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Voice Intelligence System (VIS) for disabled

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ABSTRACT

As we know that the disabled people faces difficulties in working with the computers in their day to day life. In order to overcome this difficulty a voice intelligence system is proposed as advancement in the technology. The name for the voice intelligence system is '**SAM'.** It was named such as it responds as a human. The purpose of this voice intelligence system is to make the computer to do multiple works using voice over commands. The voice over commands are predefined in a library and given reference in the source code. Thus executing this project results in controlling PC using the voice commands. The additionally added feature in this system among other existing systems is that, it responds back to the user with executing the commands with a speech back from the computer. Shortly it behaves as a human.

Keywords: HMM (Hidden Markov model), Algorithm-Viterbi

I. INTRODUCTION

Today in the technology world computer has become an integral part of every body's day to day life. We use computers to access and use multimedia files and accessing information from the internet. Every field in our society is computerized. But the information access and computer handling has to be done with the mouse and keyboard. The operations depend upon the eye sight and by reading everything that appears on the screen. So the computer is not user friendly for the blind and other disabled people. The blind people cannot read the information and cannot view the mouse cursor and other disabled people cannot use computer as well. Thus the computer becomes a toughest thing for the disabled people. We are going to develop an application for the blind and the disabled in which it can be accessed and used with the voice commands.

II. METHODS AND MATERIAL

A. Related Work

There are some previous studies about voice based systems but not very efficient. In the existing system there is no feedback voice from the system and makes it not much user friendly. So it is s big drawback for the blind people to interact with the system. Voicemail is an existing system that makes use of keyboard and mouse. The existing system is not fully voice based in nature.

The existing system involves steps like attaching a microphone and opening the recorder using mouse or keyboard. Using the computer may be easy for the normal people but it is difficult for the visually challenged people. This is because it is time consuming process for the blind people and quite difficult.

B. Proposed Work

The proposed work is a desktop application that allows accessing the computers with the help of the voice commands. We use artificial intelligence to benefit the disabled to make use of the advanced technology for their growth. The proposed work is a desktop application which makes use of artificial intelligence that makes it cost effecient and easy to use. The proposed work makes use of the Viterbi algorithm for voice detection and conversion.

It overcomes the disadvantages of the existing work in that it is fully voice based technology and gives no work to the basic input devices of a computer. Since it is a voice based technology, it provides an interactive and

easy to use GUI that can be used by a disabled person even if they are not computer literate. The idea is to create a class in .Net with .Net speech engine. The dictation mode gets activated and events are generated when the user tells the commands which are predefined.

V1,k=P(y1|k).πk
Vt,k=max(xϵS)(P(yt,k).ax,k.Vt-1,x

1. Here Vt,k is the probability of the most probable state sequence responsible for the first t observations that has k as its final state.
2. The Viterbi path can be retrieved by saving back pointers that remember which state was used in the second Equation. Let Ptr(k,t) be the function that returns the value of x used to compute Vt,k if /
3. t>1, or k if t=1. then:
$$x_T = \arg\max_{x \in S}(V_{T,x})$$
$$x_{t-1} = \mathrm{Ptr}(x_t, t)$$
4. Here we're using the standard definition of arg max. The complexity of this algorithm is .

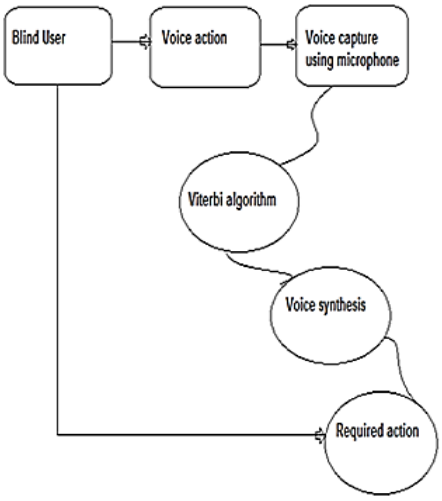


Figure 1: Overview of proposed system

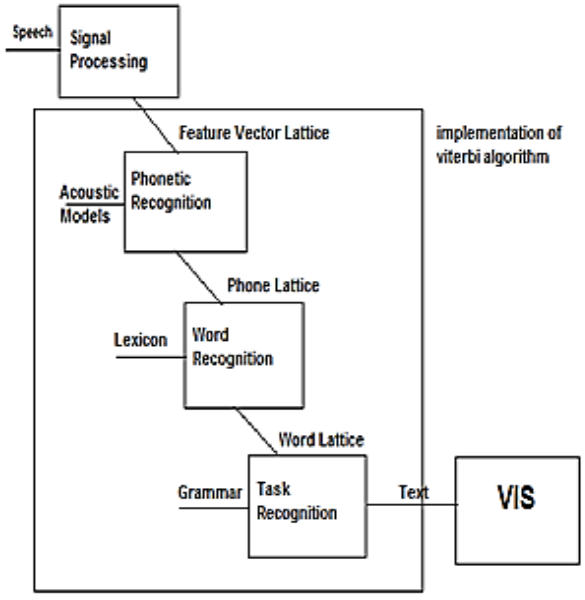
C. Viterbi Algorithm

This algorithm is used to find the most common sequence of hidden states which is called the Viterbi path that always results in a continuous sequence of observed events, especially in the context hidden Markov models. The algorithm has found universal application in decrypting the convolutional codes. It is now also commonly used in speech recognition and speech synthesis in finding the most appropriate word. For example, in speech-to-text (speech recognition), the acoustic wave signal is treated as the observed continuous sequence of events, and a string of text is considered to be the hidden cause of the acoustic wave signal. This dynamic algorithm finds the most suitable string of text as predicted by the user.

Algorithm implementation

Suppose we are given a Hidden Markov Model(HMM) with state space S, initial probabilities πi of being in a state i and then the transition probabilities of transitioning from state i to state j. Say we observe outputs yi,…..,yT. The most likely state sequence xi,…..,xT that produces the observations is given by the recurrence relations:

The algorithm executes in the way that the system detects the most appropriate word when user spells it and then matches the spelled word that is guessed with the actual word that is pronounced by the user. If both of them is found to be same then the word is selected from the loaded grammar and typed by the system without giving any burden to the user. That is how the algorithm is used to convert speech to text.



III. RESULT AND DISCUSSION

A. Voice Intelligence System Implementation

This system is developed using artificial intelligence. The proposed system is implemented by using the following hardware and software. They are as follows
Hardware:

Dual core processor
2 GB RAM
Microphone

Software:

Front End: C# GUI
Back End: C# .Net

The proposed system has 4 stages of implementation namely

1. Login Authentication
2. Voice Recognition
3. Voice based command detection
   3.1. Implementation of the Viterbi algorithm
4. Voice based functioning

Each level is implemented using .net in the front end and the backend .

B. Login Authentication

A login authentication form is included in the system in order to ensure that only the authorized user is permitted to use the system. This module can also be neglected if the user is uncomfortable with it.

C. Voice Recognition

Initially the voice commands being spoken by the user is detected by the speech recognition engine. The speech API used by the speech engine recognizes commands according to the speech culture selected.

D. Voice Based Command Detection

A voice based system that uses grammar based commands from residents to start and end actions. It makes use of the Viterbi algorithm.

This dynamic algorithm works in the way that the system detects and guesses the word when user spells it and then compares the word that is guessed with the actual word that is pronounced b. If both of them are found to be same then the word is selected from the loaded grammar and typed by the system without giving any burden to the user.

E. Voice Based Functioning

Here the main purpose of proposed system is used according to the voice commands spoken by the user.

F. The contributions of this paper are summarized as follows

We point out that Voice intelligence system is an initiative of introducing the mailing system that entirely concentrates on the benefits and comfort of the disabled people. However, by taking advantage of the To the best of our knowledge, this paper is an early feasible work on Voice intelligence system for disabled people. We propose desktop application that can be accessible from anywhere, this application is platform independent and it is supported by windows of any versions ranging from windows 7 to windows 8.1.

We establish the dynamic feature of notification that is entirely based on voice commands to enhance the performance of the proposed system. The research based analysis and experiments conclude that it is possible to add more features to the system.

IV. FUTURE ENHANCEMENTS

Future enhancements includes additional features to the developed intelligence system like introducing webcam based cursor control for the disabled persons. The proposed system includes only features like using the pc through voice based detection. So further features can also be added according to the need of the user in the forthcoming years.

V. CONCLUSION

Voice based architecture helps disabled people to access and use computers with no difficulty. The proposed system helps the disabled people in making use of advanced technology for their growth and improvement. This design will also reduce cognitive load taken by

disabled people in using the computers. It also helps handicapped and people who are less fluent in english. This project will be very much useful for today's generation either blind or physically challenged to improve their knowledge in using the computers in their day to day life.

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