regional sign variants as well as 7.399 standardised ÖGS-signs.

The priority objective of ZGH is to enter available sign videos into the database. This explains why only about 1400 signs of the complete corpus have been analysed so far. For the near future, it is planned to accelerate the analysis of signs, which will mainly be carried out by the deaf collaborators of ZGH.

3.2.4. Invitation to the Sign Language Linguistics Community

We specifically want to invite deaf researchers and, of course, also all other parties interested in sign language to use the free database for documentation and/or analysis of their sign language(s). A first impression of the database can be gained by visiting <http://ledasila.uni-klu.ac.at/>. If you are interested in further information, please contact Klaudia Krammer from ZGH: (klaudia.krammer@uni-klu.ac.at).

Section 11. Sign Language

Researchers and other parties who accept this offer and enter sign language data into the database agree to share their data with the Sign Language Linguistics Community. This in turn contributes to improving the international research networking.

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