<Abstract>

Study on the Pronunciation of Korean TTS, conditioned on the presence or absence of a morpheme boundary

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The purpose of the study is to examine how well the Korean TTS reflects the phonological phenomenon and to suggest some ways to improve the Korean TTS in terms of the phonological phenomenon. In particular, this study examines the differences between a case that the morpheme boundary affects a phonological phenomenon and a case that does not. Based on these examination results, this study represents that the current TTS algorithm needs to be improved. Mainly, it will be focused that the pronunciation of string of /n/ and /l/, which vary depending on whether or not the morpheme boundary is present.

In this study, the words related to the /n/ and /l/ string were composed of sentences, and each sentence was put into Korean TTS to listen to the pronunciation result. The number of words related to the /n/ and /l/ string was 232. In order to extract this word list, this study used the frequency survey data of Cho(2003). In Cho(2003), 58,437 words actually used in the corpus were presented. Among these words, there were 544 words related to the /n/ and /l/ string. Among them, 232 words remained except for words sharing the same word base.

The TTS device for the experiment utilized Naver Papago's TTS(NP) and Google Translator's TTS(GT). In Korean TTS, Naver Papago's TTS and Google Translator's TTS are most commonly used. This is because NP and GT are expected to be the best in technology. We did not use special equipment to record the pronunciation of TTS. This study confirmed the pronunciation of TTS by listening to the sound delivered by the earphone. This is because the study needs to pay attention to the difference in the level of phonemic variation rather than the slight difference in the level of phonetic variation.

The pronunciation result was summarized by calculating the ratio of the number of words pronounced by standard pronunciation to the number of non-standard pronunciation. By type, this study classified the cases into the cases of lateralization and nasalization.

First, let's look at how NP and GT pronounced the words related to the /n/ and /l/ string with standard pronunciation. In NP, 39 out of 232 words produced non-standard pronunciation. Of the 39 non-standard pronunciations, 6 /ll/ errors and 33 /nn/ errors were counted. GT has produced non-standard pronunciations in 53 of 232 words. Of the 53 non-standard pronunciations, /ll/ errors were 19, and /nn/ errors were 34. Overall, the number of non-standard pronunciation of GT compared to NP many times. There were a lot of GT in the /ll/ error. There were 26 items that showed the same error on NP and GT. There were 13 non-standard pronunciation in NP, but standard pronunciation in GT. Conversely, GT had a non-standard pronunciation, but NP had 25 standard pronunciation. NP and GT showed the same error in the same item, but NP and GT showed different errors in different items.

NP had 6 /ll/ errors among 39 non-standard pronunciation. However, there were 33 /nn/ errors. The /nn/ error appeared mainly at the words including a Sino-Korean lexeme used like suffix. Mostly, there were 23 errors in the words that used '론(/lon/, a theory)'. There were many errors in '량(/lyang/,

quantity)(4)', '력(/lyeok/, force)(3)', '령(/lyeong/, order)(2)' and '료(/lyo/, rate)(1)'. If so, does all the words that include the Sino-Korean lexeme used like suffixes have problem? However, test results do not seem to be such a problem. Even if we look at other words in which '론(/lon/, theory)' is used, 8 words produce standard pronunciation. /ll/ error appeared only in a few words. But all of these words appear only in very infrequent words.

GT had 19 /ll/ errors among 53 non-standard pronunciation. However, there were 35 /nn/ errors. /ll/ errors appeared much higher on GT than on NP. It can appear in words that are used infrequently. But, it can be seen that non-standard pronunciations are also produced in words that are frequently used, such as '현란하다(/hyeonlanhada/, dazzling)', '판로(/panlo/, market)', '선로(/seonlo/, track)', and '마천루(/macheonlu/, skyscraper)'. Also, the number of /nn/ errors wsa 34, similar to NP's /nn/ errors. Here again, 20 non-standard pronunciations appeared in the words related to '론(/lon/, theory)'. However, there were also 9 non-standard pronunciations in words related to '력(/lyeok/, force)'. Other than that, non-standard pronunciation appeared in '령(/lyeong/, order)(2)', '량(/lyang/, quantity)(1)', '료(/lyo/, rate)(1)', '룡(/lyong/, dragon)(1)'.

If we look at the above test results, we can confirm the current status of pronunciation related to the /n/ and /l/ string as follows.

First of all, the /n/ and /l/ string were producing largely appropriate pronunciation in both NP and GT, despite the possibility of two different types of pronunciation depending on the environment. However, both NP and GT were producing non-standard pronunciations in some words. However, there were many /nn/ errors compared to /ll/ errors. It is presumed that the processing of /n/ and /l/ is basically calculated as /ll/, and that /nn/ is calculated in a specific environment. That is, basically, the /n/ and /l/ string is processed as lateralization, and if there is a morpheme boundary, it is treated as nasalization. Therefore, it is very important to recognize whether a morpheme boundary is included between the /n/ and /l/ string. In a fairly large number of words, it is appropriate to perceive it, because in some words morpheme boundary fail to recognize and /nn/ is pronounced as /ll/ according to the general rule.

Then, considering the above two situations, NP and GT seem to need two measures to improve the accuracy of TTS. In the words related to the string of /n/ and /l/, general words without morpheme boundary should be extended to word-based standard pronunciation data. Next, the input of morphological information for the lexical phrases such as '론(/lon/, theory)', '력(/lyeok/, power)', '량(/lyang/, quantity)' and 료(/lyo/, rate)', which are frequently used as a suffix, becomes more clear, So that they can be converted to /nn/ in a combined word.

However, this study did not deal with the pronunciation of loanwords that do not have the standard pronunciation in Korean. This means that it is necessary to research separately the pronunciation of loanwords of Korean TTS pronunciation.