VOICE MODULATION AND VERIFICATION FOR SMART AUTHENTICATION SYSTEM

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ABSTRACT:- Biometric is physical characteristic unique to each individual. It has a very useful application in authentication and access control. The designed system is a text-prompted version of voice biometric which incorporates text-independent speaker verification and speaker-independent speech verification system implemented independently. The foundation for this joint system is that the speech signal conveys both the speech content and speaker identity. Such systems are more-secure from playback attack, since the word to speak during authentication is not previously set. During the course of the project various digital signal processing and pattern classification algorithms were studied. Short time spectral analysis was performed to obtain MFCC, energy and their deltas as feature. Feature extraction module is same for both systems. Speaker modelling was done by GMM and Left to Right Discrete HMM with VQ was used for isolated word modelling. And results of both systems were combined to authenticate the user. The speech model for each word was pre-trained by using utterance of 45 English words. The speaker model was trained by utterance of about 2 minutes each by 15 speakers. While uttering the individual words, the recognition rate of the speech recognition system is 92 % and speaker recognition system is 66%. For longer duration of utterance (>5sec) the recognition rate of speaker recognition system improves to 78%.

1. INTRODUCTION

A Text involves Traditional and Scientific Methods to improve the quality of the Text to voice recognition. Scientific methods of Text training need to be introduced for further improvement with our present day empirical methodology. The process of enriching the Text is known as Text culture. It involves training the Text to sing or speak in a particular desired way. It is a procedure where one learns to master one's Text. This study includes traditional and scientific methods to improve the quality of Text. Fundamentally Text culture refers to the methodology adapted to train or control the Text to sing effectively. The dynamism, perfect control and freedom of the Text and the uplifting and inspiring effect of the performance. The entire vocalizing mechanism involves coordinated action of various muscles initiated by the brain combined with a sense of purpose to express a thought or idea.—Text culture is the coming together of an understanding of science (to a high degree) with the physical feel of the Text. We will have to understand the terms anchoring, focusing, erection and fusion of the Text itself.

2. SYSTEM ANALYSES

2.1 Existing System

Currently the viable authentication mechanisms is use are password or PIN based. A user wishers to be authenticated enters a short string or a number which is supposedly easy to remember, but is easy to forget and the authenticating machine checks the hash of the password against a stored hash in a database. If a user were to forget his or her password or it was stolen by someone wishing to steal the user's identities of the user becomes endangered and easy to compromise. A common solution to the problem is to implement a biometric authentication mechanism such as retina scans or fingerprint based authentication. The advantage of this a retina or a fingerprint cannot be forgotten and it is unique to each user. While such a system us extremely difficult to compromise, the cost of implementation restricts its development. In addition, if such biometric data was in fact compromised, the result would be disastrous for the user- he or she cannot change fingerprints or retinas.

2.2 Proposed System:

The system proposed to solve both the problem of password based authentication and biometric authentication is via Text Verification Using Back Propagation. The hardware necessary for Text verification is inexpensive and it can be deployed in (E.g. credit card machines in stores, tablet PCs, ATM machine).The system is proposed to overcome authenticating problem in Text verification with the help of Back propagation Algorithm. Any person in this world can never sign a same Text every time in their life time. His/her Text will be differing from time to time. When the user is in a calm mood the Text will be very different than the Text of the same user in a hurry or in a bad mood. So to overcome this problem Back propagation Algorithm this is one of the best neural network techniques to train the artificial neuron to recognize the different type of Text of same user. If the neurons are fine-tuned they can provide us the best authentication security.

3. SOFTWARE REQUIREMENT SPECIFICATIONS

3.1 Introduction to .NET Framework

- The Microsoft .NET Framework is a software technology that is available with several software windows operating systems.
- It includes a large library of pre-coded solutions to common programming problems and a virtual machine that manages the execution of the programs written specifically for the framework.
- The pre-coded solutions that form the framework's Base Class Library cover a large range of programming needs in a number of areas, including user, interface, data access, database connectivity, cryptography, web application development, numeric algorithms and network communications.
- The class library is used by programmers, who combine if with their own code to produce applications.
- Programmers written for the .NET framework executes in the software environment that manages the program's runtime requirements. Also part of the .NET framework, this runtime environment is known as the common Language Runtime (CLR).

4. SYSTEM IMPLEMENTATION:

4.1 USER DETAILS MANAGEMENT:

In this module user details along with user original Text is stored in the database. The Text will be converted into binary format & stored as OLE object in database. Initially the variance for comparison is set to an acceptable value. All the database operations are done in SQL using stored procedures concept.

4.2 TEXT CAPTURING:

4.4 TEXT RETIEVAL FROM DATABASE

4.4.1 LEARNING TEXT

In this module a new Text is got from user as input, after that Text is processed as follows. The number of Text strokes, timing of strokes, Text proportions and stroke length. If any of the process results in variance less than the initial variance, then absolute difference are calculated between the new variance and initial variance. If the error or difference is not minimized to a value, the average is taken between new and initial variance. This average is taken as a input variance for another new Text. Again the difference is calculated if the error is not minimized the above process is repeated until error is minimized. The application user must stop only if he is satisfied with the result. If the error is minimized final variance and last error is stored in database, for next phase of verifying Text.

4.4.2 TEXT PROPORTION VERIFICATION

The Text proportion we use both the height and width will be checked. For finding the height and width of the Text it use the **Get Bounding Box ()** method. This method return the height and width value of the Text. This method returns the height and width of every node in the Text. Using the height and width of the Text the verification is done separately for height of the Text and the width of the Text separately.
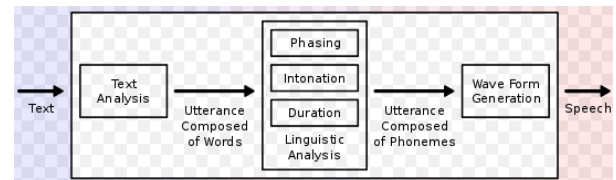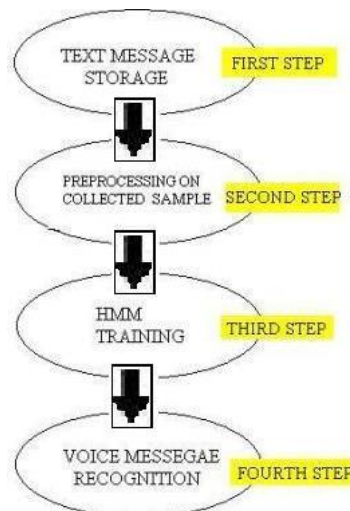

4.4.3 TEXT PROPRTION IN WIDTH

The width of the both the Text is found using the **GetBoundingBox()** method and by combining the width of two Text the output variance will be calculated and this output variance is compared with the input variance and if the output variance is greater than input variance then the Text is rejected.
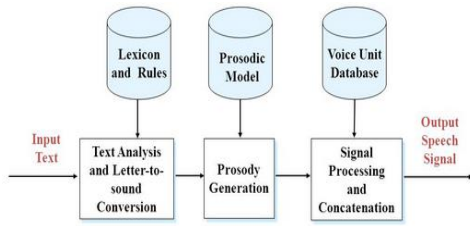
4.4.4 TEXT PROPRTION IN HEIGHT

The Height of the both the Text is found using the **GetBoundingBox()** method and by combining the width of two Text the output variance will be calculated and this output variance is compared with the input variance and if the output variance is greater than input variance then the Text is rejected.

4.5 Modulation Techniques

The Communications Toolbox™ supports modulation these techniques for digital data. All the methods at the far right are implemented in library blocks. Like analog modulation, digital modulation alters a transmittable signal according to the information in a message signal. However, for digital modulation the message signal is restricted to a finite set. Modulation functions output the complex envelope of the modulated signal. Using the Communications Toolbox, you can modulate or demodulate signals using various digital modulation techniques, and plot signal constellations.
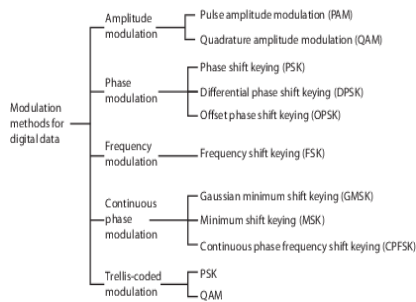

5. UML DIAGRAM

UML stands for Unified Modeling Language. UML is a standardized general-purpose modeling language in the field of object-oriented software engineering. The standard is managed, and was created by, the Object Management Group. The goal is for UML to become a common language for creating models of object oriented computer software. In its current form UML is comprised of two major components: A Meta-model and a notation. In the future, some form of method or process may also be added to or associated with UML. The Unified Modeling Language is a standard language for specifying, Visualization, Constructing and documenting the artifacts of software system, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that have proven successful in the modeling of large and complex systems. The UML is a very important part of developing objects oriented software and the software development process. The UML uses mostly graphical notations to express the design of software projects.

5.1 ER DIAGRAM:
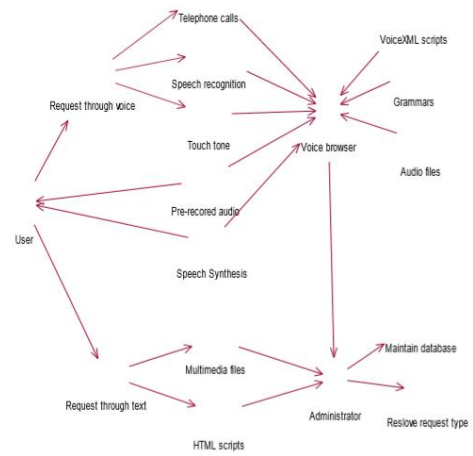
5.2 CLASS DIAGRAM:

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among the classes. It explains which class contains information.
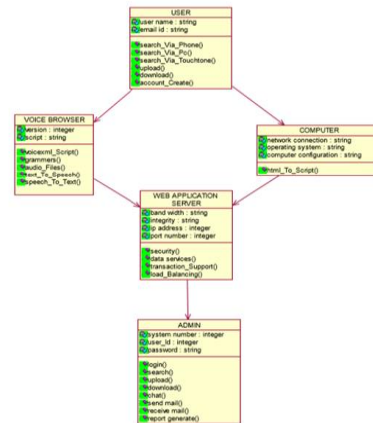
5.3 SEQUENCE DIAGRAM:

A sequence diagram in Unified Modeling Language (UML) is a kind of interaction diagram that shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart. Sequence diagrams are sometimes called event diagrams, event scenarios, and timing diagrams.
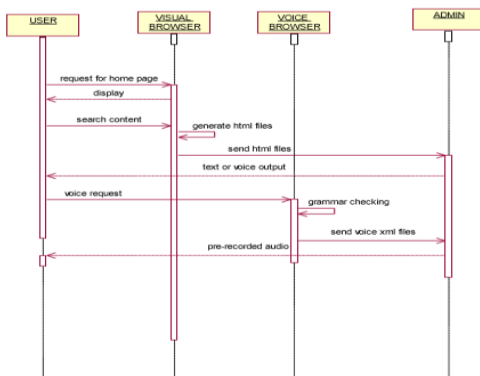
6. SYSTEM TESTING

Testing virtual to the success of the system. System testing makes logical assumption that if all the parts system are correct, the goal will be successfully achieved. This system is tested by following test cases and prepared for final implementation.

6.1 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produces valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application. It is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation and user manuals.

6.2.4 SYSTEM TESTING

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

6.2.5 WHITE BOX TESTING

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

6.2.6 BLACK BOX TESTING

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box .you cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

6.2.7 ACCEPTANCE TESTING

User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements.

Functional testing is centered on the following items:

Valid Input   :   identified classes of valid input must be accepted.

Invalid Input   :   identified classes of invalid input must be rejected.

Functions   :   identified functions must be exercised.

Output   :   identified classes of application outputs must be exercised.

Systems/Procedures.

7. OTHER TESTING METHODOLOGIES

7.1 User Acceptance Testing

User Acceptance of a system is the key factor for the success of any system. The system under consideration is tested for user acceptance by constantly keeping in touch with the prospective system users at the time of developing and making changes wherever required. The system developed provides a friendly user interface that can easily be understood even by a person who is new to the system.

7.2 Output Testing

After performing the validation testing, the next step is output testing of the proposed system, since no system could be useful if it does not produce the required output in the specified format. Asking the users about the format required by them tests the outputs generated or displayed by the system under consideration. Hence the output format is considered in 2 ways – one is on screen and another in printed format.

7.3 Validation Checking

Validation checks are performed on the following fields.

7.4 Text Field:

The text field can contain only the number of characters lesser than or equal to its size. The text fields are alphanumeric in some tables and alphabetic in other tables. Incorrect entry always flashes and error message.

7.5 Numeric Field:

The numeric field can contain only numbers from 0 to 9. An entry of any character flashes an error messages. The individual modules are checked for accuracy and what it has to perform. Each module is subjected to test run along with sample data. The individually tested modules are integrated into a single system. Testing involves executing the real data information is used in the program the existence of any program defect is inferred from the output. The testing should be planned so that all the requirements are individually tested.

A successful test is one that gives out the defects for the inappropriate data and produces and output revealing the errors in the system interfacing systems or procedures must be invoked.

8. CONCLUSION

In this project, I have presented an exercise survey of smart authentication system, I have categorized the modules in speaker recognition and discussed different approaches for each module. In addition to this, I have presented study of the various typical search being carried out in the field of speaker recognition. I have also discussed issued and challenges pertaining to the speaker recognition system and face recognition system for smart authentication systems. And also I did smart authentication for large sectors for security purpose. This project is used for security or Network Security by the coming generation to used this security system.

9. FUTURE ENHANCEMENT

The purpose of this module is to convert the speech wave form to some type of parametric representation at a considerably rate. The heart of any speaker recognition features from the speech and face recognition. They are basically categorized into level of speech and level of authentication. The version of Text and face recognition is going to be help of the security purpose. The Text Modulation and verification is helps to the banking sector and other sectors to be used in future. Modulation of Text and Recognition of face is the high level security of the Smart Authentication System.

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