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IDENTIFYING THE SPEAKER AGE BY using ACOUSTIC PARAMETERS: FUNDAMENTAL FREQUENCY, FORMANTS AND INTENSITIES

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ABSTRACT

Voice is very important factor through which we get the information about the persons age, stress, emotions, gender, sadness and about happiness. In this paper we tried to have an idea about age of speaker. Our study involves 30 speakers of different age groups. We have considered different voice parameters like Fundamental frequencies, Formant frequencies and Intensities. In this we considered different voiced vowels are used to study the changes between the three age groups.

KEYWORDS: Fundamental frequency (F0), Intensities, Formant frequencies, Voice parameters, Vowels.

INTRODUCTION

Voice is very important factor to detect the many information by speech like stress, age, emotions, beauty, gender, happiness and sadness. Voice is generated with the help of airflow through the lungs which is converted by the vocal folds. Cavities are utilized to passed the airflow to the lips to generate the sound. The vocal folds are open and closed quickly when the voice source is vowels. With the quickly open and closing vocal folds we can easily detects the information about the speech[1]. Speech is nothing but it is a sequence of sounds which is generated from the speech production system under the influence of specific language knowledge [2]. With the help of speech information we can detect the various speech parameters like pitch, formant frequencies, intensities, jitter, shimmer, harmonic to noise ratio (HNR), and noise to harmonic to noise ratio (NHR). Then with the help of voice parameters we can detect the voice variations at the different age levels of a persons. Here we detect the age with the help of voice parameters Intensity, Formant Frequencies and Pitch based on the vowels ('a', 'e', 'i', 'o', 'u'). When the speech is generated then we can get many information about the speaker because persons get many changes with change in age from childhood to old age[3]. Larynx changes after when the person arrived its maximum size in puberty. By detection of these information we can easily detect the age at different levels.

MATERIALS AND METHODOLOGY

In this paper we have recorded the voice of 30 healthy persons of different age groups aged between 14-30 years, 31-49 years and 50-80 years. Voices are analyzed and the various voice parameters (Fundamental frequency, formant frequencies and intensities) are extracted. All the voice samples were recorded at the home environment with no background noise with the help of microphone M27 which have frequency response: 100Hz- 16kHz, sensitivity: -58dB \pm 3dB, and S/N ration: More than 60dB. Then the voices are analyzed and various features are extracted by the samples of Five vowels (a, e, i, o, u). We analyzed the three samples of each vowel. Then the Formant frequencies, fundamental frequencies and intensity are computed.

METHODOLOGY

1. Record the voice of 30 healthy females person are collected.
2. Vowels spoken by each person of different age levels and recorded by the microphone M27 for the extraction of voice parameters.
3. Acoustic parameters such as Fundamental frequency, Formant frequencies and Intensities are extracted using PRAAT software.
4. On the bases of different values of voice parameters detect the different age levels of a person means person belong to adult age or middle age or old age.

RESULTS AND DISCUSSION

We detected the different age groups based on the voice parameters as Fundamental frequency, Formant frequencies and Intensities. We concluded that the frequency level decreased with increase in age for females. The following bar graphs proved the age detection process. In the figure 1 we compare the Formant frequency (F1) for the vowel 'a' at the three age levels in this the frequency response is decreased with increased with age level. This result is similar for all other vowels ('e', 'i', 'o', 'u'). In figure 2 we compare the Formant frequency (F2) for the vowel 'e' at the three age levels in this the frequency response is decreased with increased in the age. This result is similar for other all vowels ('a', 'i', 'o', 'u'). In figure 3 we compare the Formant frequency (F3) for the vowel 'i' at the three age levels in this the frequency response is decreased with increased in age. The result is similar for other vowels ('a', 'e', 'o', 'u'). In figure 4 we compare the Fundamental frequency (Pitch(F0)) for the vowel 'o' at the three age levels in this the fundamental frequency response is decreased with increased in age. This result is similar for other vowels ('a', 'e', 'i', 'u'). In figure 5 we compare the Formant frequency (F4) for vowel 'u' at the three age levels in this frequency response increased firstly for the adult age then decreased for the middle age and then minor increased for the old age. this shows same result for the other vowels ('a', 'e', 'i', 'o'). In figure 6 we compare the Intensity for the vowel 'a' at the the age levels. we concluded that the intensity level is decreased with increased in age levels. This proved the same result for the other vowels ('e', 'i', 'o', 'u').

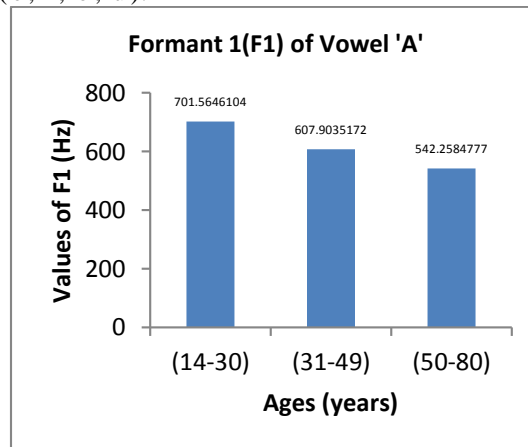


Figure 1: Compare the F1 at three age levels for the vowel 'a'

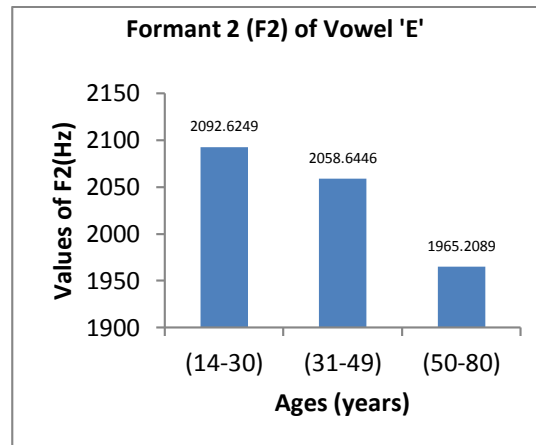


Figure 2: Compare the F2 at the age levels for vowel 'e'

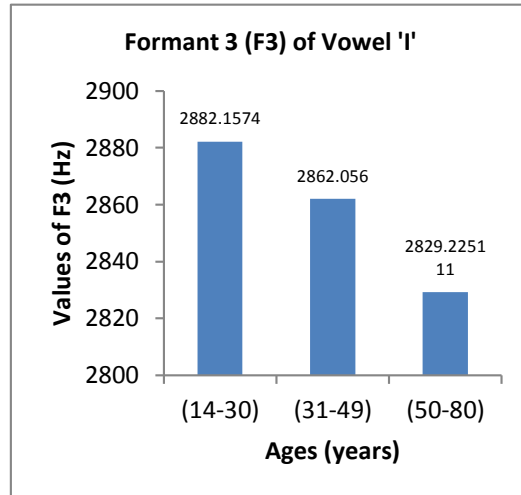


Figure 3: Compare the F3 at the three age levels for the vowel 'i'

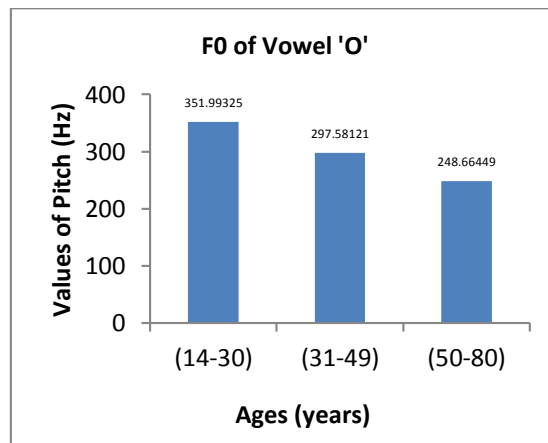


Figure 4: Compare the F4 at the three age levels for the vowel 'o'

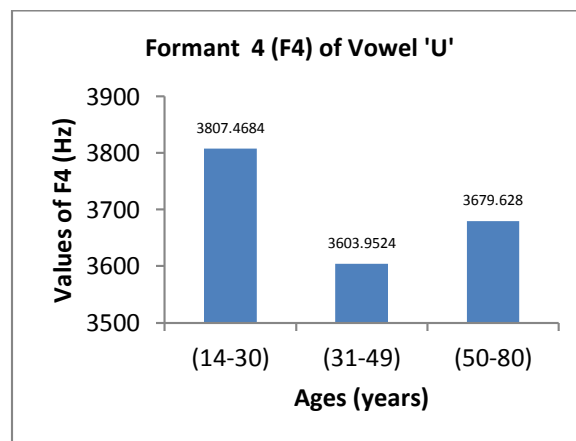


Figure 5: Compare the F4 at three age levels for the vowel 'u'

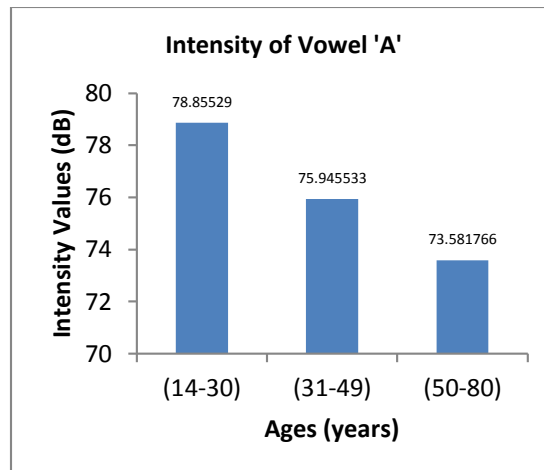


Figure 6: Compare the Intensity at the three age levels for the vowel 'a'

CONCLUSION

In this paper we concluded that the voice parameters are changes with change in the age level. Here we used three age levels one is adult age second level is middle age and third level is old age level. In this we considered the three voice parameters that are Fundamental frequency, Formant frequencies and Intensities on the basis of vowels ('a', 'e', 'i', 'o', 'u') we proved the age detection process. We get the results are Fundamental frequency, Formant frequencies and Intensities response decreased with increased in age of the person.

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