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Authentication System Based on the Combination of Voice Biometrics and OTP Generation

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ABSTRACT

Authentication is the process by which the identity of an individual is verified. Voice authentication is the verification of identity based on the analysis of an individual's voice. Voice authentication has various advantages, but it is seldom implemented due its shortcomings as compared to other forms of biometric authentication. In this paper we have discussed about the approach for the implementation of voice authentication system through the combination of OTP to increase its real world applicability and reduce its shortcomings.

KEYWORDS: *Authentication System, Voice Biometrics, OTP Generation*

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I. INTRODUCTION:

In recent times the most popular type of authentication is password authentication, but with the increasing number of attacks by hackers it becomes essential to set a strong password. The strength of a password is equivalent to its complexity, but due to increase in complexity, it becomes very difficult to remember such passwords. So alternative forms of authentication which use biometrics are very useful as the user does not have to remember anything to authenticate his or her identity.

Biometric authentication such as fingerprints and iris biometrics require very specialized equipment and are therefore costly and difficult to implement whereas voice authentication require minimal amount of equipment and also very easy to implement. But voice authentication can be broken with help of voice recordings which can obtained fairly easily. So the purpose of this paper is to overcome the shortcoming of voice authentication with OTP so that it is resistant to attacks with recorded voice.

II. EXISTING SYSTEM

In voice authentication the first step is to input the audio data into the system and convert it in to format in which it can be processed. In this method we take the sound waves which are one dimensional in nature and turn it in into numbers by recording the height of the wave at equally spaced points. This process is known as sampling. This sampled data is stored into the system.

In the next step, the stored audio data is pre-processed so that it easier for the neural network to recognize patterns in it. This can be done in a variety of ways depending on neural network used. The audio data is represented in various formats for example it can be represented in the form of a spectrogram, which is the visual representation of audio data.

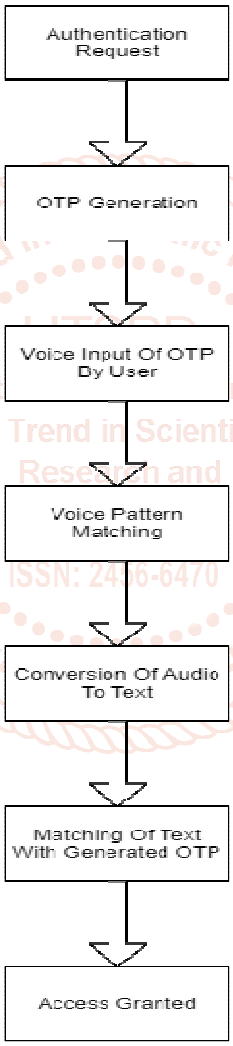
In the next step, we extract features from this pre-processed audio data so that the neural network can analyze them and recognize patterns from them. These patterns are used to match and compare different types of audio data.

After the extraction of features, it is sent into the neural network. A number of samples of the user's voice is recorded and then sent into the neural network model to train it and find similar patterns which is used to recognize the user's voice during voice authentication.

Although this type of voice authentication has various advantages the main drawback from the security point of view is that it cannot differentiate between a recorded voice played from an audio voice and the actual user. The system only recognizes feature patterns from the audio, which is also present in audio played through audio devices. This is a huge problem for an authentication system, as the identity of the user, can be easily spoofed with the help of a recording of the user's voice.

III. SOLUTION

Considering the drawback mentioned above, a possible solution is the implementation OTP along with voice authentication. In this method, first during the registration process the user is requested to recite numbers from zero to nine, one by one a number of times. This data, is recorded as ten different inputs and then sent into the algorithm, to train it so that it can recognize the voice pattern of the user. After the registration process is completed, the user can login using his voice. In the login process, the user sends an authentication request, after receiving this request the program generates a random four digit unique code, which is displayed on the screen. Then unique code or OTP is recited by the user. When the OTP is recited by the user, it is taken as input into the system. Each digit recited by the user is input into the previously trained algorithm one by one, the pattern of the voice is matched with the pattern of the user's voice. If the voice pattern of each of the digit matches with the voice pattern of the user, the next step is initiated where each digit is converted from speech to text format, this text is the matched with the previously generated OTP. If the text matches with the previously generated OTP, then the authentication process is complete and the user is granted access.



This implementation is a very effective solution because the attacker cannot access the system with a pre-recorded audio as the voice passphrase changes every time. As each digit of the passphrase, is converted into text and compared with the generated OTP, a previously recorded audio of the user will have the same voice pattern but after it has been converted to text it will not match currently generated OTP, thereby preventing identity spoofing.

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