

DATABASE INTERACTION USING SPEECH RECOGNITION

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ABSTRACT

Interaction with standard databases are possible only if we know about standard SQL queries. This paper focuses on interacting with a database with speech. Here users can interact with the database with their voice for retrieving details from it. Hence it is not necessary that user must a prior knowledge of SQL queries. Information Retrieval deals with the easy access to the information based on the user's request, which will be presented in the form of a query. A dialog system that understands spoken natural language queries, asks for further information if necessary and produces an answer to the speaker's query. Most of the research works in Information Extraction focus only on written language processing, in which a few are devoted to the study of Spoken Language Information Extraction.

Keyword: - Word Recognition, Keyword search, Query Processing, Pattern Matching, Speech Recognition, Database, Performance Evaluations, Speech to SQL, SQL generator.

1. INTRODUCTION

Natural Language Processing is a sub-field of Artificial Intelligence that is used to create intelligent machines that can communicate with humans in the same way that humans do with each other. It shortens the gap between man and machine. The main goal of Natural language Query Processing is to have a machine translate human sentences.

2. LITERATURE SURVEY

"[1] "Conversion of natural language Query to SQL Query"

Author: Abhilasha Kate, Satish Kamble, Aishwarya Bodkhe

Every person will get pleasure from employment of tongue. Using plain English, this device can assist Users in retrieving and managing data from various databases. The consumer is not required to learn a complex query language such as SQL. The system's user-friendliness stems from its ability to take data in speech format.

[2] "A Speech Recognition and Speech Corpus System based on Matlab"

Author: Qiang He, Youwei Zhang

Matlab handles memory maintenance and other tasks, allowing users to concentrate on the core of the HMM training and recognition algorithm. This makes you save a lot of time. When an algorithm has been fully understood, successfully improved, or a new collection of algorithms has been created, it is possible to migrate them to another language as quickly as possible.

[3] "Voice based Natural Language Query Processing "

Author: Puja Munde, Sayali Tambe

This device was created using speech recognition technology. User's speech is taken as input and then converted into text. This text is further converted into SQL query and the results are displayed in a tabular format. To get results in tabular format, techniques like analyzer, parser, matching and dictionary mapping are used. The NLP technique assists in the resolution of both basic and complex questions.

[4] "Key word based Query Recognition in a Speech Corpus by using Artificial Neural Networks"

Author: Raji Sukumar A, Sarin Sukumar A

Because of the universal availability of the internet, people feel that there is nothing more easy than searching the internet. Despite this, a significant portion of the world's population lacks access to the Internet. As a consequence, speech query processing systems are extremely necessary. The scheme includes a natural language question based on grammar, which describes how words are combined in a meaningful way using well-known laws.

[5] "Speaker Independent Speech Recognition System for Paite Language using C# and SQL Database"

Authors: Kapang Leogh, Chingmuankim

Speaker independent Speech Recognition System is a system trained to respond to the users, regardless of who the speaker is. With the rapid increase and advancement in technologies, individuals can now interact with laptops, computers and smartphones. Speech Recognition System serves as the main interface between human and computer. Many Research has been done major Indian Languages.

[6] "Effective XML Keyword Query Processing"

Author: Prashant R. Lambole, Dr. Prashant N, Chatur

We proposed an efficient XML keyword query processing technique based on ELCA query semantic for the better knowledge discovery over XML data in this paper. Taking into account the problem of missing keywords in a query and the sparse distribution of keywords in an XML text, our proposed technique provides meaningful results even when standard ELCA computation algorithms return NULL or root node by locating ELCA nodes for sub-queries generated using a subset of keywords in the query.

3. SPEECH RECOGNITION

Speaker Recognition is another term for Speech Recognition. The user must say a word or phrase into a microphone at the time of enrollment. This is required in order to obtain a candidate's speech sample.

An Analog to Digital Converter (ADC) converts the electrical signals from the microphone into a digital signal. It is saved as a digitized sample in the computer memory. The machine then compares and tries to fit the candidate's input voice to the stored digitized voice sample, resulting in identification of the candidate.

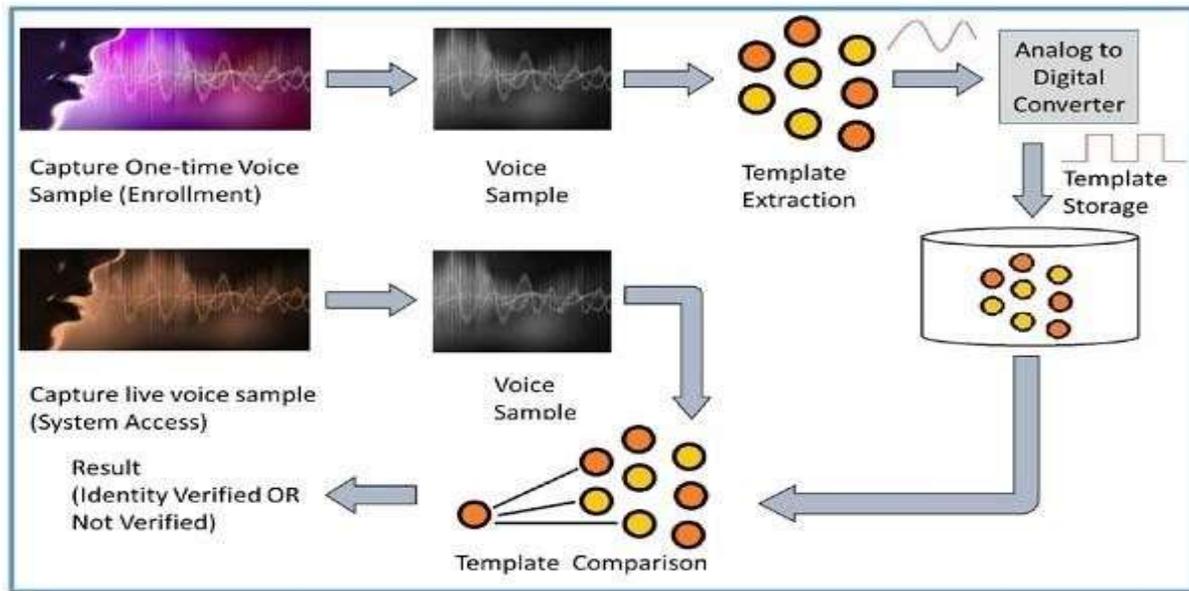


Fig -1 : Speech Recognition

4. MATHEMATICAL MODELLING

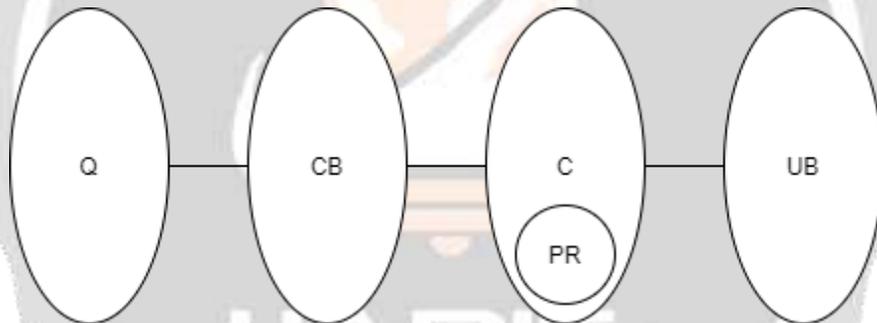


Fig -2: Math Model

Where,

- Q = User Input
- CB = Preprocess
- C = Apply classifier Algorithm

- PR = Preprocess request evaluation
- UB = Response

Set Theory

Let S be a system which inputs voice

$$S = \{In, P, Op, \mu\}$$

Identify Input In as $In = \{Q\}$

Where,

$Q =$ User entered input(voice)

Identify Process as $P = \{CB, C, PR\}$

Where,

$CB =$ Preprocess

$C =$ Apply Classifier Algorithm

$PR =$ Preprocess request evaluation

Identify Output OP as $Op = \{UB\}$

Where,

$UB =$ Predict outcome

$\mu =$ Failures and success conditions.

Failures:

A large database will increase the amount of time it takes to retrieve information.

Failure of the hardware.

Failure of program.

Success:

Look at the dataset for the details you need.

The user receives a short response based on their specifications.

Space Complexity:

The complexity of spaces is determined by how discovered patterns are presented and visualized. The more data is processed, the more space is needed.

Time Complexity:

Check the number of trends in the dataset. Suppose number of trends = n .

If ($n > 1$), retrieving information will take a long time. As a result, this algorithm has an $O(nm)$ time complexity.

The mathematical model presented above is NP-Complete.

5. USE CASE DIAGRAM

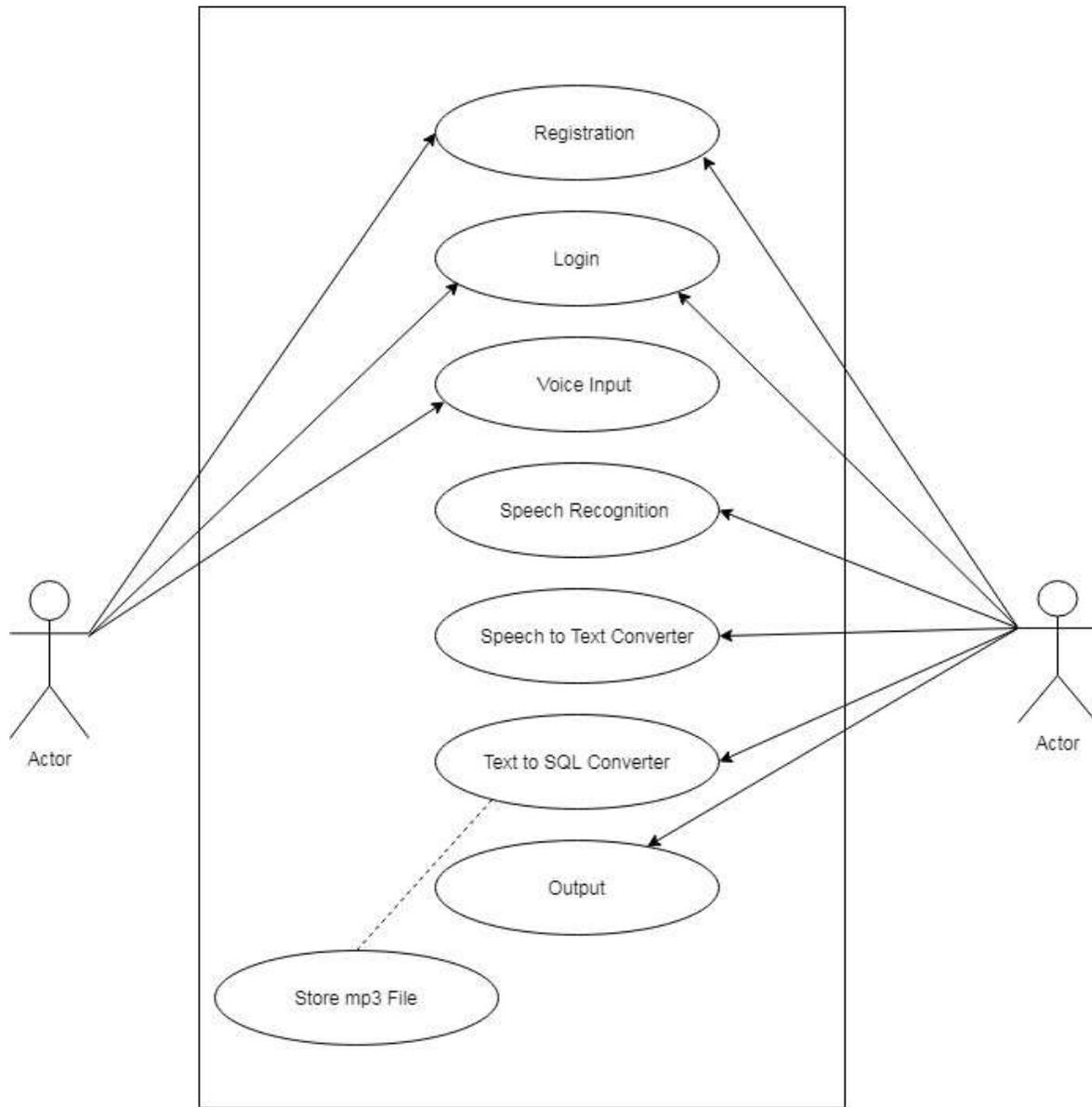


Fig -3: Use Case Diagram

Fig shows the utilization cases of the proposed system for the System and demonstrates differing kinds of actors involved during this system and actions related to them.

6. MODULES

i. Voice Detection

It takes user's voice input through speech recognition package.

ii. Pattern Matching

Pattern matching constructs the query from user's voice input and provides output to the user.

iii. Authentication

Each user has their own profile which is secured with a password.

iv. Web Application

Web application is provided for interacting with users.

7. CONCLUSION

The implementation of the database toolbox DBTool and the recording tool Act Voice are transparent to the user in the speech recognition educational framework mentioned above. Matlab handles memory maintenance and other tasks, allowing users to concentrate on the core of the HMM training and recognition algorithm.

8. FUTURE WORKS

Only a few queries such as SELECT and INSERT have been implemented in this currently. Other queries such as UPDATE and DELETE can be implemented in future.

6. REFERENCES

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