A Preliminary Study on the Gender-discrimination using TF32 Software in Aging Voices

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Abstract—The aim of this study is to investigate the discriminatory power of the TF32 program in distinguishing the gender of aging voices. The four parameters all show the significant differences for the gender classification. Therefore it can conclude that the TF32 is discernible in gender analysis.

I. INTRODUCTION

Acoustic analysis of an older adult's voice has become an important tool for assessing voices in experimental and clinical settings using TF32 program because it is valuable for quantifying voice quality [1]. No studies have studied the discriminatory power of the TF32 program in terms of identifying the gender of aging subjects [2].

II. METHODS

60 aging voices with two words phonated from above 60 years old (30 males and 30 females) were used in this study. The words are "alcohol" and "Los angeles".

Four acoustic parameters that are calculated by TF32 program are considered for the purposes of the present investigation: F0 (called "fundamental frequency"), jitter in percent, shimmer in percent, and signal-to-noise ratio in decibel (SNR).

III. RESULTS
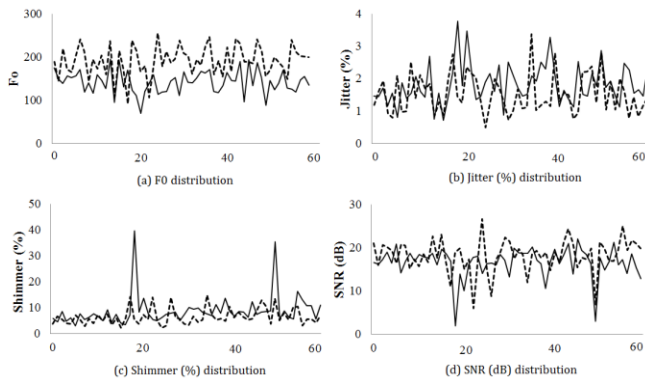
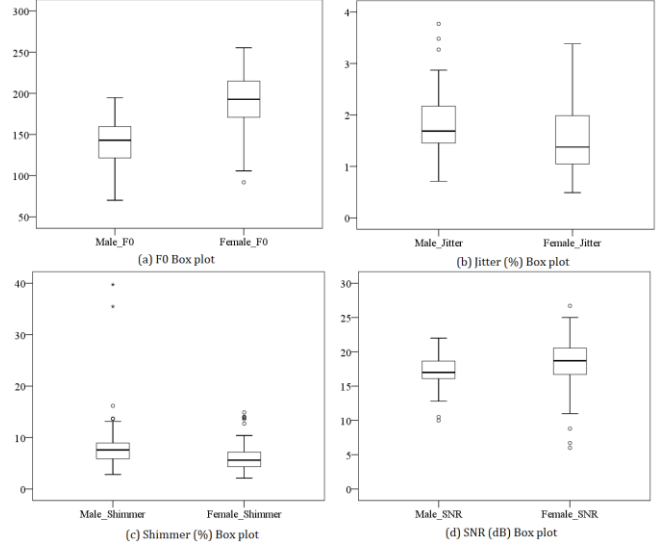Figure 1. Distributions of the acoustic parameters extracted from TF32

Figure 2. Box plots of the acoustic parameters extracted from TF32

In Figure 1 and 2, there are some differences between the male and female voice signals. Table 1 shows the statistical analysis for gender classification of aging voices. All parameters show p-values <.05 in a Mann-Whitney U test, it is said that they are useful and meaningful for the gender classification. In particular, F0 and shimmer (%) performs better statistically than do the other parameters.

TABLE 1. Statistical analysis between male and female voice signals

F0	p = 0.000*
Jitter (%)	p = 0.004*
Shimmer (%)	p = 0.000*
SNR (dB)	p = 0.003*

It can conclude that TF32 program is suitable for checking the ability of the voice analysis to identify the elderly' gender. Future investigations will compare gender-discriminating ability of various voice analysis software.

REFERENCES

[1] J. Lee, "Development of Voice Activity Detection Algorithm for Elderly Voice based on the Higher Order Differential Energy Operator," *Journal of Digital Convergence*, vol. 14, pp. 1–7, Nov. 2016.

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