Various Techniques Used For Emotion Detection from Speech

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Abstract

Emotion detection plays very important role for making interactive communication If we already know the emotion of the person to whom we are communicating then we can easily talk him according that person mood. With the help of the emotion detection we can make good understanding Generally the communications are made verbally[1,3]. So the emotion detection is can be done from the speech only. Now days the emotion detection from speech is the attractive topic of the researchers. As we know that every human have different types of emotions. In this paper we focus on the some general emotion of the human such as neutral, anger, joy, happy, sad etc. For detecting the emotion of the human emotion we generally analysis the different features of the speech.

Keyword – Emotion detection, Features of speech, Speech Analysis, human emotion study, Techniques for emotion detection

I. INTRODUCTION

Now days the emotion detection from speech is the interesting task of the researcher. Generally we use the verbal communication, as we know that every person has different type of emotion according their mood[2,4,5]. According to the emotion there is variation in the speech properties, for example we can know the emotion or mood of any small kid only by the speech of him/her. The speech has several property such as –pitch, force, loudness, stress, frequency etc. by analysis of these features we can easily know the emotion of the speaker. According to the mood of the person the property of the speech also effected. As we know that any person have different types of emotion such as – happy, sad, fear, disgust, anger, surprise, excitement, relief, pride, shame, satisfaction, guilt, embarrassment etc. these all are some common emotion that each person have. In this paper we focus on this feature and find out that how these features can be used to know the emotion of the speaker. In this paper we also analysis the methodology which is helpful for emotion detection.

II. Features of Speech

a) Pitch

The pitch of any sound is different according to the emotion of the speaker. As we know that related to the frequency of the sound waves.as we know that the level of the pitch can be calculated that at what speed the sound is making the vibration in the air waves[6]. Generally the pitch has three levels as high, low, and standard as shown in the fig 1.

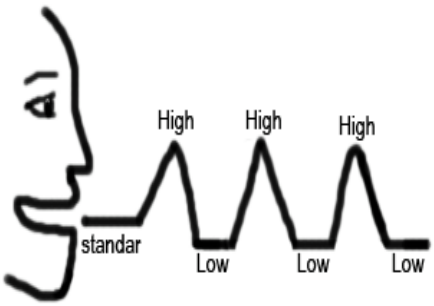

Fig 1: Pitch Level

The level of the pitch is depends upon the oscillation. The standard pitch level has normal oscillation and the high level pitch have fast oscillation and the low pitch have slow oscillation. The pitch is depends upon the vocal folds of the speaker. The man and the woman have different length of vocal fold the male vocal folds range between 17mm to 25mm and female vocal folds range between 12.5mm to 17.5 mm. The pitch is the important component of sound as the pitch is depends upon individual as well as sentence or speech.

b) Loudness of Speech

Generally loudness of speech is idiosyncratic the pressure of sound in the speech of the speaker. Loudness several meaning according to the uses[3,4]. Loudness idiosyncratic measure is totally different from the physical measures. According to the emotion the speaker deliver the speech as the anger mood the speaker use the high loudness and in sad mood the loudness is very low. So this feature is useful for detecting the emotion of the speaker.

c) Force in the Sound

The force in the speech plays very important role. Force is mainly applied on every word of the speech according to the emotion of the speaker. As the anger mood the speaker forces the word by which he/ she can express his / her felling to the listener. So, with the help of this emotion we can easily extract or detect the emotion of the speaker for each work which is spoken in the speech. This feature is important because in the long speech the speaker have different emotion for every word as well for every sentence.

d) Frequency of Speech

The frequency means the reputation of the pattern that occurs in the given time. According to the emotion the speaker uses the different frequencies. By analysis the every frequency of the speech we can easily know the mood in which the speaker is delivering the sentences to the listeners.

e) Stress in Sound

The stress is generally known as the degree of emphasis of the speech of speaker[1]. According to the emotion or felling of the speaker the stress varies in the whole speech as if speaker is in anger mood or in any problem then the speech which is delivered by him/ her have max stress in the other part if the speaker is on happy mood then the stress is low.

III. Emotion of Human

a) Happy

Happiness is the wonderful emotion that occur by the felling of the joy, contentment, gratification, satisfaction etc. In the happy emotion the tone of the speaker is pleasant and upbeat, the if a joyfulness in the voice of the speaker.

b) Sad

The sadness emotion is occur by the felling of the hopeless, degradedness, disappointment, grief. The sadness of the speaker can be determined by the dampened mood as well as quietness. In the sad emotion the pitch of the speaker is very low and the is also very less force in the sound. There is also some variation in the speech frequency.

c) Fear

The fear emotion occur when any one face any type of trouble or danger. In the fear emotion the

frequency of the speech have some vibration as well as the force of the is very low.

d) Anger

The anger emotion occurs by the felling of the agitation, antagonism. It may also occur when something is not going according your perception. In the anger emotion the tone of the speaker is gruffly or can be yelling. The pitch is also high. The speaker uses much force on the word in his/ her speech.

e) Surprise

The surprise emotion may be positive or negative, it generally occurs of something unexpected. In the speech of speaker the surprise emotion can be detected by the yelling, gasping and screaming.

f) Excitement

The excitement emotion occur when we are excepting something to be done according our perception. In the excitement emotion the frequency of the speech is high and the pitch as well as force is verify word by word in the complete speech. So this property can be consider to find out the emotion of the speaker.

g) Satisfaction

The satisfaction emotion is also the part of the happy emotion. The satisfaction emotion occur when the work is completed according our perception. In the Satisfaction emotion the tone of the speech is smooth with normal frequency as well as normal force and loudness.

IV. Methodology For emotion detection from Speech

When we have to determine the emotion from the speech we have to follow some steps which are show in the below image

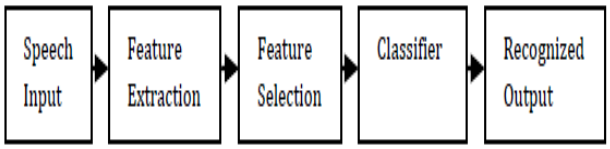

Fig 2: Steps for emotion detection

Steps for Emotion Detection

Step1: Record the speech in the audio format.

Step2: Extract all the feature of speech.

Step3: Select the important features of speech.

Step4: Analysis the emotion of speech according of every feature.

Step5: Classify the feature.

Step6: Output the detected emotion

V. Conclusion

In this paper we do the analysis of the different features such as pitch, force, loudness and frequency etc. of the speech and find out that how these features can be used to know the emotion of the person to whom we are communicating. We also focus the common emotion of the person as happy, sad, surprise, anger, shame, satisfaction, fear, excitement etc. We also analysis the complete process by which we can know the emotion of the speaker.

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