

# An Interactive English Pronunciation Dictionary for Korean Learners

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## Abstract

We present research towards developing a pronunciation dictionary that features sensitivity to learners’ native phonology, specifically designed for Korean learners of English-as-a-Foreign-Language (EFL). We envision a future system that can record and process learners’ imitation of the dictionary pronunciation and instantly provide segmental and prosodic feedback on accent. Towards this goal, we have designed and collected a speech corpus to address the phonological and prosodic issues of Korean EFL learners. We leverage the SUMMIT speech recognizer’s ability to model phonological rules to automatically identify non-native phonological phenomena. These phonological rules were carefully constructed to account for the influence of learners’ native language (Korean) on the target language (English). Feedback messages are provided to the learner to point out the non-native phonological variations detected by the speech recognizer in order to help them improve segmental pronunciation. Instructions are also given to the user on the prosodic aspects of the pronunciation, which are based on detected duration and  $F_0$  cues. We evaluated the effectiveness of the feedback mechanism by rating 222 English utterances from six native Korean subjects, before and after receiving native-language dependent feedback messages. Human raters judged 61% of the utterances as improved after feedback.

## 1. Introduction

Surveys of language learners have reported that a dictionary with pronunciation exercises is an easily accessible and attractive form of pronunciation reference [1, 2]. Such audible dictionaries are widely available, and are published by Cambridge, Cobuild, Longman, MacMillan, Oxford, Webster, etc. However, these dictionaries remain insensitive to a learner’s native language, in spite of findings that non-native accents in foreign languages are mainly derived from the native phonology [3, 4, 5, 6, 7].

In this paper, we present our research towards developing a pronunciation dictionary that features sensitivity to learners’ native phonology, specifically designed for Korean learners of English-as-a-Foreign-Language (EFL). We envision a future system that can record and process learners’ imitation of the dictionary pronunciation and instantly provide segmental and prosodic feedback on accent. Towards this goal, we have designed and collected a speech corpus to address the phonological and prosodic issues of Korean EFL learners. All speech data were force-aligned with their corresponding transcriptions using the MIT SUMMIT speech recognition engine [8]. Central to our technology is the use of two sets of phonological rules, one for native English phonology, and another expanded to cover non-native phonological variations expected from Korean EFL learners. Differences in the alignments produced with

|          | Phone            | Syll.          | Str.           | Rhy.        | Inno.         | Total             |
|----------|------------------|----------------|----------------|-------------|---------------|-------------------|
| Word     | 8,176<br>(1,362) | 1,504<br>(94)  | 770<br>(70)    | 0<br>(0)    | 0<br>(0)      | 10,450<br>(1,526) |
| Phrase   | 0<br>(0)         | 0<br>(0)       | 264<br>(24)    | 272<br>(17) | 32<br>(2)     | 568<br>(43)       |
| Sentence | 0<br>(0)         | 260<br>(20)    | 371<br>(33)    | 569<br>(32) | 1059<br>(68)  | 2259<br>(153)     |
| Total    | 8,176<br>(1,326) | 1,764<br>(114) | 1,405<br>(127) | 841<br>(49) | 1,091<br>(70) | 13,277<br>(1,722) |

Table 1: Distribution of data. The number of unique stimuli are shown in parentheses. (Note: Syll. = Syllable, Str. = Stress, Rhy. = Rhyme, Inno. = Intonation.)

the two sets of phonological rules will reveal segmental insertion, deletion, and substitution in the non-native speech, and are used to trigger feedback messages pointing out the specific errors. Instructions are also given to the learner on the prosodic aspects of the pronunciation, which are based on measured duration and  $F_0$  cues.

Our prosodic scoring methods take advantage of the fact that the non-native speakers in our corpus were trying to imitate examples from a native speaker. We achieve vocabulary independence in detecting phonetic mispronunciations, since our methodology requires only the *phonemic* baseforms of the words. We believe that these research settings are reasonable for the audible dictionary application. Our approach can be contrasted with existing pronunciation teaching software, such as Dr. Speaking [9] in Korean English, which typically have a limited set of words and sentences.

The paper is organized as follows. We first describe our speech database, which was designed to have a balanced coverage of the major aspects of segmental and prosodic phonology. We then provide a detailed description of our technology, including automatic methods for detecting segmental and prosodic cues of non-native accentedness. After that, we evaluate the effect of native-language-sensitive feedback on improving learners’ pronunciation. Finally, we summarize our results and point out potential future research.

## 2. Non-native speech data collection

The non-native speech database was designed and constructed to cover a broad range of non-native productions of English vowels, consonants, syllables, stress, rhythm, and intonation. The linguistic distribution of the collected data is summarized in Table 1.

There were a total of 13,277 speech samples in the original corpus. Of these, 8,176 isolated words, taken from SQuand Rich DAAtabase [10], were used to facilitate segmental research on the phone level, and the remainder, including words, phrases, and sen-

# An Interactive English Pronunciation Dictionary For Korean

**Tina Cho**



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**Korean Wave in World Englishes** Brittany Khedun-Burgoine,Jieun Kiaer,2022-09-16 This book examines the linguistic impact of the Korean Wave on World Englishes demonstrating that the K Wave is not only a phenomenon of popular culture but also language The Korean Wave is a neologism that was coined during the 1990s that includes K pop K dramas K film K food and K beauty and in recent years it has peaked in global popularity This book intends

to show how social media phenomena have facilitated the growth of Korea's cultural influence globally and enabled a number of Korean origin words to settle in varieties of Englishes. This in turn has globalised Korean origin words and revolutionised the English language through an active and collaborative process of lexical migration. Korean origin words such as oppa (older brother) are no longer bound solely to Korean speaking contexts. The study focuses primarily on media content, particularly social media, corroborated by case studies to examine how linguistic innovation has been engendered by the Korean Wave.

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