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NBA (BME, CSE, ECE, EEE and Mechanical)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

"EMOTIONAL RECOGNITION USING TEXT&AUDIO"

PRESENTATION BY,

NAMES:

ASWIN.N	710720104011
JANANIKEERTHANA.U	710720104034
JERISH PRINCETON.R	710720104037
SIVAPRAKASH.A	710720104307

UNDER THE GUIDANCE OF ,

GUIDENAME:Mr.SELVARAJ.R

DESIGNATION:Assistant Professor (SLGR) / CSE

Outline of the Work

- Introduction
- Problem Definition
- Objectives of the work
- Existing System
- Literature Review(Table Format)
- Proposed system
  - System Design
  - Methodology
- Results & Outcome
- Coding ScreenShots
- Conclusion

Introduction

- Deep learning algorithms have successfully solved machine learning problems.
- Machine intelligence can be used to understand and reflect human emotions.
- The goal of speech emotion recognition is to predict the emotional content of speech and classify speech according to one of several labels (i.e., happy, sad, neutral, and angry).

Problem Definition

- NLP focuses on how computers can analyze, understand, and generate human language data.
- NLP enables computers to understand, interpret, and generate natural language data.
- NLP uses machine learning, deep learning, and AI to achieve tasks.

Objectives of the Work

- Identifying emotion from speech is a non-trivial task pertaining to the ambiguous definition of emotion itself.
- Multimodal machine learning models compared to deep learning models.
- Light-weight models outperform deep learning, but combining feature sets can complicate the learning process and increase overfitting.

Existing System

- Emotion recognition is a challenging task, and extensive reliance has been on models that only use Facial and Audio features in building well-performing classifiers.

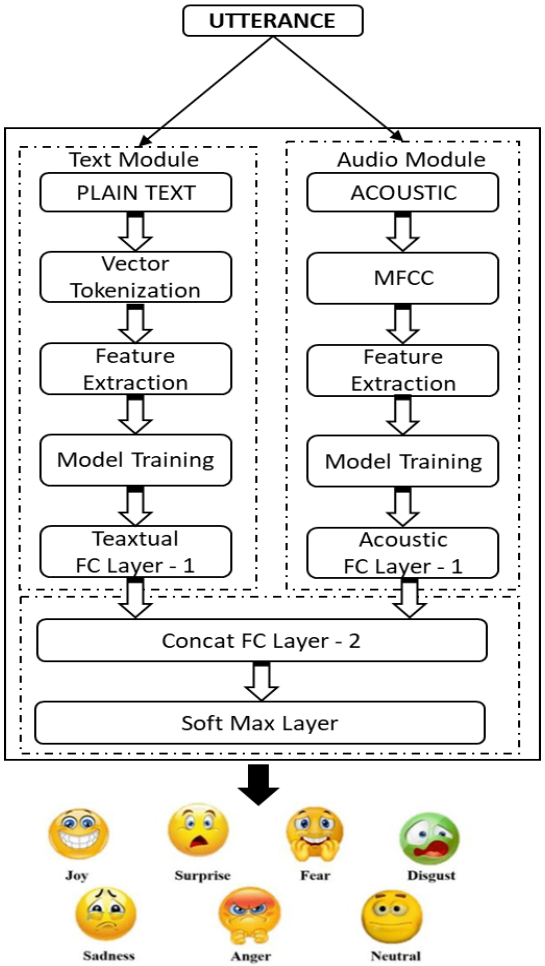
- AffectNet

- SPEAR

Literature Review

Title of Paper	Authors	Year of Publications	Journal/Conference Name	Inference from the paper
Multi-level Speech Emotion Recognition Based on HMM and ANN	Mao, X., Chen, L., Fu, L	10-08-2020	*IJRESM*	. In: WRI World Congress on Computer Science and Information Engineering,
"Audio-based emotion estimation for interactive robotic therapy for children with autism spectrum disorder," in Proc.	J. Kim, P. Azzi, M. Jeon, A. M. Howard, and C. H. Park,	04-04-2021	IJARCCE	In this paper we learnt about various software deeply invloved in the system.
Emotional chatting machine	Hao Zhou, Minlie Huang, Tianyang Zhang, Xiaoyan Zhu, and Bing Liu	12-08-2018	JETIR	Emotional conversation generation with internal and external memory
Features, classification schemes, and databases	M. El Ayadi, M. S. Kamel, and F. Karray	07-03-2018	JMESTN	In this paper we learnt about the various security measures,GSM call ,operations involved in camera positioning.

Proposed System-Architectural Design of the System



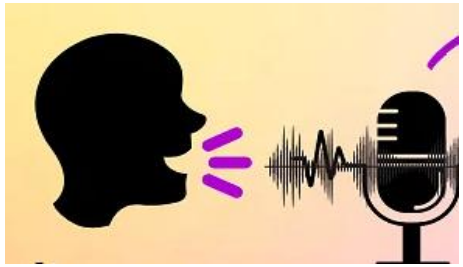
Proposed System-Methodology

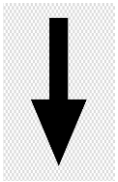
- Deep dual recurrent encoder model uses text and audio signals to better understand speech data.
- Dual Recurrent Neural Network combines audio and text to predict emotion class.
- Understanding human emotions through machine intelligence.
- Building robust emotion classifiers to develop emotionally aware intelligence.

Results and Outcome

- Emotional recognition using text and audio provides accuracy and reliability.
- Technology can improve mental health, customer service, and entertainment experiences.
- Implementation of emotional recognition technology can improve communication and empathy.

Coding Screenshots





CODING

TEXT BASED EMOTION RECOGNITION CODE

```
# Text Based Emotion Recog using NLP Vect
!pip install tensorflow

import os

import tensorflow
print(tensorflow.__version__)
import keras
print(keras.__version__)
#install the NLTK (Natural Language Toolkit)
!pip install nltk
import pandas as pd
import numpy as np
from nltk.corpus import stopwords
from nltk.stem.porter import PorterStemmer
import re
train=pd.read_table('train.txt', delimiter = ';', header=None, )
val=pd.read_table('val.txt', delimiter = ';', header=None, )
test=pd.read_table('test.txt', delimiter = ';', header=None, )
data = pd.concat([train , val , test])
data.columns = ["text", "label"]
data.shape
data.isna().any(axis=1).sum()
#text preprocessing
ps = PorterStemmer()
def preprocess(line):
    review = re.sub('[^a-zA-Z]', ' ', line) #leave only characters from a to z
    review = review.lower() #lower the text
    review = review.split() #turn string into list of words
    #apply Stemming
    review = [ps.stem(word) for word in review if not word in
stopwords.words('english')]
#delete stop words like I, and ,OR   review = ' '.join(review)
    #trun list into sentences
    return " ".join(review)
```

```
#install the NLTK (Natural Language Toolkit)
import nltk
nltk.download('stopwords')
data['text']=data['text'].apply(lambda x: preprocess(x))
from sklearn import preprocessing

label_encoder = preprocessing.LabelEncoder()
data['N_label'] = label_encoder.fit_transform(data['label'])
data['text']
# Creating the Bag of Words model by applying Countvectorizer -convert textual
data to numerical data
from sklearn.feature_extraction.text import CountVectorizer
cv = CountVectorizer(max_features=5000,ngram_range=(1,3))
#example: the course was long-> [the,the course,the course was,course, course was,
course was long,...]
data_cv = cv.fit_transform(data['text']).toarray()
data_cv
#X_train, X_test, y_train, y_test=data_cv,test_cv,train['N_label'],test['N_label']
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test =train_test_split(data_cv, data['N_label'],
test_size=0.25, random_state=42)
# first neural network with keras tutorial
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
# load the dataset
# split into input (X) and output (y) variables
# define the keras model
model = Sequential()
model.add(Dense(12, input_shape=(X_train.shape[1],), activation='relu'))
model.add(Dense(8, activation='relu'))
model.add(Dense(6, activation='softmax'))
# compile the keras model
model.compile(loss='sparse_categorical_crossentropy', optimizer='adam',
metrics=['accuracy'])
# fit the keras model on the dataset
# fit the keras model on the dataset
history = model.fit(X_train, y_train, epochs=10, batch_size=10,
validation_data=(X_test, y_test))
# evaluate the keras model
_, accuracy = model.evaluate(X_train, y_train)
print('Accuracy: %.2f' % (accuracy*100))
import matplotlib.pyplot as plt
```

Conclusion

- Emotion recognition has seen progress in recent years, but there are still challenges to be addressed to make it more effective and reliable.
- Emotion recognition algorithms are still limited, but there is potential for further development.
- Emotion recognition advances, new applications and use cases expected.

Thank you

Queries ?