

# A Study on the Formation of Hangul-International Phonetic Alphabet Conversion Table

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**Abstract:** In this paper, we proposed the formation of Hangul-International Phonetic Alphabet conversion table that also meets the standard Korean pronunciation rule. In Hangul, due to a phonetic value change phenomenon, notation and pronunciation are different. To do this, conversion table of notation-phonetic value is created, and conversion table of phonetic value-International Phonetic Alphabet notation are formed.

As a result, the conversion table of International Phonetic Alphabet notation that accords with the standard Korean pronunciation has been formed, and it is proved by experiments that the result of conversion has no faults.

## 1. Introduction

Even though the number of foreigners who are studying Korean is increasing, only a few of them can pronounce Korean accurately. That is because it is impossible to express Korean pronunciation with English phonetic notation exactly. In addition, pronunciations of British English and American English are different so that foreigners have difficulty in learning the accurate pronunciations of Hangul by English phonetic notation.

Therefore, the purpose of this thesis is the International Phonetic Alphabet notation to use exact pronunciation of Korean language, the conversion table of International Phonetic Alphabet notation that accords with the standard Korean pronunciation has formed.

IPA(International Phonetic Alphabet) is a common Phonetic Alphabet for the purpose of expressing exact and correct sound.

## 2. The Standard Korean Pronunciation Rule & IPA Transcription

Since Hangul has different nature of writing and Phonetics(Pronunciation), if Korean writing is converted by IPA, it never is possible to convert into common IPA. First of all, I believe that it is essential to set up a standard pronunciation table in order to create Hangul - International Phonetic notation conversion table.

This paper has focused on a research of creation of Korean-IPA conversion table along with standard pronunciation.

Hangul has different and unique distinction between writing and pronunciation because of phoneme change appearance. Therefore, it is necessary to have Hangul phonetic value according to standard pronunciation.

Futhermore, based on that phonetic valued and IPA notation

Korean Standard Phonetic is the rule in the process of converting Han-gul writing characters into verbal Korean. International Phonetic Signs is based on Roman characters. It is created not only phonetically but also practically so that it can be used for the study in most of languages such as vocal technique of dialect, pronunciation revision, study of foreign language and publishing dictionary and studying materials.

## 3. The creation Phonetic Value -International Phonetic notation conversion table

For the purpose of creation of conversion table in Hangul - IPA, I make examples for each items of standard pronunciation with Petrinet, which is very effective graphically and mathematically, as a tool.

I futher make a close matrix table of Petrinet with combining program for this standardized items

"Table 1. notation - phonetic value conversion table."

ㄱ	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄱ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄴ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄷ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄷ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄹ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㄹ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅁ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅁ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅂ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅂ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅅ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅅ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅇ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅇ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅈ(C)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
ㅈ(J)	ㄴ	ㄷ	ㄹ	ㅁ	ㅂ	ㅅ	ㅇ	ㅈ	ㅊ	ㅌ	ㅍ	ㅑ	ㅓ	ㅕ	ㅗ	ㅛ	ㅜ	ㅠ	ㅡ	ㅣ
* C(chosung): primary consonant																				
* J(jongsung): final consonant.																				

I also create a notation - phonetic value conversion table by erase and zip the transional information from this combined close matrix.

"Table 2. phonetic value -IPA conversion table."

C(chosung)			Y(joongsung)		
	INDEX	IPA		INDEX	IPA
ㄱ	0	0067	ㅏ	0	0061
ㄲ	1	006B	ㅑ	1	025B
ㄴ	2	006E	ㅓ	2	006A 0061
ㄷ	3	0064	ㅕ	3	006A 025B
ㄸ	4	0074	ㅗ	4	028C
ㄹ	5	006C	ㅛ	5	0065
ㅀ	6	006D	ㅜ	6	006A 028C
ㅁ	7	0062	ㅠ	7	006A 0065
ㅂ	8	0070	ㅡ	8	006F
ㅃ	9	007A	ㅜ	9	0077 0061
ㅄ	10	0073	ㅠ	10	0077 025B
ㅇ	11	014B	ㅣ	11	00F8
ㅈ	12	025F	ㅍ	12	006A 006F
ㅊ	13	0063	ㅑ	13	0075
ㅌ	14	0063 0280	ㅓ	14	0077 028C
ㅋ	15	006B 0280	ㅕ	15	0077 0065
ㆁ	16	0074 0280	ㅗ	16	0077 0069
㆏	17	0070 0280	ㅛ	17	006A 0075
㆑	18	0068	—	18	026F
			ㅜ	19	026F 0069
			ㅠ	20	0069
J(jongsung)					
		IPA			IPA
ㄱ	0	NULL	ㅏ	14	NULL
ㄲ	1	0067	ㅑ	15	NULL
ㄴ	2	NULL	ㅓ	16	006D
ㄷ	3	NULL	ㅕ	17	0062
ㄸ	4	006E	ㅗ	18	NULL
ㄹ	5	NULL	ㅛ	19	NULL
ㅀ	6	NULL	ㅜ	20	NULL
ㅁ	7	0064	ㅠ	21	014B
ㅂ	8	006C	ㅡ	22	NULL
ㅃ	9	NULL	ㅜ	23	NULL
ㅄ	10	NULL	ㅠ	24	NULL
ㅇ	11	NULL	ㅣ	25	NULL
ㅈ	12	NULL	ㅍ	26	NULL
ㅊ	13	NULL	ㅑ	27	NULL

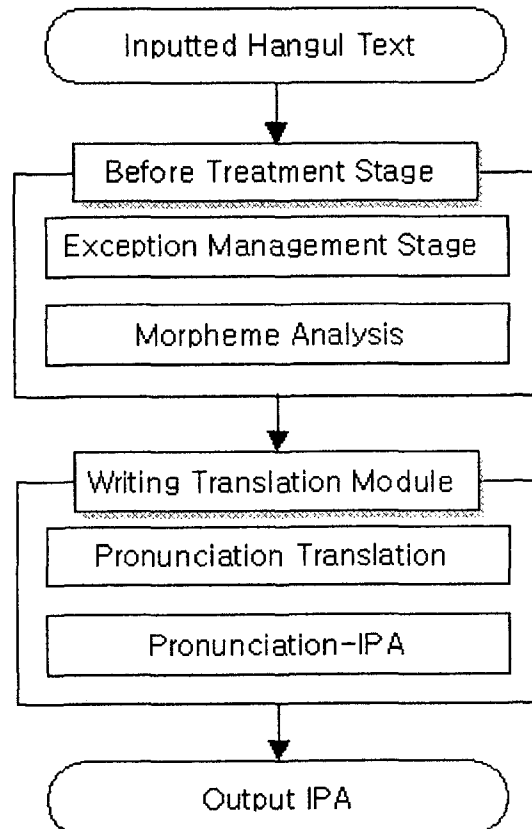
I also created phonetic value -IPA conversion table based on that table. I also choose transcriptional method according to "Handbook of the International Phonetic Association (A Guide to the use of the International Phonetic Alphabet, 1999)"

#### 4. A result of experiment

The main structure of the system for Korean-International phonetic alphabet conversion is as below.

Inputted Hangul texts are delivered to the writing translation module via the exception management stage and the morpheme pretreatment analysis. In the exception management stage, texts which are not or incomplete Hangul are treated properly. In the morpheme analysis stage, necessary morpheme analysis information for the pronunciation translating stage is made and delivered to the writing translation module.

"Figure 1. Caption of the Figure."



The writing translation module is divided into two parts: the writing-pronunciation translation stage and the pronunciation-international phonetic sign translation stage. When Hangul is translated into international phonetic signs, we cannot make the exact corresponding international phonetic signs because the manners of writing and pronunciation differs in Korean. However, since the writing-pronunciation translation table obtained by modeling Hangul standard pronunciation and the Hangul-international phonetic sign translation table obtained by modeling the international phonetic sign notations are included together in the pronunciation translation stage, inputted texts can be translated into their correct pronunciations by treating the phoneme changes of Hangul.

As a result of experiment in fable 'wind and sun' in "Handbook of the International Phonetic Association", have proved that the result had been without any problem through experiments

As a result of experiment in fable 'wind and sun' and 'Korean national anthem' with this created Han-gul -

International Phonetic symbol conversion table, I found that the conversion has been done in correct standard pronunciation and international phonetic symbols.

"Figure 1. Caption of the Figure."

바람과	바람과	ba lamgwa
햇님이	햇님이	hɛnɪ ml
서로	서로	ʒa lo
힘이	힘이	hl ml
더	더	da
세다고	세다고	ze da go
다두고	다두고	da t'u go
있을	있을	i dwl
때	때	te

Korean is composed of vowel and consonant. Then, phonetic value is in forms of consonant plus vowel, consonant and vowel plus consonant, and only vowel itself. In case of vowel itself, primary consonant of 'ㅇ' makes null due to lack of phonetic value.

It appears to be very vague in case of ending consonant and next primary consonant without phonetic value 'ㅇ'. For example, 'u-li-na-la' is the correct sound, however, it could be possible to pronounce as 'u-lin-al-a'.

I certainly believe that it is necessary to establish a rule for distinction of syllables in international phonetic alphabets

In this paper, I make distinction with space between syllables such as 'u li na la'.

## 5. Conclusion

This paper has finished research in regard to creation of Han-gul -International Phonetic symbol conversion table along with standard pronunciation. And I have proved that the result had been without any problem through experiments.

This paper also illustrates possibility of conversion of phonetic value and spelling based on the 'Rule' with such experiment. This Han-gul -international phonetic alphabet conversion table could help foreigners to pronounce Korean correctly by showing the sound in phonetic letter. I further expect that this research would help establishment of

Korean phonetic system since it is in compliance with International Phonetic Association.

I suggest that it is necessary to collect exceptional words which is not within the rule for the future assignment.

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