**METHODOLOGY**

In the course of the project work, investigation of acoustic information in

order to improve the performance with respect to overall classification error of some attitude to be model from speech was carried out**.** The scheme for combining various sources of information was decision level fusion using data mining tool. Here, we have five independent class of emotion , and then a final decision is made by combining the output results from these classifiers. Figure 3.0 shows the overall steps in classification . Focus is on perceived emotions based on a set of features extracted from the audio and on impoliteness as the only factor of conversational quality.

DATA COLLECTION

ATTRIBUTE SELECTION.

DATA PREPROCESSING AND CLASSIFICATION.

CROSS VALIDATION AND EVALUATION

Fig 3.1: FLOW CHART FOR THE MODELLING PROCEDURE

**1. DATA COLLECTION.**

The enterface’05 emotion database is an audio-visual emotion database that can be used as a reference database for testing and evaluating emotion recognition algorithm used in this work. Content of the database contains 42 subjects coming from 14 different national. Among the subjects a percentage of 81% were men, while remaining 19% were women. All the experiments were driven in English language. They had to react to each of the situations and human experts judged whether expressed the emotion in an unambiguous way. if this was the case , the sample was added to the database, if not , it was discarded. Sample rate of 44100Hz, normal volume wav bit rate of 7056kbits/sec.

**2. ATTRIBUTE SELECTION.**

Primary structure prediction has to do with predicting primary emotions which in speech which will later be used to create model for other emotions used in call center quality assessment from audio file gotten from enterface database.

MIR toolbox in Matlab is used that has a function MIREMOTION based on Eerola, Lartillot and Toiviainen, 2009 work that predict such description of emotion based on the analysis of the audio contents of the recordings . Hence the output of miremotioncorresponds to this underlying localization of emotional content within the 5 basic classes . Each class is supposed to have values spanned in the interval [1,7]. Value 1 would correspond to very low value, and value 7 to very high value. This convention is used because the models are based on listeners' emotional ratings that were collected exactly the same way, as it corresponds to a classical Libert scale used in experimental psychology.

But even if the model was constructed using observation spanning in the interval [1,7], particular audio examples, not considered in the training, can extend beyond that range. So the interval [0,8] looks like a more probable range of value for this concepts.

Results from the prediction create a score for each of the class ( happy, sad, tender, anger, fear) within the range of 0-7 for each dataset. Overall data set used is 945 samples presented inarff format later exported to weka 3.6 data minning tool for further preprocessing and classification.

**3. DATA PREPROCESSING AND CLASSIFICATION.**

In the pre-processing phase, Discretization would be performed on the dataset , process is known to be one of the most important data preprocessing tasks in data mining. Many machine learning techniques can be applied only to data sets composed of categorical attributes but a lot of data sets include continuous variables. One solution to this problem is to partition numeric variables into a number of sub-ranges and treat each such sub-range as a category. This process of partitioning continuous variables in to categories is usually termed discretization.

After discretization, a special multi-classifier system would be developed converting continuous variable to nominal variable. The classification system has a two-layered structure, The low-level classifiers used to create attribute from the attribute from the database as a new class. The modeling process of the fusion model is as follows: at first every instance that belongs to each emotion class are classified by the chosen model from, leading to 5 attribute for every instance. The original class attribute, either “polite as Yes ” or “impolite as No”, is kept in the new instance using emotional classes :sadness(high) ,fear (low)and anger(low) as instance of the class “politeness” in arff-format used by Weka.

The second development step is to learn a new classification model with the instances created . Due to the structure of the input data, the model can be trained with any classification algorithm that can handle nominal attributes.

**4. CROSS VALIDATION AND EVALUATION.**

In this work , two classifiers, naive bayes algorithm and J48 decision tree algorithm are used for comparison. The classification performance is measured by the recognition rate (RR) which is calculated via ten-fold cross-validation. Comparison is made on accuracy,

sensitivity and specificity using true positive and false positive in confusion matrix generated by the respective algorithms. Also we can use the correct and incorrect instances that give us a most efficient method for classification by using the confusion matrix.

**RESULT AND DISCUSION**

The performance of classification algorithm is usually examined by evaluating the accuracy of the classification. However since classification is often a fuzzy problem, the correct answer may depend on the user. Traditional algorithms evaluation approaches such as determining the space and time overhead can be used but these approaches are usually secondary. Determining which better best is depends on the interpretation of the problem by users.

**1.EXPERIMENTAL RESULT AND DISCUSSION .**

The performance of classification algorithm is usually examined by evaluating the accuracy of the classification. However since classification is often a fuzzy problem, the correct answer may depend on the user. Traditional algorithms evaluation approaches such as determining the space and time overhead can be used but these approaches are usually secondary. Determining which better best is depends on the interpretation of the problem by users.

classification using Naive Bayes algorithm and J48 decision tree algorithm on dataset.arff dataset was performed with Weka tool which provide inbuilt algorithms for naive Bayes and J48.

**1.1.Results and discussion for classification using J48 :**

J48 is applied on the data set and the confusion matrix is generated for class sadness which is one of the attribute pointing impoliteness.

Instances: 945

Attributes: 5

Happy

Sad

Tender

Anger

Fear

Test mode: 10-fold cross-validation

=== Classifier model (full training set) ===

J48 pruned tree

------------------

Sadness = '(-inf-2.809868]': '(-inf-4.751589]' (208.0/32.0)

Sadness = '(2.809868-inf)': '(4.751589-inf)' (737.0/221.0)

Number of Leaves : 2

Size of the tree : 3

Correctly Classified Instances 692 73.2275 %

Incorrectly Classified Instances 253 26.7725 %

Kappa statistic 0.412

Mean absolute error 0.3852

Root mean squared error 0.4391

Relative absolute error 79.0513 %

Root relative squared error 88.9694 %

Total Number of Instances 945

=== Detailed Accuracy By Class ===

TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class

0.443 0.058 0.846 0.443 0.582 0.459 0.669 0.623 '(-inf-4.751589]'

0.942 0.557 0.700 0.942 0.803 0.459 0.669 0.675 '(4.751589-inf)'

Weighted Avg. 0.732 0.347 0.761 0.732 0.710 0.459 0.669 0.653

=== Confusion Matrix ===

a b <-- classified as

176 221 | a = '(-inf-4.751589]'

1. 16 | b = '(4.751589-inf)'

**1.2.Results and discussion for classification using Naïve Bayes**

Naive Bayes is applied on the data set and the confusion matrix is generated for class sad which represent impoliteness.

Instances: 945

Attributes: 5

Happy

Sad

Tender

Anger

Fear

Test mode: 10-fold cross-validation

Naive Bayes Classifier

Class

Attribute '(-inf-4.751589]' '(4.751589-inf)'

(0.42) (0.58)

===========================================================

Happy

'(-inf--3.217105]' 89.0 68.0

'(-3.217105-inf)' 310.0 482.0

[total] 399.0 550.0

Sad

'(-inf-8.293094]' 306.0 481.0

'(8.293094-inf)' 93.0 69.0

[total] 399.0 550.0

Tender

'(-inf-1.770379]' 84.0 90.0

'(1.770379-inf)' 315.0 460.0

[total] 399.0 550.0

Anger

'(-inf-2.809868]' 177.0 33.0

'(2.809868-inf)' 222.0 517.0

[total] 399.0 550.0

Correctly Classified Instances 681 72.0635 %

Incorrectly Classified Instances 264 27.9365 %

Kappa statistic 0.409

Mean absolute error 0.3753

Root mean squared error 0.4407

Relative absolute error 77.0188 %

Root relative squared error 89.2783 %

Total Number of Instances 945

=== Detailed Accuracy By Class ===

TP Rate FP Rate Precision Recall F-Measure MCC ROC Area PRC Area Class

0.559 0.162 0.714 0.559 0.627 0.417 0.715 0.681 '(-inf-4.751589]'

0.838 0.441 0.724 0.838 0.777 0.417 0.715 0.709 '(4.751589-inf)'

Weighted Avg. 0.721 0.324 0.720 0.721 0.714 0.417 0.715 0.698

=== Confusion Matrix ===

a b <-- classified as

222 175 | a = '(-inf-4.751589]'

89 459 | b = '(4.751589-inf)'.

Conclusively, From the analysis for both J48 and Naïve Bayes, J48 shows recognition rate of 73.22% with Weighted Average of TP rate value=0.732 FRate= 0.34 And ROC Area of 0.710 , which shows a better classified model compaired with Naïve bayes that has 72.06% recognition Rate .