

The Construction of the Verb Sub-library of *VLAGAN EGULEN-U NILBVSVN*

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ABSTRACT. *VLAGAN EGULEN-U NILBVSVN* is one of the greatest works of the famous Mongolian writer Injannasi, who plays a very important role in the history of Mongolian literature. In this paper, all the 1478 verbs in the corpus of *VLAGAN EGULEN-U NILBVSVN* are analyzed by Mongolian Information Processing. While analyzing the construction of the verb sub-library of *VLAGAN EGULEN-U NILBVSVN*, the paper introduces the way of compiling *VLAGAN EGULEN-U NILBVSVN* electronic dictionary and the process of recording its information contents such as entries, pronunciation, part of speech, syllable, paraphrases, word frequency, word frequency level, morphological form and example sentences.

Keywords: *VLAGAN EGULEN-U NILBVSVN*, the verb sub-library, fields, field's value

1. Introduction. Injannasi (1837-1892) is a well-known writer, poet and theoretical critic in modern Mongolian literary history. He has left behind a mass of works such as *HOHE SVDVR*, *NIGEN DABHVR ASAR*, *VLAGAN_A VHILAHV TINGHIM*, *VLAGAN EGULEN-U NILBVSVN*, *SARAN HOHOHE-YIN \$ASTIR*, *CILAGVN DER_E-YIN*

SIGUMJILEL, *NOMCI-YIN HAGVRMAG*, *CAGAN EGULE* and *SARAN-V DAGVLAL*. Among them, *VLAGAN EGULEN-U NILBVSVN* is his first novel and has an obvious impact on his following creation of works.

Until now, based on the corpus of Injannasi's works, three electronic dictionaries have been compiled, i.e. *HOHE SVDVR* electronic dictionary, *NIGEN DABHVR ASAR* multi-functional electronic dictionary and *VLAGAN_A VHILAHV TINGHIM* multi-functional electronic dictionary (which contain sub-libraries of parts of speech, work introduction, poetry, related papers and related books). Both the corpus processing and the constructing of the verb sub-library of *VLAGAN EGULEN-U NILBVSVN* contributes to the compilation of Injannasi's multi-functional electronic dictionary. Furthermore, it will enrich the Mongolian corpus materials and be used for Mongolian information retrieving and machine translation. Therefore, constructing the verb sub-library based on the corpus of *VLAGAN EGULEN-U NILBVSVN* has become significant.

To construct the verb sub-library, the first step is to process the corpus, including proofreading, tagging phrases and morphological features. Then, verbs are extracted from the corpus and recorded word by word. Finally, the word information such as pronunciation, part of speech, syllable, paraphrases, word frequency, word frequency level, morphological form and example sentences will be matched with corresponding verbs.

2. The Source of the Corpus. From 2005 to 2010, the modern Mongolian corpus has been expanded from 5 million words to 10 million words. *VLAGAN EGULEN-U NILBVSVN* is one of these additions. This corpus is based on the 1990 edition published by the Inner Mongolia Peoples Publishing House and following the Latin transcription rules of the Inner Mongolia University modern Mongolian corpus. The corpus sample is shown below:

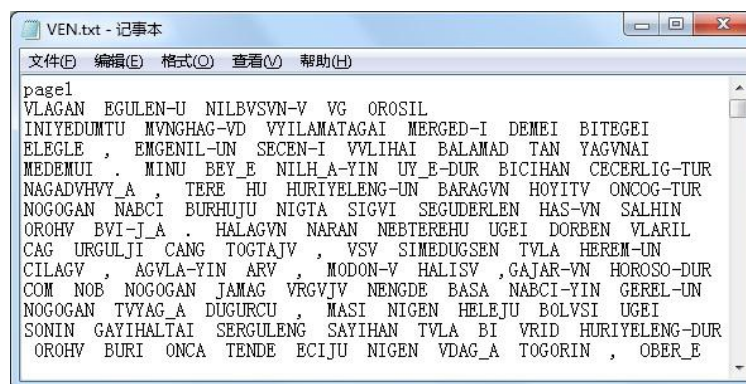


FIGURE 1. THE SAMPLE OF CORPUS *VLAGAN EGULEN-U NILBVSVN*.

3. Corpus Processing.

3.1. The Proofreading of the Corpus. In corpus processing, the accuracy of the corpus should be ensured first. In reality, however, since materials of the corpus are usually logged in manually, there unavoidably exists the possibility of misspellings and input errors due to different dialects or even mispronunciation. Therefore, the corpus is proofread with the 1990 edition *VLAGAN EGULEN-U NILBVSVN* and standardized by *Mongolian-Chinese*

Dictionary¹.

3.2. The Tagging of Fixed Phrases. On the basis of corpus proofreading, tagging phrases of corpus is accomplished with the Mongolian morphology analyzing software programmed by School of Mongolian studies of Inner Mongolia University. Then, the corpus is revised, based on professor Qinggeltu's *Detailed Interpretation of Modern Mongolian Fixed Phrase Grammatical Information Dictionary*².

3.3. The tagging of morphology. Mgllex, a software programmed by School of Mongolian studies, is applied to word segmentation and morphology tagging.

The tagging of the morphology is shown below:

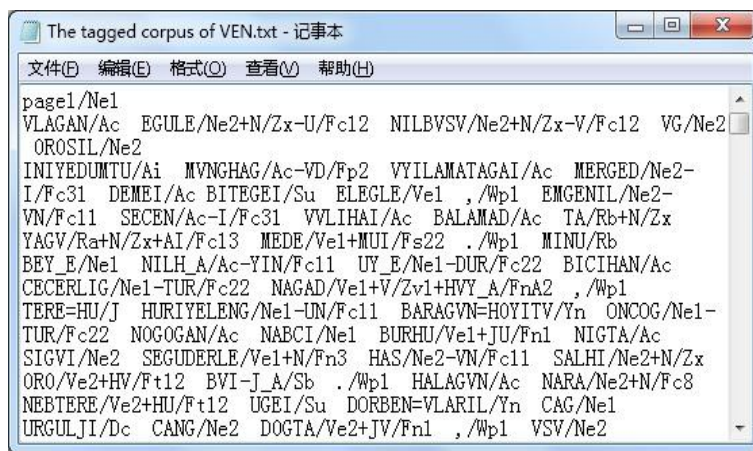


FIGURE 2. THE SAMPLE OF MORPHOLOGY TAGGING OF CORPUS *VLAGAN EGULEN-U NILBVSU*.

Once the corpus processing is completed, the corpus is recorded in Microsoft Excel by word or by phrase. Then the verbs are listed in the verb sub-library.

4. Fields and Field's Value of Verb Sub-Library. *VLAGAN EGULEN-U NILBVSU* electronic dictionary is one of Injannasi's multi-functional electronic dictionaries. With the requirements of research consistency, the fields of the verb sub-library in *VLAGAN EGULEN-U NILBVSU* are the same as those in the sub-library of *NIGEN DABHVR ASAR* and *VLAGAN A VHILAHV TINGHIM* multi-functional electronic dictionary.

The fields of verb sub-library include Mongolian form(MU), Latin transcription (GU), pronunciation (DDG), Part of speech (UA), syllable (UB), paraphrase (MVT, GVT, HVT), word frequency (IT), word frequency level (DD), morphological form (HH) and example sentence (MJU, GJU) etc. The verb sub-library is shown below:

¹ Mongolian Language Research Institute, Inner Mongolia University. 1999. Mongolian-Chinese dictionary (revised edition). Inner Mongolia University Press, Hohhot.

² De, Qinggeltu. 2005. Detailed Interpretation of Modern Mongolian Fixed Phrase Grammatical Information Dictionary. Inner Mongolia Education Press, Hohhot.

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FIGURE 3. THE SAMPLE OF VERB SUB-LIBRARY.

4.1. Entries. The creation of entries is the most essential step for the compilation of a dictionary. The entries in verb sub-libraries are written in the form of morphological ends “HVV/HUU”.

4.2. Mongolian Form of Entries. In this field, the software Mongolian Editor 4.0 is used to transform the Latin transcription of entries to the Mongolian form of entries.

4.3. Pronunciation. Pronunciation is presented in the International Phonetic Alphabet (IPA) system according to the pronunciation in *Mongolian-Chinese Dictionary*.


4.4. Part of Speech. According to “information technology - Mongolian word and expression marks for information processing” (GB/T 26235-2010), Mongolian verbs are classified into four types: general verb, pro-verb, link verb and auxiliary verb. After a statistical analysis, the distribution of verbs in *VLAGAN EGULEN-U NILBVSVN* is shown below:

TABLE 1. STATISTICS OF VERB ENTRIES

First-class	Second-class	Third-class	Entries' number	Total
verb	general verb	Ve1	780	1478
		Ve2	678	
	pro-verb	Vt	4	
	link verb	Vx	7	
	auxiliary verb	Vz1	2	
		Vz2	7	

As the table shows, there are 1478 entries listed in the sub-library of *VLAGAN EGULEN-U NILBVSVN*. Among them, general verbs account for 98.64% of all verbs, while pro-verbs for 0.27%, link verbs for 0.47% and auxiliary verbs for 0.61%. Further, transitive verbs and intransitive verbs account for 52.77% and 45.87% of all verbs, while first class auxiliary verbs and second-class auxiliary verbs account for 0.14% and 0.47% of

entries respectively. The classified verbs are distributed as follows: transitive verb > intransitive verb > link verb = second class auxiliary verb > pro-verb > first class auxiliary verb.

4.5. Syllable. In this field, verb entries are resolved into syllable, which is separated by Full Stop “.”. For example, the entry “” (go) is resolved into “O.CI.HV”.

4.6. Paraphrase. The paraphrases of each entry are listed in the form of Latin transcription and Mongolian form respectively. Applying the paraphrasing software programmed by BAO Songbo, paraphrases from *Mongolian Language Dictionary* are recorded in this field. Then, the software Mongolian Editor 4.0 is used for the translation of paraphrases from Mongolian form into Latin transcription. For example:

~~𑌕𑌃𑌕𑌃~~(take away) :

[illegible]

【3】 刑罰、財産没収の執行：法律に準ずる； 寛容的処分； 任意の処分（deal with: execute according to law; lenient treatment; arbitrary disposal）

ABACIHV:

【1】YAGVM_A-YI 0R0N-ACA NI SILJIGULHU BVYV ABCV 0DHV : M0RI-BAN
~ ; N0M-IYAN ~ . 【2】HEREG YABVDAL--DV UJELTE-YIN EGUDEN-ECE
HANDVHV : MAGV--DV ~ . 【3】HEREG YABVDAL--I SIIDHEN SIIDBURILEHU :
HAVLI -BAR ~ ; AGVCILAN ~ ; DVR A J0RIG-IYAR-IYAN ~ .

Sometimes, however, the paraphrasing software cannot find correct paraphrases for the entries because those paraphrases are not listed in *Mongolian Language Dictionary*. In this case, *HORIN NAIMATV Dictionary*³ may be of great help. If there are still no corresponding paraphrases, Consulting the Chinese version of *VLAGAN EGULEN-U NILBVSVN* translated by ZHAO Jingyang, along with *Chinese-Mongolian Dictionary*⁴, satisfactory answers can be available.

4.7. Chinese Paraphrase. The Chinese paraphrase is added according to the paraphrases in *Mongolian-Chinese Dictionary*. For example:

འཇོག་པ་(take away) :

(及)拿去, 取去, 领去, 带去: ᑭᑦᑭᑦ / ~ 带到远处去; ᑭᑦᑭᑦᑭᑦ / ~ 叫去 (take it: take it far away; call out) ②提到: ᑭᑦᑭᑦᑭᑦ / ᑭᑦᑭᑦᑭᑦ / ᑭᑦᑭᑦᑭᑦ / 提到原则上来分析 (mention: analysis in principle) ③处理, 处置, 处分, 处决, 论处: ᑭᑦᑭᑦᑭᑦ / ~ 宽大处理; ᑭᑦᑭᑦᑭᑦ / ᑭᑦᑭᑦᑭᑦ / 给予纪律处分; ᑭᑦᑭᑦᑭᑦ / ᑭᑦᑭᑦᑭᑦ / 依法处决。 (deal with, dispose, execute, punish: deal with leniently; disciplinary sanctions; execute according to law.)

³ Namjilma.2013. H0RIN NAIMATV Dictionary.Inner Mongolia Peoples Publishing House, Hohhot.

⁴ Institute of Mongolian Language and Writing, Inner Mongolia Academy Of Social Science. 2005. Chinese-Mongolian Dictionary (3rd Edition). The Ethnic Publishing House. Hohhot.

In case an entry does not have a paraphrase in *Mongolian-Chinese Dictionary*, the version of *VLAGAN EGULEN-U NILBVSVN* translated by ZHAO Jingyang is referred to.

4.8. Word Frequency. In this field, the frequency of occurrence of each entry in corpus *VLAGAN EGULEN-U NILBVSVN* is recorded. For example, if the word “CAYIHV” (whiten) appears 5 times, the frequency of this word is noted “5”.

4.9. Word Frequency Level. The occurrences of each entry are graded according to their values. The level of occurrence is represented with a symbol★. To be specific, the level 1 noted <<★☆☆☆☆>> is the entry whose occurrence is between 1-10, the level 2 noted <<★★☆☆☆>> is the entry whose occurrence is between 11-50, the level 3 noted <<★★★☆☆>> is the entry whose occurrence is between 51-100, the level 4 noted <<★★★★☆>> is the entry whose occurrence is between 101-500 and the level 5 noted <<★★★★★>> is the entry whose occurrence is greater than 501. The entries categorized by the level of occurrence in corpus *VLAGAN EGULEN-U NILBVSVN* are shown below:

TABLE 2. STATISTICS OF WORD FREQUENCY LEVEL

Word frequency level	Ve1	Ve2	Vt	Vx	Vz1	Vz2	Total
★☆☆☆☆	611	572	2	5	0	2	1192
★★☆☆☆	125	81	0	0	0	2	208
★★★☆☆	21	16	0	1	0	1	39
★★★★☆	20	7	2	0	1	1	31
★★★★★	3	2	0	1	0	1	8

4.10. Morphological Form. In this field, the morphological forms of entries appearing in corpus *VLAGAN EGULEN-U NILBVSVN* are recorded. The variations in term of voice, aspect, tense, modality, and evidentiality are noted with the morphological forms standardized in “Information technology-Mongolian word and expression marks for information processing”.

The format is “morphological form tag = occurrence”, and entries are usually transformed by multi morphological suffixes. If an entry is transformed by one morphological suffix, its morphological suffixes should be noted respectively in aforesaid format and separated from the next one by space. If its morphological suffixes are added one after another connectively, it should be noted in the format “morphological form1 + morphological form2 = occurrence”. For example: ALVSLAHV (span):Fn3=1 Ft11+Fc41=1. ”Fn3=1” means the morphological suffix “N” inflects the entry “ALVSLAHV” and appears one time in the corpus. “Ft11+Fc41=1” means the morphological suffixes “GSAN-ACA” inflects the entry “ALVSLAHV” and appears one time in the corpus.

4.11. Example Sentence. In this field, example sentences of the entries appearing in corpus *VLGAN EGULEN-U NILBVSVN* are listed in the verb sub-library. The example sentences which are written in Latin transcription are replicated from the corpus database directly. Then the example sentences in Mongolian form are transformed by the software Mongolian Editor 4.0.

5. Conclusions. In our study, corpus processing and constructing verb sub-library cost much manpower and time. The corpus processed in our work will contribute to relevant studies such as Corpus linguistics, Natural language processing and Computational linguistics. Some data about the study could be used in the computational linguistic research on Injannasi's work. In further research, a new research method could be studied for reducing labor intensity and saving manpower. Other Injannasi's works apart from *HOHE SVDVR*, *NIGEN DABHVR ASAR*, *VLGAN_A VHILAHV TINGHIM*, *VLGAN EGULEN-U NILBVSVN* can be studied further to complete Injannasi's multi-functional dictionary and then to set up a cloud platform.

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