

# A Survey on Ranking of query results using structure mining based on Automatic Speech Recognition.

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**ABSTRACT** — Speech Recognition is the process of converting an acoustic waveform into text containing the similar information conveyed by speaker. A model is learned from a set of audio recordings whose corresponding transcripts are created by taking recordings of speech as audio and their text transcriptions. Speech based applications are getting enormous popularity by incorporating Natural Language Processing(NLP) techniques. Input to such applications is in natural language and output is obtained in natural language. In case of speech recognition, research followers are mostly using three different approaches namely Acoustic phonetic approach, Pattern recognition approach and Artificial intelligence approach. And for ranking using structure mining a new algorithm Weighted Page Content Rank user can get relevant and important pages easily as it employs web structure mining and web content mining. A webpage ranking analysis can be apply on the scenario where the searching and interaction with the numerous web data is required, so in order to provide effective result.

**KEYWORDS** — ASR.

## 1. INTRODUCTION

As automatic speech recognition (ASR) technologies continue to advance, it is reasonable to believe that speech and text offerings will eventually be symmetric, since they are alternative representations of human language, in the spoken and written form, respectively, and the transformation between the two should be direct and straightforward. With this perspective, spoken content retrieval, or indexing and retrieving multimedia content from its spoken part, is an important key to easier browsing and retrieving of multimedia content in the future. In cases where the essence of the multimedia content is captured by its audio, especially for broadcast programs, lecture, meetings, etc. Indexing and retrieving the content based on the spoken part not only eliminates the extra requirements of producing the text description for indexing purposes, but can precisely locate the exact time when the desired information appears in the multimedia. In recent years, spoken content retrieval has achieved significant advances by primarily cascading ASR output with text information retrieval techniques. [1]

The spoken content is first converted into word sequences or lattices via ASR. The cascade approach was subsequently found to work well mainly for relatively high ASR accuracies. Speech recognition technique is the process of mapping an acoustic waveform into a text (or the set of

words) which should be equivalent to the information to be conveyed by the spoken word. Speech recognition in computer system domain is defined as the ability of computer systems to accept input in the form of spoken words(audio format) and map into a text format in order to proceed with further computations [2]. For this purpose, Natural Language Processing (NLP) is a very active area of research and development in Computer Science. Important applications of NLP are machine translation [3] and automatic speech recognition. For NLP, a basic unit of speech recognition is the intermediate form of speech information around which many of the recognition processing is organized for human beings or for machines. ASR for Indian languages is still at its infancy [4] [5] where as western languages like English and Asian languages like Chinese are comparatively well matured. Hence ongoing decade shows growing interest in this field and also huge scope for research work.

Speech recognition involves different functions:

- Speech analysis
- Feature extraction
- Acoustic modeling
- Language and lexical modeling
- Recognition

## WEB STRUCTURE MINING

Web structure mining is defined as the procedure to see the model of the link structure of the web pages. To sort out the links generate the information such as the similarity and relations among them by getting the advantage of hyperlink topology. Page Rank and hyperlink analysis also fall in this category. The design of Web Structure Mining is to generate structured abstract about the website and web page. It seeks to identify the connection structure of hyperlinks at inter document level. The web documents contain links and they use both the real or primary data on the web so it can be accomplished that Web Structure Mining has a relation with Web Content Mining. It is quite frequent to connect these two mining tasks in an application.

### Clustering

Cluster analysis or clustering is the task of grouping a set of objects in such a direction that objects in the same group are called a cluster. It is a primary task of explanatory data mining, a common technique for statistical data analysis used in various fields including machine learning, pattern, picture analysis, data retrieval & Bioinformatics. In clustering method, targets of the dataset are grouped into clusters, in such a way that groups are almost different from each other and the objects in the same group or cluster are very alike to each other. Unlike

Classification, in which previously defined set of categories are faced, but in Clustering there are no predefined set of classes which means that resulting clusters are not recognized before the implementation of clustering algorithm. These clusters are extracted from the dataset by grouping the objects in it.

### **Ranking**

A ranking is a relationship between a set of items such that, for any two points, the first is either 'ranked higher than', 'ranked lower than' or 'ranked equal to' the second. In mathematics, It is not necessarily a total order of objects because two different objects can have the same ranking. The rankings themselves are totally merged. With regards to Clustering, ranking operations to estimate the likelihood of the occurrence of data items or the targets.

## **2. LITERATURE REVIEW**

A. N. Mishra[6] and his team worked on automatic speech recognition on speaker independent connected digits with Revised perceptual linear prediction, Bark frequency cepstral coefficients and Mel frequency cepstral coefficients with a clean dataset. Hidden Markov Model is implemented using HTK. A.N.Mishra again with Astik Biswas and Mahesh Chandra[7] designed a system for isolated digit recognition in Hindi.

**Wenpu Xing [7]-2004** discussed a new approach known as weighted page rank algorithm (WPR). This algorithm is an extension of the Page Rank algorithm. WPR performs much better than the conventional Page Rank algorithm in terms of making the larger piece of relevant pages to a passed query.

In 2008 Chunyi Guo and et al has presented that speech is one of the most direct and effective means of human communication, it's natural to apply biomimetic processing mechanism to automatic speech recognition to solve the existing speech recognition problems. Three typical techniques were selected respectively: Simulated evolutionary computation (SEC), artificial neural network (ANN) and fuzzy logic and reasoning technique, from intelligence building processing simulation, intelligence structure simulation and intelligence behavior simulation, to identify their applications in different stages of speech recognition.

In 2009 Negar Ghourchian has presented that the use of a new Filtered Minima-Controlled Recursive Averaging (FMCRA) noise estimation technique as a robust front-end processing to improve the performance of a Distributed Speech Recognition (DSR) system in noisy environments.

In 2010 Richard M Stern and et al has described a way of designing modulation filter by data driven analysis which improves the performance of automatic speech recognition systems that operate in real environments.

**Kavita Sharma [8] – 2011** have hit the books about how to extract the useful information on the WWW and also pass the superficial knowledge and comparison about data mining. This paper describes the current, past &

future of web mining. This introduces online resources for retrieval information on the web, i.e. web content mining, & the discovery of user access patterns from web servers, i.e. web usage mining that enhance the data mining drawback and web structure mining i.e. for analysis the hyperlink structure and document construction.

In 2012 Kavita Sharma and et al has presented Speech Recognition is a broader solution which refers to a technology that can recognize a speech without being targeted at single speaker such call system can recognize arbitrary voice. The fundamental purpose of speech is communication, i.e., the transmission of messages.

In 2012 Bhupinder Singh has presented that phase of Speech Recognition Process using Hidden Markov Model. Preprocessing, Feature Extraction and Recognition three steps and Hidden Markov Model (used in recognition phase) are used to complete Automatic Speech Recognition System. Today's life human is able to interact with computer hardware and related machines in their own language.

**Syed Thousif Hussain[9]-2012** have proposed the approach which is used to generate a high number object class. This sort of querying the object investigate all type of object and data associated with it. It gives the output based on the re-rank of image and its object first it download all the relevant images and on extracting features it investigate about the downloaded data.

**Neelam Tyagi [10] - 2012** have analyzed that the World Wide Web consists billions of web pages and huge amount of data available within web pages. In this report, a page ranking mechanism called Weighted PageRank Algorithm based on Visits of Links (VOL) is being devised for search engines, which functions along the footing of the weighted Page rank algorithm and calls for a number of visits of inbound links of web pages into account. The original WPR is an extension to the standard PageRank algorithm. The suggested algorithm is used to obtain more relevant data according to a user's inquiry. Hence, this concept is actually useful to display most valuable pages on the top of the result list on the basis of user browsing behaviour, which shorten the search space to a large plate. The story also presents the comparison between original and VOL method.

Campbell performed phonetic speaker recognition with support vector machines (SVM) [12]. By computing frequencies of phones in conversations, speaker characterization was performed. A new kernel was introduced based on the standard method of log likelihood ratio scoring. The resulting SVM method reduced error rates dramatically over standard techniques. Hatch compared 1-best phone decoding vs. lattice phone decoding for the purposes of performing phonetic speaker recognition. The results indicate that lattice decoding provide a much richer sampling of phonetic patterns than 1-best decoding. All the state-of-the-art speaker recognition approaches try to model phonetic dependencies along the time scale, or in time dimension. In the following sections, we will present our contributions in the speaker recognition research. We introduce a speaker recognition approach that aims at modelling the statistical pronunciation patterns based on the information from two "orthogonal" dimensions: time

dimension and cross-stream dimension. It will be shown that comparable or better results are achieved by the proposed approach.

Summary: in this dissertation various techniques related to the literature been discussed and below table represent various advantages and disadvantage comparison in between discussed technique.

Authors	Years	Paper name	Results
Kavita Sharma	2011	Web Mining Today and Tomorrow	work how to extract the useful information on the WWW and also pass the superficial knowledge and comparison about data mining
Bhupinder Singh et al.	2012	Speech Recognition with Hidden Markov Model	Develop a voice based user machine interface system.
Divyesh S. Mistry, Prof. A.V. Kulkarni,	2013	Speech Recognition Technology, Mel-Frequency Cepstral Coefficients (MFCC), Artificial Neural Network (ANN)	Shows the improvement in recognition rates of spoken words
Rashmi Sharma, and Kamaljit Kaur	2014	Comparative Study of Web Structure Mining Techniques for Links and Image Search	to provide the more reliable and relevant search results in Response to user in the form of images and links.
Mayur R Gamit, Prof. Kinnal Dhameliya, Dr. Ninad S. Bhatt	2015	Classification Techniques for Speech Recognition: A Review	Describes the different classification techniques that can be helpful in speech recognition approach.
Dipika Sahu, Yamini Chouhan	2016	Comparative Study and Analysis on the Techniques of Web Mining	introduces Link mining, as well as block-level links mining issues also thought about their application and effectiveness

### 3. CLASSIFICATION TECHNIQUES IN ASR

1. Acoustic Phonetic Approach
2. Pattern Recognition Approach
3. Artificial Intelligence Approach

#### 1. Acoustic Phonetic Approach

In Acoustic Phonetic approach the speech recognition were based on finding speech sounds and providing appropriate labels to these sounds[14].This is the basis of the acoustic phonetic approach which postulates that there exist finite, distinctive phonetic units called phonemes and these units are broadly characterized by a set of acoustics properties present in speech.

#### 2. Pattern Recognition Approach

The Pattern Recognition approach involves two essential steps namely, pattern training and pattern testing [16]. The

essential feature of this approach is that it uses a well formulated mathematical framework and establishes consistent speech pattern representations for reliable pattern comparison. This approach contains many techniques such as HMM, DTW, SVM, VQ etc.

#### 3. Artificial Intelligence Approach

The artificial intelligence approach attempts to mechanize the recognition procedure according to the way a person applies its intelligence in visualizing, analyzing and finally making a decision on the measured acoustic features. The artificial intelligence approach is a hybrid of the acoustic phonetic approach and pattern recognition approach [15].The hybrid concept of both Hidden Markov Model and Artificial Neural Network is also applied in speech recognition. The various methods in artificial intelligence

are Multi-layer Perceptron (MLP), Self-Organizing Map (SOM), Back-propagation Neural Network (BPNN), Time Delay Neural Network (TDNNs) [17].

#### 4. PROBLEM FORMULATION IN WEB STRUCTURE MINING

1. Some of the challenges of the Semantic Web include vagueness, uncertainty, and inconsistency.
2. Web services related content are not provided by genetic search engine automatically.
3. Location based query not get an optimized result in semantic search.

#### 5. METHODOLOGY

**A) Data collection:** Data collection is the initial step of web usage mining, the data authenticity and the integrality will directly affect to the following works smoothly carrying on and the final recommendation of characteristics service's quality. Therefore it must utilize scientific, reasonable and advanced technology to gather many data. At present, towards web usage mining technologies, the main data origin has three kinds: server data, client data and the middle data.

**B) Data preprocessing:** Some database is In - sufficient, inconsistent and including noise. The data pretreatment is to carry on a unifications transformation to those databases. The result is that the database will to become integrated and consistent.

**C) Knowledge Discovery:** Use statistical method to carry on the analysis and mine the pretreated data. We might discover the user or the user community's interests then construct interest model. At present the generally used machine learning methods mainly have clustering, classifying, the relation discovery and order model discovery. Each method has its own excellences and shortcomings, but the quite effective method mainly is classifying and clustering at the presents.

**D) Pattern analysis:** Challenges of Pattern Analysis are to filter uninteresting information and to visualized and interpret the interesting pattern to the users. Initial delete the less significance rules or models from the interested model storehouse; Next utilize technology of OLAP and so on to carry on the comprehensive mining and analysis; Once more, let discovered information or knowledge be visible; Finally, provide the characteristic service to the electronic commerce website.

**E) Focused Crawling:** A focused web crawler takes a set of well-selected web pages exemplifying the user interest. The focused crawler start from the given page and recursively explores the linked web pages. While the

4. The Google search API fix the number of searches performs per day.

The Ranking Algorithm has always presents a solution to obtain the ranking on a given attribute as input. It uses the hyperlink structure of the Web as an information source. It generates the structural summary for the web sites and web pages. The aim of the web structure mining is to generate the structural abstract about the websites and webpage. It establish the link construction of the hyperlinks at the inter text level. The topology used in web structure mining is that will categorize the web pages. [13]

crawlers performs a breadth-first explore of the complete web, a focused crawler explores only a small portion of the web using a best-first search guided by the user interests. crawling for retrieving multimedia content in the web, instead of plain HTML documents.

**F) Clustering Web Objects:** Focused crawling retrieves large numbers of relevant data. In order to offer fast and more precise access to the query results, clustering is an established method to group the retrieved statistic to achieve superior understanding. If the query result is websites or combined objects like images and their text descriptions, algorithm are wanted to handle these combined data types to find meaningful clustering.

**G) Wrapper Induction:** A wrapper is a piece of software that allows a semi structured Web source to be queried as if it were a databases Given a sets of manually labeled page, a machine learning technique is applied to learn extraction rules or patterns.

**H) Automatic Data Extraction:** Given a set of positive page, produce extraction patterns. Given only a single page with multiples data record, create extraction patterns.

**I) User Ranking:** Once collocation identified, our system is ready to discover or rank the user against WEB Forum. We are using two different algorithms to find the user rank. They are Page rank and MRR (Mean reciprocal rank).

#### 6. PROPOSED WORK

By identifying the pitfall of existing system, in proposed system which will take voice as input which is given to ASR and retrieve the text. On the basis of that it will send then to search engine which will retrieve some link. We are applying sorting algorithm based on structure mining and rerank the links which are the outputs of search engine. In structure mining we check for in links and out links in a page. On the retrieved results it analyzes the popularity of website and rerank according to that in result analysis. The



system implements user feedback which tells about the usage of our system in comparison with existing search results.

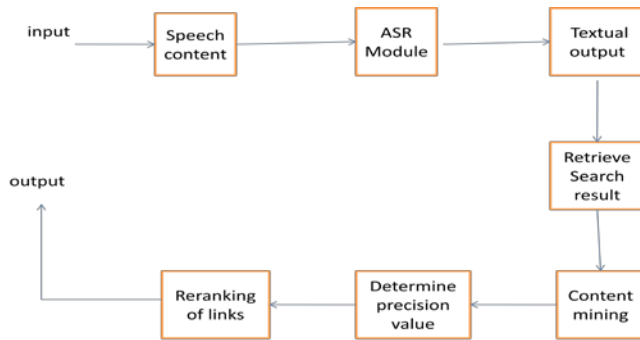


Fig. Flow Diagram

## CONCLUSION

In this paper we discussed various ASR techniques and have put some of the essential information and requisites for the same by surveying a small part of existing work. It briefly discussed the Speech Recognition System and various approaches used in ASR. And in structure mining by analyzing the algorithms on the data sets, the data patterns are also analyzed. Number of outcomes depends on the proposed and existing system should be compared with tabular and graphical format in the expected outcomes of the proposed work. Our expected work is to analyze the best web result which will be most relevant to the user query by re-ranking the retrieved result from search engine.

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