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**RESEARCH ARTICLE**

# Speech Segmentation and Classification Using HMM Techniques

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***ABSTRACT- The increasing usage of web results the heavy communication and slow returns from web. Because of this, there is the requirement of some approaches to optimize the web resources usage. One of such approach is caching that can be used within an organization to optimize the access of frequently used web pages. Caching is about to predict the requirement of next web access of a user and load it in cache before user request. This kind of intelligent prediction comes under web usage mining. In this work, an intelligent SVM improved speech classification approach is defined to perform next web page prediction. The work will be here presented in three main stages. In first stage, to perform the intelligent sequence mining the dataset will be filtered. The filtration will be here performed using clustering approach. The clustering will be performed based on web usage. Now only the cluster that represents the high usages pages will be considered for prediction. In second stage, SVM will be applied to analyze the web page usage and the prediction of next required page access. The SOM will be applied here to assign the weightage to next possible based on frequency and time stamp analysis. Once the weightage will be applied, the final work is to apply the neural network to predict the next visiting page.***

***GENERAL TERMS- Web Caching, Web prefetching, data mining***

***KEYWORDS- SVM, WWW, HTML***

## 1. INTRODUCTION-

### 1.1 Speech Segmentation

Speech segmentation is the process of identifying the boundaries between words, syllables, or phonemes in spoken natural languages. The term applies both to the mental processes used by humans, and to artificial processes of natural language processing.

Speech segmentation is a subfield of general speech perception and cannot be adequately solved in isolation. As in most natural language processing problems, one must take into account context, grammar, and semantics, and even so the result is often a probabilistic division (statistically based on likelihood) rather than a categorical one. Though it seems that coarticulation - a phenomenon which may happen between adjacent words just as easily as within a single word - presents the main challenge in speech segmentation across languages, some other problems and strategies employed in solving those problems can be seen in the following sections.

### 1.2 Support Vector Machine(SVM)

In machine learning, support vector machines (SVMs, also support vector networks) are supervised learning models with associated learning algorithms that analyze data and recognize patterns, used for classification and regression analysis. Given a set of training examples, each marked as belonging to one of two categories, an SVM training algorithm builds a model that assigns new examples into one category or the other, making it a non-probabilistic binary linear classifier. An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible. New examples are then mapped into that same space and predicted to belong to a category based on which side of the gap they fall on.

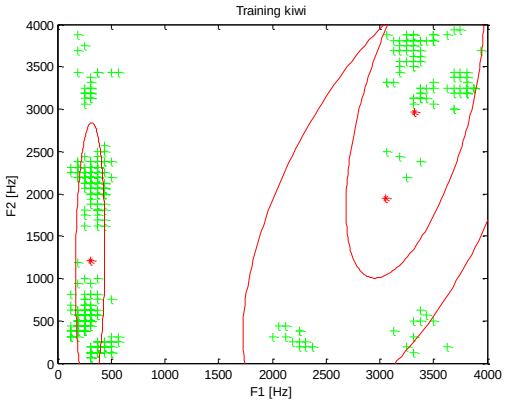
In addition to performing linear classification, SVMs can efficiently perform a non-linear classification using what is called the kernel trick, implicitly mapping their inputs into high-dimensional feature spaces.

### 1.3 Hidden Markov Model(HMM)

A hidden Markov model (HMM) is a statistical Markov model in which the system being modeled is assumed to be a Markov process with unobserved (hidden) states. A HMM can be presented as the simplest dynamic Bayesian network. The mathematics behind the HMM was developed by L. E. Baum and coworkers. It is closely related to an earlier work on the optimal nonlinear filtering problem by Ruslan L. Stratonovich,[6] who was the first to describe the forward-backward procedure.

In simpler Markov models (like a Markov chain), the state is directly visible to the observer, and therefore the state transition probabilities are the only parameters. In a hidden Markov model, the state is not directly visible, but output, dependent on the state, is visible. Each state has a probability distribution over the possible output tokens. Therefore the sequence of tokens generated by an HMM gives some information about the sequence of states. Note that the adjective 'hidden' refers to the state sequence through which the model passes, not to the parameters of the model; the model is still referred to as a 'hidden' Markov model even if these parameters are known exactly.




### 1.4 Research Methodology

Step1: Study about speech segmentation and classification.

Step2: Take a sample of voice on which techniques applied.

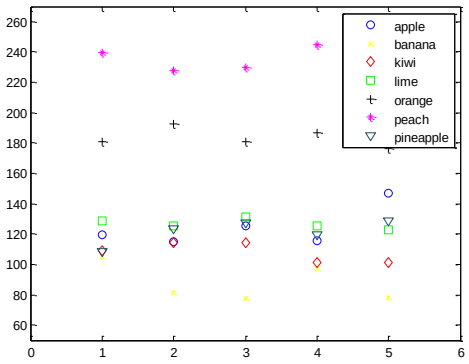
Step3: Make segmentation of speech for further classification process.

Step4: Apply Classification technique SVM.

Step5: Apply HMM (Hidden Markov Model)

## 2. Background

The manual extraction of patterns from data has occurred for centuries. Early methods of identifying patterns in data include Bayes' theorem (1700s) and regression analysis(1800s).




The proliferation, ubiquity and increasing power of computer technology has dramatically increased data collection, storage, and manipulation ability. As data sets have grown in size and complexity, direct "hands-on" data analysis has increasingly been augmented with indirect, automated data processing, aided by other discoveries in computer science, such as neural networks, cluster analysis, genetic algorithms (1950s), decision trees and decision rules (1960s), and support vector machines (1990s). Data mining is the process of applying

these methods with the intention of uncovering hidden patterns[16] in large data sets. It bridges the gap from applied statistics and artificial intelligence (which usually provide the mathematical background) to database management by exploiting the way data is stored and indexed in databases to execute the actual learning and discovery algorithms more efficiently, allowing such methods to be applied to ever larger data sets.

## 3. Literature Survey

### 3.1 Alba Sloin and David Burshtein, "Support Vector Machine Training for Improved Hidden Markov Modeling"[2]

We present a discriminative training algorithm that uses support vector machines (SVMs), to improve the classification of discrete and continuous output probability hidden Markov models (HMMs). The algorithm uses a set of maximum-likelihood (ML) trained HMM models as a baseline system, and SVM training scheme to rescore the results of the baseline HMMs. It turns out that the rescoring model can be represented as an unnormalized HMM. We describe two algorithms for training the unnormalized HMM models for both the discrete and continuous cases. One of the algorithms results in a single set of unnormalized HMMs that can be used in the standard recognition procedure (the Viterbi recognizer), as if they were plain HMMs. We use a toy problem and an isolated noisy digit recognition task to compare our new method to standard ML training. Our experiments show that SVMrescoring of hidden Markov models typically reduces the error rate significantly compared to standard ML training.

### 3.2 Lars Eriksson, "Algorithms for Automatic Segmentation of Speech"[3]

A problem in speech recognition and also in automatic phonetic transcription from read speech is accurate segmentation of the incoming speech signal into syllable-sized segments. Several methods for automatic speech segmentation using computers have been developed. One common and also quite simple algorithm is to use the intensity from the original signal and the intensity from one or more bandpass filtered versions of the signal. These are compared using different criteria to determine the syllabic boundaries in the speech signal.

## 4. Conclusion and Future Scope

Successful completion of the voice classification of the given voice files for both algorithms. Along with this we have the completion of classification for the two algorithms of modified SVM & HMM classification techniques. Comparison is performed by these algorithms on voice file. Only some samples of voice are taken and classify voice according words. In future the proposed algorithm can be applied on video files. The variety and quantity of data is constant in this work so in future we can vary these issues also

## REFERENCES-

1. IJIRCCE(An ISO 3297: 2007 Certified Organization)Vol. 2, Issue 8, August 2014,Vijayalakshmi B, Dr.Sugumar Rajendran, "Survey on Speech Emotion Detection Using SVM and HMM"[

2. Defense Advanced Research Projects Agency (DARPA) under Contract No. HR0011-06-C-0023,David Rybach, Christian Gollan, Ralf Schl¨uter, Hermann Ney, "AUDIO SEGMENTATION FOR SPEECH RECOGNITION USING SEGMENT FEATURES"

3. http://digital.cs.usu.edu/~cyan/CS7960/hmm-tutorial.pdf**,** Phil Blunsom, "Hidden Markov Models"

4. http://www.igi.tugraz.at/lehre/CI/tutorials/HMM.zip,Barbara Resch, "Hidden Markov Models : A Tutorial for the Course Computational Intelligence".

5. International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 2, Issue 4, April 2013.