RECENT ADVANCEMENT AND ROLE OF SEARCH ENGINES IN INFORMATION RETRIEVAL SYSTEM

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Abstract:

In recent Advancement growth of information is ubiquitous in nature and can be accessed anywhere by the user and needed information is provided according to the query search is the main objective in information Retrieval system. The source of information accessed can be of any form Text, audio and video etc. In the information retrieval system the information accessed is in the form of Text based retrieval, speech retrieval system and Image Retrieval system However user can get needed information retrieval of information accordingly by using Text, speech and image search criteria. In information Retrieval System text based retrieval is more reliable then speech retrieval system, where the accuracy rate in terms of precision and recall are more effective in text based retrieval system compared to speech and image retrieval system

INTRODUCTION

A large number of information accessed in the form of audio and video forms the base for Multimedia Information Retrieval System (MIRS). Most of MIRS today is monolithic or only using one media format like Google1 for text search, tineye2 for image search, youtube3 for video search or 4shared4 for music. The main objective is to retrieve the relevant information for query search of user in any of the form of Retrieval.

The distinct information on the internet provides the user wide options to search the query in different forms of search in information retrieval system. The scope for search engines to Recognize the user

query search in which ever form and provide needed information which is relevant information according to the user search process need which hits on the different clusters to Retrieve the relevant data. The measure of retrieval is correlated by the rate of precision and recall level. The information retrieval capabilities also provide various search capabilities for the user to improve the relevant data retrieval. The search to process when correlated with text and speech retrieval system requisite much to develop .This paper presents the innovative approach for speech retrieval by the modern search engines with accuracy and reduced storage processing time

MACHINE LEARNING:

Search engines, medical diagnosis, detecting credit card fraud, stock market analysis, classifying DNA sequences, speech and handwriting recognition, object recognition in computer vision etc.

Some machine learning systems attempt to eliminate the need for human intuition in the analysis of the data, while others adopt a collaborative approach between human and machine. Human intuition cannot be entirely eliminated since the designer of the system must specify how the data are to be represented and what mechanisms will be used to search for a characterization of the data. Machine

learning can be viewed as an attempt to automate parts of the scientific method.

There are different types of Machine learning algorithms depending on the desired outcome of the algorithm.

Common algorithm types include:

Supervised learning: where the algorithm generates a function that maps inputs to desired outputs. One

Standard formulation of the supervised learning task is the classification problem: the learner is required to learn (to approximate the behavior of) a function which maps a vector into one of several classes by looking at several input-output examples of the function.

Unsupervised learning: which models a set of inputs in which labeled examples are not available and the data are not trained.

Semi-supervised learning: which combines both labeled and unlabeled examples to generate an appropriate function or classifier for the data to retrieve from the system

Reinforcement learning: where the algorithm learns a policy of how to act given an observation of the world. Every action has some impact in the environment, and the environment provides feedback that guides the learning algorithm.

Transduction learning: similar to supervised learning, but does not explicitly construct a function: instead, tries to predict new outputs based on training inputs, training outputs, and new inputs.

Learning to learn: where the algorithm learns its own inductive bias based on previous experience.

The performance and computational analysis of machine learning algorithms is a branch of statistics known as computational learning theory.

Understanding the Speech recognizer:

In the recent approach the role of speech recognizer plays a crucial role and the effective tool kit

SONIC utilizes state-of-the-art statistical acoustic and language modeling methods. The system acoustic modelsare decision-tree state-clustered Hidden Markov Models (HMMs) with associated gamma probability density functions to model state-durations. The recognizer implements a two-pass search strategy. The first pass consists of a time-synchronous, beam-pruned Viterbi token-passing search through a lexical prefix tree. The recognizer also incorporates both model-based and feature-based speaker adaptation methods. SONIC also includes implementation of feature-based adaptation methods such as Vocal Tract Length Normalization (VTLN). SONIC is a collection of tools which are run from the command line,

Search Engines: A web search engine is a software system that is designed to search for information on the World Wide Web. The search results are generally presented in a line of results often referred to as search engine results page (SERPs). These are the most frequently used search engines

1. The search engine giant holds the first place in search is the Google.

2. Bing is Microsoft's attempt to challenge Google in the area of search, but despite their efforts they still did not manage to convince users that their search engine can produce better results than Google.

3. ASK is based on a question/answer format where most questions are answered by other users or are in the form of polls. It also has the general search functionality but the results returned lack quality compared to Google or even Bing

4. Yahoo search is powered by Bing. Yahoo is still the most popular email provider and according to recent analysis holds the fourth place in search.

5. The AOL network includes many popular web sites like engadget.com, techchrunch.com and the huffingtonpost.com.

6. Baidu is the most popular search engine in China. It's market share is increasing steadily .Baidu is serving billion of search queries per month.

7. Wolframalpha is different that then all the other search engines. They market it as a Computational Knowledge Engine which can give you facts and data for a number of topics. It can do all sorts of calculations, for example if you enter *"mortgage 2000"* as input it will calculate your loan amount, interest paid etc. based on a number of assumptions

LITERATURE REVIEW

Douglas O'Shaughnessy (2015)

HMM has been both a boon and a bane for ASR: it has allowed practical progress in use of ASR, yet has tended to hinder further advances; its model simplicity has resisted many modifications to allow lowering ASR error rates, yet no clear alternative has appeared. Neural networks and support vector machines have found recent application in ASR, but are not as versatile as HMMs. Similar comments can be made of the MFCC approach to data compression. We have long realized that the critical information (for ASR) resides in the spectral envelope (formant structure) of the input speech signal. Attempts to reliably estimate the center frequencies and bandwidths of the resonances of the VT (i.e., formants) are still seen today, but no foolproof formant estimator (nor pitch period estimator) has been perfected. Pattern recognition schemes that rely on a succession of error prone modular steps are often doomed to poor accuracy (indeed, a strength of the HMM is its consideration of all data before making any decisions). Thus, the weakness of attempting formant estimation at any early stage of ASR, without any clear method for feedback correction of errors, has made ASR designers look toward simple spectral estimation. Initial methods using basic filter banks or fast Fourier transforms (FT) did not focus well enough on the limited critical elements of speech spectra. LPC (linear predictive coding) succeeded in furnishing a compact set of about 10 coefficients (as in cell phones) to represent the VT transfer function of a frame of speech data

Rakesh Kumar Singh and S.K.Suman (2012) as of late numerous researchers have directed research on typical movement administration and streamlining and have accomplished productive outcomes. With the expansion of the event recurrence and mischief level of crises, a few analysts have started to focus on street activity administration and scattering under crisis conditions since the Many sociologists have contemplated the

movement framework development, movement control framework and network debacle aversion. Based the solid seismic tremor that happened in considered the genuine effect of the quake on the vehicle framework and proposed a more grounded flexibility activity framework. The creator likewise examines the unwavering quality of the foundation structure, the dependability of the hub and the time dependability of the movement arrange. At the season of unwavering quality, scientists trust that the development of reroute streets is imperative for calamity help exercises, and adaptable activity control and a few directions on private autos, and in addition some preparation and planning to keep away from bottlenecks happening in peacetime are likewise critical.

Chiou, Y.- C.; Lai, Y.- H (2008) The street system will be effectively blocked when a tremor happens. Consequently, it is important to ponder the association dependability of the street arrange hubs and to pass judgment on the key areas and advance the crisis medicinal safeguard way trust that catastrophe readiness is viewed as the foundation of crisis administration. From the perspective of the entire nation, a nation needs to build up a national fiasco counteractive action structure and an entire network calamity avoidance framework. Then again, the state ought to build up crisis administration schools to advance debacle counteractive action at the network level and do proper crisis preparing. As a supplement to government powers, undertakings and non-administrative associations ought to likewise act to react to crises. Numerous scientists have examined the street arrange steadiness and the adjustments in the rush hour gridlock

stream in crises. focused on organize soundness after fiascos and gave a proficient and fast street arrange execution appraisal strategy. manufactured an execution reenactment show for movement arranges in crises, and it can give choices to crises in various situations. These creators likewise confirmed the advantages of system administration with models, for example, Boston, Massachusetts explained upon the execution of transportation framework amid a debacle, including the hazard, weakness, unwavering quality and adaptability

Oshima, D.; Tanaka, S.; Oguchi, (2012) Road harm after a seismic tremor, proposed a fluffy multi-target programming calculation and utilized a movement control plan to control vehicles entering and leaving the hazardous situation additionally thought about taking care of the requests of fiasco alleviation and people in general. As an objective, a multi-target activity control plot demonstrate was set up in light of the hypothesis of bi-level programming techniques and system advancement, and a fluffy intelligent calculation and hereditary calculation were utilized to discover the arrangement. Proposed a model reference versatile control (MRAC) structure to lead constant activity administration amid a post-catastrophe crisis clearing to powerfully control the movement stream and lessen setbacks and property misfortunes. Regarding the requests of crisis responders after mischances, considered the joint arranging issue of crisis departure and crisis movement administration They built up a two-organize enhancement demonstrate and proposed a path inversion technique to enhance the system execution. Ultimately, manufactured a coordinated multi-target

enhancement model to take care of the issues of the help way in an unverifiable post-debacle condition and movement control-plot advancement

METHODOLOGY

Automatic speech recognition is primarily used to convert spoken words into computer text. Additionally, automatic speech recognition is used for authenticating users via their voice (biometric authentication) and performing an action based on the instructions defined by the human. Typically, automatic speech recognition requires preconfigured or saved voices of the primary user(s). The human needs to train the automatic speech recognition system by storing speech patterns and vocabulary into the system. The classification made here is based upon the typical design considerations of a recognition system, which may be closely related to a specific application or task. In general, these parameters are one way or another fixed into the system. For each of the categories, the extremes of an easy and difficult task, from the recognizer's point of view, are given.

parameter	Easy task	Difficult task
Vocabulary size	small	unlimited
Speech type	isolated words	continuous speech
Speaker dependency	speaker dependent	speaker independent
Grammar	strict syntax	natural language
Training method	multiple training	embedded training

Classification of speech recognition systems.

The classification methods for ASR systems in recent advancement are implemented by.

(a)   Hidden   Markov Model(HMM):

The core idea in using HMM for speech recognition applications is to createa stochastic models from known utterances and compares it with the unknown utterances was

generated by speaker. An HMM M is defined by a set of states N that have K observation symbols as well as, three possibility metrics for each state which are in (equation 1)

$M = \{\Pi, A, B\}$ (1)

Where:

• Π: initial state probability.

• A: $a_{t,j}$ state transition probability.

• B: $b_{t,j,k}$ symbol emission probabilities.

For each HMM system, it could be use three different types of topologies to employ Markov chain which are ergodic model, general left to right model, and linear model.
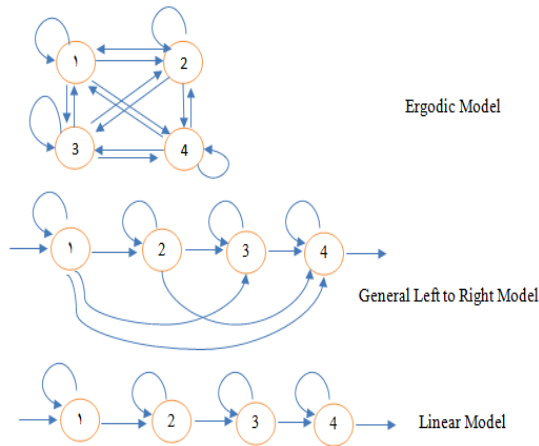
Fig 1.1: illustrates HMM three states topologies for a system with four states 1, 2, 3,4

Consequently, each state has its own probability which leads to compute the probability for an occurrence of state in a given situation of another state using Bayesian rule.

In this context, for any system employs HMM technique three basic algorithms which are classification, training, and evaluation algorithms. In classification algorithm, the recognition process is enabled for any unknown utterance by identifying the unknown observations sequence via choosing the most likely class to have produced the observation sequence. In training algorithm, the model is responsible to

store data collected for a specific language (i.e. in our research

the language was the English language). In the evaluation algorithm, the probability of an observation sequence is computed for matching processes.

This has come about, as a rule, in flexibility of transport activity/request to GSDP lower than solidarity.

• For the venture street, a flexibility of Bus movement to GSDP of 0.2 has been received.

RESULTS

Understanding the Speech recognizer:

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SONIC utilizes state-of-the-art statistical acoustic and language modeling methods. The system acoustic modelsare decision-tree state-clustered Hidden Markov Models (HMMs) with associated gamma probability density functions to model state-durations. The recognizer implements a two-pass search strategy. The first pass consists of a time-synchronous, beam-pruned Viterbi token-passing search through a lexical prefix tree. The recognizer also incorporates both model-based and feature-based speaker adaptation methods. SONIC also includes implementation of feature-based adaptation methods such as Vocal Tract Length Normalization (VTLN). SONIC is a collection of tools which are run from the command line,

As Figure 1.2 shows, there are two programs in the SONIC package which can perform speech recognition: sonic batch and sonic server. As the name says, sonic batch does recognition in batches, and is capable of recognizing thousands of audio files one by one, and is most useful when one wants to perform tests. sonic server is used to perform realtime recognition or dictation. It communicates with sonicclient over a TCP/IP port which in turn takes microphone input.
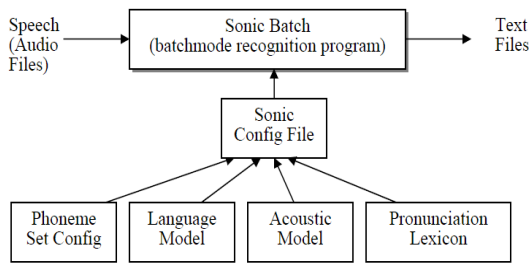
Fig 1.2 Sonic recoginsion process

This sonic batch supports number of speech given by user and the phnome set config at varied points are identified and acoustic sound are being controlled and through the lexicon the word pronunciation is manged which extends support for different language model.

CONCLUSION

This paper discusses some important issues in speech processing in the context of speech recognizer and varied search engines . The major challenges in speech processing in different senerios are: varying tonal language ,noise environment, speech verification and biometric. This paper suggests speech processing methods to determine some crucial events in speech, which are robust to above-said adverse conditions. In this work, authors have proposed automatic speech recognision methods at crucial events in speech, which are robust to speech coding and background noisy environments. By using speech recognizer like SONIC speech signals are processed in the presence of coding and noisy environments which support language model and lexican language for relevant retrieval of information which is supported by the different search engine with unique features providing user a need ful information.for developing the speech systems such as speech recognition,

speaker recognition, and speaking rate modification. This paper summarizes the findings of the present work, highlights the major contributions, and flashlights on the directions for future work.

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