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Bisty - The Department Assistant

Prajakta D. Chaudhari[#1],
Shivani S. *Gole [#2], Nikita K. Jagtap[#3],Sonal Bramhe [#4]*
*Alpana P. Adsul[*5],*

[#]UG students, SITS, SPPU Pune

[*]Information Technology Department SITS, SPPUniversity,

5apadsul_sits@sinhgad.edu

Abstract

Information retrieval is the *process of getting data from database and updating the data with current information. A speech recognizer is an intricate device that responds to human speech. Student Information Management System (SIMS) provides a simple interface for maintenance of student information. It can be used by educational institutes or colleges or even by student to maintain the records of students easily. The proposed work aims to provide security through voice recognition. The framework enables just approved users to access data; by this we can get protection and security. Users can ask their help addresses like time, date and climate and find solution to the inquiries. In this we are making an attempt to develop a voice authenticated student database display system. Audio input is provided to system, asked information related to student will be either in tabular or graphical form. NLP is applied to find out answer of question asked by departmental assistant from excel sheet.*

Keywords— *SIMS, NLP, Information retrieval, Assistant, Speech recognition*

I. INTRODUCTION

The recent revolution in digital technology has touched every sphere and facet of lives and education sector has not been spared. Unlike any other sector, the link between digital technology and education is unique and complementary. On one hand, digital technology has become the enabler by redefining the very basics of the sector and altering the rules of game[1]. On the other hand, today's young mind will decide the future direction of digital technology as they are going to be the innovators of the tomorrow. Currently more than 40 crore Indians use the internet and this number will get doubled in the next four years. The government has embarked on a mission to connect 2.5 lakh villages through the fibre superhighway. The government is aiming to train crores of Indians in different skills by 2022. It means that digital technology is all set embrace every moment of our lives. We are already a digital society and are moving towards the knowledge society[1].

The design and implementation of a comprehensive student information system and user interface is to replace the current paper records. Institute faculty members are able to directly access all aspects of a student's academic progress through a secure, online interface embedded in the college's website. Previously, the college relied heavily on paper records for this initiative. While paper records are a traditional way of managing student data there are several drawbacks to this method. First, to convey information to the students it should be displayed on the notice board and the student has to visit the notice board to check that information. It takes a very long time to convey the information to the student. Paper records are difficult to manage and track. The physical exertion required to retrieve, alter, and re-file the paper records are all non-value added activities.

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Now-a-Days every institute needs automation. Interactive voice response is a telephony feature in which a touch tone telephone enables interaction with a database to acquire information. The interactive voice response system has been put into operation in variety of ways such as in bank balances, flight and movie schedules, so that registered customers can receive up-to-date information instantly. IVR technology is also used to gather information. The main goal of this work is to add mobility and automation to the process of managing student's database in an institute.

II. LITERATURE SURVEY

Voice based data recovery framework is a benefit for outwardly tested individuals and its transportability include causes them in a superior manner. The framework proposed in [1] effectively responds to a wide range of inquiry and the equivalent is confirmed much under boisterous condition. As a future work, the framework can be verified with face acknowledgment to keep from opening and review individual records of others in Facebook, Twitter and so on. Likewise it tends to be additionally created to direct outwardly provoked individuals to walk freely on streets with the assistance of sensors and maps. This kind of gadgets can be fitted in meeting room to convey data for the clients without secretary in the workplace.

Data recovery is turning into a complicated piece of each space. Be it in securing information from different sources to shape a solitary unit or to display the information so that anybody can remove valuable data and consequently utilized in information investigation, information mining and so on[2]. This field has increased a lot of significance in the ongoing years in light of the fact that starting today we are detonated with different sort of data from this present reality. The developing significance of research information and recovering the wise information are the fundamental concentration for any business today. So coming years this is where significant work should be finished. Rini John and Sharvari Govilkar [2] centered to execute a framework for data recovery from the website pages utilizing Natural Language Processing (NLP) and have appeared to improving outcomes than the current framework. In [2] have planned a framework for data recovery system for web utilizing NLP where procedures Hierarchical Conditional Random Fields (for example HCRF) and broadened Semi-Markov Conditional Random Fields (for example Semi-CRF) alongside Visual Page Segmentation is utilized to get the exact outcomes. Likewise equal handling is utilized to accomplish the outcomes in wanted time allotment.

Paper [3] shows different powerful methodologies in each layer of Information Retrieval utilizing Natural Language Processing slanted towards higher exactness and induction and an investigation of late headways in the field of Information Retrieval utilizing Word Embedding, Machine Learning, Deep Learning and Neural Networks. These methodologies apply to characteristic language understanding, common language age, machine interpretation, highlight extraction, picture subtitling and move learning.

Organized information, normally, is predefined information. Semi-organized and unstructured information are not predefined information that incorporates records, messages, online life posts, pictures, recordings, and so forth [4]. Content extraction is a basic phase of breaking down Journal papers. Diary papers for the most part are in PDF position which is semi organized information. Diary papers are exhibited into various segments like Introduction, Methodology, Experimental, Result, Conclusion and so forth. It makes simple to investigate dependent on perusers intrigued theme. The fundamental significance on area extraction is to locate an agent subset of the information, which contains the data of the whole set. In [4], Florence Vijila S and Nirmala . K introduced audit of different extraction strategies from a PDF report. Information union is utilized to consolidate the extricated information to acquire organized information from papers. This will make the information extraction process simple to oversee and break down.

In the Modern Era of quick moving innovation we can do things which we never figured we could do in any case, to accomplish and achieve these contemplations there is a requirement for a stage

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which can computerize every one of our errands effortlessly and comfort [5]. Along these lines there is have to build up a Personal Assistant having impressive forces of conclusion and the capacity to connect with the surroundings just by one of the materialistic type of human cooperation for example HUMAN VOICE [5]. The Hardware gadget catches the sound solicitation through mouthpiece and procedures the solicitation with the goal that the gadget can react to the individual utilizing in- constructed speaker module. For Example, in the event that you ask the gadget 'what's the climate?' or 'how's traffic?' utilizing its implicit aptitudes, it looks into the climate and traffic status individually and afterward restores the reaction to the client through associated speaker[5].

In [6] general framework for building NLU modules from application data has been presented. They faced lots of challenges during voice search. First one is the mismatch between error prone ASR in the presence of ambient noise

and high user expectation of search effectiveness. For example instead of "free wi-fi restaurant" it recognized as "free five restaurant " this search does not satisfy user needs unless the system can resolve the words wi-fi. Second is Information users search by and search for is not limited to text only. Therefore it is beyond keyword matching. User tend to be more talkative when naturally speaking a request. For example instead of "best restaurant near rajiv gandhi park" if user say "I want the best restaurant nearby" so it must convert this phrase into a distance content. So that's why in paper [6] they present NLU module. Voice search is an combination of ASR and text or database search. In this paper[6] they integrate an NLU module between the automatic speech recognition and search. The role of NLU is Parse the automatic speech recognition output into meaningful segments that contribute to high precision search and Understand user's intent [6].

NLU module takes ASR lattices in the form of word confusion networks. There are one or multiple arcs between a pair of consecutive nodes. Symbols on these arc are alternative words for the given word position.ASR output is 1-best and lattices. ASR 1-best is a special case of WCN where there is only one word for each word position & posterior probabilities are uniformed. NLU task is to segment into sequence of concepts. It represents the query subject probability and introduce it as the forth component to the NLU optimization. NLU parser takes as input ASR WCNs and NLU models. It outputs parsing results in the form of concept value pairs[6].

The structure of a standard speech recognition system is illustrated as :Raw speech : Speech is typically sampled at a high frequency[7]. Signal analysis: Raw speech should be initially transformed and compressed, in order to simplify subsequent processing. Many signal analysis techniques are available which can extract useful features and compress the data by without losing any important information. There is various feature extraction methods are MFCC,LPC,etc[7]. The Hidden Markov Model(HMM), Dynamic Time Warping(DTW), Artificial Neural Networks(ANN) are typical algorithm used for speech recognition.

1. HIDDEN MARKOV MODEL (HMM) [7]: It is a collection of states connected by transitions. It begins in a designated initial state. In each discrete time step, a transition is taken into a new state, and then one output symbol is generated in that state. The choice of transition and output symbol are both random, governed by probability distributions. When an HMM is applied to speech recognition, the states are interpreted as acoustic models, indicating what sounds are likely to be heard during their corresponding segments of speech; while the transitions provide temporal constraints, indicating how the states may follow each other in sequence. Because speech always goes forward in time, transitions in a speech application always go forward.

2. DYNAMIC TIME WARPING (DTW)[7]: Dynamic time warping (DTW) is an algorithm for measuring similarity between two temporal sequences which may vary in time or speed. For instance, similarities in walking patterns could be detected using DTW, even if one person was walking faster than the other can also detected by DTW. In fields such as data mining and information retrieval, DTW has been successfully applied to automatically cope with time deformations and different speeds associated with time-dependent data.

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III. PROPOSED SYSTEM

The design and implementation of a comprehensive student information retrieval system and user interface is to replace the current paper records and maintaining confidentiality. Input is audio which is processed further for authentication. System first recognized speech, if voice is of authorised person then the speech is converted to text.

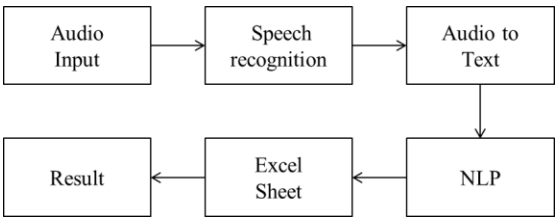

Fig. 1 A block diagram of proposed system

NLP is applied to find out answer of question asked by departmental assistant from excel sheet. Result will be in the form of tabular or graphical. Most of the research being done on natural language processing revolves around search, especially enterprise search. This involves allowing users to query data sets in the form of a question that they might pose to another person. The machine interprets the important elements of the human language sentence, such as those that might correspond to specific features in a data set, and returns an answer. NLP can be used to interpret free query and make it analysable. There is a tremendous amount of information stored in free excel files, like patient medical records, for example. Prior to deep learning-based NLP models, this information was inaccessible to computer- assisted analysis and could not be analysed in any kind of systematic way. But NLP allows analysts to sift through massive troves of free text to find relevant information in the files.

IV. RESULT

The system has run for 500 times with different audio/speech as a input.

TABLE I: OUTPUT FOR 500 SAMPLES

Accuracy	98.8%
misclassification rate	1.2%
precision	99.58%
recall	99.17%
f-measure	99.374%

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TABLE II

CONFUSION MATRIX

TN=46	FP=2
FN=4	TP=478

V. CONCLUSIONS

Authorized person (teacher or student) can update or read the record. Student information system deals with all kind of student details, academic related reports, college details, course details, curriculum, batch details, placement details and other resource related details too. It tracks all the details of a student from the day one to the end of the course. In the proposed system audio input is processed for authentication. System first recognized speech, if voice is of authorised person then the speech is converted to text. Then NLP is applied to find answer of query from excel sheet.

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