

The Power Density Spectrum of Telugu Speech *

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The study was concerned with the power density spectrum of Telugu speech. This was undertaken to obtain the full particulars of the spectrum with respect to power at different frequencies. As far as the review carried out, no such study has been carried out with respect to Indian languages. Similar studies were reported with respect to European languages such as English, German, Russian, Swedish, etc.

An attempt has been made to carry out a similar study with respect to Telugu language. Telugu is the second largest spoken language in India and the spoken language was appreciated all over the world since centuries. The spoken Telugu is having similar tonal quality of Italian language.

The procedures adopted in the study were improved, reliable and latest when compared to the procedures adopted by others.

A large number of subjects and large samples were adopted in the study to obtain reliable results. Two more advanced steps were incorporated in the study: (1) screening the subjects for speech, hearing, ENT and psychological problems;

(2) the male and female samples were obtained along with mixed samples to find out the deviations, if any.

Conclusions

- (1) In case of female sample, highest power was concentrated from 250 Hz to 1000 Hz. The peak intensity was observed at 250 Hz. The intensity drop was 13 dB SPL/Octave from 500 Hz to 5000 Hz. The ratio of intensities at fundamental and highest frequency was 3:1.
- (2) In case of male sample, the highest power was concentrated from 200 Hz to 1000 Hz. The peak intensity was observed in between 200 Hz and 250 Hz. The intensity drop was 5 dB SPL/Octave from 200 Hz to 5000 Hz. The ratio of intensities at fundamental and highest frequency was 2:1.
- (3) In the case of mixed sample, the highest power was concentrated from 150 Hz to 2000 Hz. The peak intensity was at 500 Hz with minor peaks at 200 Hz and 800 Hz. The intensity drop was 7 dB SPL/Octave from 500 Hz to 5000 Hz. The ratio of intensities at fundamental and highest frequency was 3:1.

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- (4) In case of female sample the intensity drop was 3 times higher when compared to males sample. The intensity drop started at earlier frequency in case of male sample. The mixed sample speech spectrum was more uniform and was accepting the characteristics of both male and female speech spectrums.

Recommendations

- (1) The data obtained with respect to Telugu speech spectra can be utilized for any applications.
- (2) Since all the three samples data was in correlation, it is recommended to use the mixed sample spectrum for all practical applications.
- (3) Taking the values of power density spectrum it is possible to generate "Speech Noise" by using white noise source and equalizer. Such a speech noise generator is more reliable in speech discrimination tests with an audiometer for Telugu-speaking people.
- (4) A speech noise generator gives a better source of signal for building acoustic measurements such as reverberation time, sound field distribution and acoustical insulation.
- (5) The data are useful in the field of Digital Communication System.
- (6) Even though the power spectrum must be considered as rather rough description of speech, it is possible that the language peculiarities of Telugu speech are so pronounced that they show up even in this spectrum obtained. It is therefore worth investigating if a spectrum analysis might be used as a criterion for the effect of, for example, speech training at the School for the Deaf, as the ability of the students to articulate speech with large content of high frequency might be disclosed with such a method.