

Voice Based E-Mail System For Visionless People And Object Detection Using Optimization Technique

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Abstract: Now-a-days technology has been improving a lot over the Internet and people utilizing the internet are also increasing rapidly. Email has been playing a key role in communication due to its efficiency. E-Mails are said to be the most reliable and most widely used way of communication for sending and receiving official information. But for visually impaired people it is very difficult to use the internet and technology. They cannot see the screen of the computer and cannot use the keyboard. So they cannot access the internet and becomes very difficult to communicate by using the internet. A recent analysis enclosed that there are more than 255million visually challenged people around the world. They even don't know how to use E-Mail. The only way that they can do is that they have to depend on the third person. This paper mainly aims at introducing a system that will help blind people to use the system without practice. The advantage of this system is that it will not let the user to use a keyboard, since it is difficult to recognize the characters on a keyboard for blind people. It simply works on mouse clicks and interactive voice response which makes very simple and easy to use. [3] Object Detection is locating an object in the frame of Video Sequence. It helps to detect unsuspecting events occurred in public places such as detecting traffic violators. Since the surveillance is done using multiple cameras, the computation power needed is more. One of the solutions to overcome this problem is Cloud Computing based approach. Object detection is done by the one of the most popular and simple technique called background subtraction. Here the Subtraction is parallelized by workflow scheduling mechanisms. Once parallelization is achieved through workflow scheduling computation time is reduced. Hence the object detection time is reduced which is more helpful for most of the Real Time object detection and tracking applications viz video surveillance, Robot Navigation and etc. To optimize the scheduling we go for BAT optimization algorithm which is a Meta heuristic technique.

Index Terms: Communication; Email; optimization; parallelization; scheduling; visually impair

1 INTRODUCTION

is a web-based application for visually challenged persons using interactive voice response. This will be useful to visually challenged people by enabling features like they can send, read and do any type of useful tasks simply by using their voice. The main advantage of this project is that there is no use of a keyboard and by using voice ,a mouse click they can able to access the services of E-Mail. Now by saying this, every one question is that how visually challenged people can give mouse clicks on the screen but in this, there is no need of cursor portion on the screen just it works on clicks like a left click or right click. It works in a way that a person can give clicks anywhere on the screen. So it's very useful for the visually challenged (i.e,) blind people for communication. It brings equality in society so it is useful for our society. It is also useful for illiterate people. [4] Object detection is an image processing application that detects objects like houses, humans and vehicles in digital images. Detecting of an object is used in video frame sequences to classify the direction of moving objects. Subtraction of the reference is the method of removing the background objects in a series of video frames. Since the surveillance is done using multiple cameras, the computation power needed is more. One of the solutions to overcome this problem is Cloud Computing based approach.

Cloud computing is technology where large pools of systems are connected to transport data from one end to other end and it make use of internet and isolated server to preserve data application. The idea of cloud computing is reusability of IT capabilities. There is no need to install any piece of software on the local machine. It is referred as PAY AS YOU GO MODEL. It provides services to the external user or external customer using internet technology. Cloud is a grouping of parallel, distributed and grid systems which is virtualized. It is the service level agreements imposed between the providers and consumers. A Workflow is a category of platform services that makes it easier to computerize distributed applications based on the infrastructure of cloud. A Workflow Scheduling is a process that maps and manages the execution of inter-reliant tasks on distributed resources. [3] The resources are allocated to the tasks such that the execution can be completed to satisfy the constraint imposed by users.

2 LITERATURE SURVEY

The existing Systems reads content present on the screen by using screen readers. Speech to text converter which converts speech to text and text to speech converter is used for converting text messages to speech. Although this is a useful technology, still there are some major problems which make efforts useless.

Drawbacks of the system are:

- i. It becomes difficult for blind people to access E-Mail since the screen reader is containing noisy audio interface.
- ii. Automatic Speech recognizer performance degrades if it contains noisy environment.

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- iii. One of the main drawbacks is that both automatic speech recognizer and text to speech are language dependent.
- iv. Tools and technologies for blind people do not exist in mobile phones.
- v. There is a use of a keyboard where blind people have to recognize the character which is very difficult for blind people. [5]

3 EXISTING SYSTEM

Presently visually challenged people cannot compose mail or read emails. They have to depend on the third person. Those systems which will respond by voice are very rare. So, it is difficult to compose or read mail for blind people presently. Of course, technology has increased and there are some systems which are working on screen readers but it also has its own cons. [1].

4 PROPOSED SYSTEM

The proposed system is developed by the existing system. By the solution which we are going to explain both Blind people and also normal people can easily access to E-Mail. They can be able to do all the tasks simply by a voice and by giving the mouse clicks. The big advantage is that there is no need to use a keyboard and no need to remember any shortcuts. The user gives the input an voice and the system converts the voice to text and sends to receiver. Similarly, when the user gets a message the system will convert the text to a voice by which the user can be able to understand the message. By testing, we came to know that our proposed system is much better than the existing system through its unique facilities available. It gives the most accurate result [1].

5 METHODOLOGIES AND TOOLS

- Android Mobile Phone.
- Monitor
- Mouse
- RAM 512Mb
- Hard Disk 40GB
- Coding languages: Java
- IDE eclipse
- For Front End: Java and Android
- For Back End: My SQL.

5.1 Various Workflows

- Montage Workflow- Montage means the procedure of constructing latest composite whole from fragment of pictures, text etc... It involves selecting, editing, piecing together the separate section of film to form a continuous whole. It is used in astronomical applications such as it generates custom mosaics of sky based on a set of input images. [4].
- Epigenomics Workflow-The Epigenomics workflow is basically a data processing channel which is used to make routine the implementation of the different genome sequencing functions.
- Cyber Shake Workflow - This workflow is used to describe the volcanic activity using probabilistic seismic danger examination. It is data intensive Workflow with larger CPU and storage requirements.[5]

5.2 Regular BAT Algorithm

The usual BAT algorithm was based on the echolocation of

micro bats. Let us briefly initiate the echolocation, prior to summarize the particulars of the algorithm [6].

5.2.1 AN ECHOLOCATION

There are approximately 1000 different BAT species. Its sizes can vary widely, ranging from about 1.5 to 2 grams of tiny bat to about 1 kg of gigantic bats. To a certain degree, many bats use echolocation for locate their prey. Micro bats make widespread use of echolocation, while mega bats do not use it. Usually, micro bats use a sonar type, called echolocation, to detect the prey and avoid obstacles. We can emit a very loud sound pulse and we listen to the echo that bounces back from the objects around them. Depending on the species, their pulses differ in properties that may be related to their hunting strategies. Micro bats can usually emit around ten to twenty such sound bursts per second. When entering their prey, the frequency of pulse emission can be increased to about 200 pulses per second.

5.2.2 BAT ALGORITHM

BAT algorithm consists of 3 rules,

- i. All BATs utilize echolocation to identify where the prey is available, as well as the difference between prey and background barriers.
- ii. Bats move randomly with velocity v_i at location x_i with a speed S_{min} , varying wavelength and loudness A_0 to seek prey. You can change the wavelength of your emitted pulse.
- iii. The loudness can fluctuate in numerous behaviors that are from a large (positive) A_0 to a lowest amount invariable value A_{min} .

5.3 MATHEMATICAL MODEL OF BAT WORKFLOW SCHEDULING

Each bat is connected with a velocity v_i^t and a position x_i^t . amongst all the bats, the recent finest result is x^* . Therefore, above three regulations can be transformed into following three formulae's.

$$S_i = S_{min} + (S_{max} - S_{min}) \epsilon \quad \text{-----} \quad (1)$$

$$v_i^t = v_i^{t-1} + (x_i^{t-1} - x^*) f_i \quad \text{-----} \quad (2)$$

$$x_i^t = x_i^{t-1} + v_i^t \quad \text{-----} \quad (3)$$

A. Voice to text Converter

In this, the speech is given as input using a phone and it processes the speech to identify the pronounced text. After processing it is stored in a file which is being developed by using Eclipse Workbench. This task is divided into several steps like feature extraction which is built based on voice recognition algorithms, data dictionary and data. The speech is recognized in even intervals since it is stationary the period will be 20ms. The output will be in the form of a text. So to convert a speech to a text there are various algorithms. In this phenomenon when the user gives the speech as the input, the system recognizes the speech and converts it into the text and asks verification. If everything is done and valid the user can send message by giving the mouse click actions. [4]

B. Text to voice converter

Using techniques like speech synthesis the text can be converted into voice. In this text to speech converter the text is given as input and the speech will become as output. System includes reading messages in emails for blind and visually challenged people. Although this is a difficult task this can be implemented by defining the characters in keyboard priority and by using a controller and a interface with a keyboard. This accepts finite number of strings or characters and can read any text by recognizing the characters. It reads the text using the optical sensors and it converts text to speech through which all sort of problems will be sorted for blind people. This mechanism helps the visually impaired people for the communication. The design is mainly divided into three stages they are:

- Stage 1: in this web-page is developed which is used by a user for interaction.
- Stage2: This is the main stage in the design of project in which the database will be given i.e the data to be stored. It is also used to store data of emails which are sent or received.
- Stage 3: in this, the complete design is explained through some use-case diagrams and through flow chart representation. Through this, the entire concept as well as mechanism should be understandable. [2]

The above flowchart represents the idea of system unambiguously.

C. Stages and steps in our project

Login Page:

This will be the first web page which can be created using HTML and in this, system will ask to enter the user name. No need to worry system can convert the speech to a text So that user can give user name as voice and again it asks for password in a similar manner. If both the user name and the password matched it can direct the user to the main page or else it will go back again to the login page.

Main page:

This is the main page where user has to work. After logging user will direct to this main page where the user can compose, receive messages and can perform various tasks like checking inbox. As this is the vital part, here our system will be implemented, visually challenged persons can compose mail through speech and by mouse clicks and can reads messages by text to speech converter. Messages can also be saved as drafts and lastly users can logout of the session. All this can be done only by text to speech and speech to text converters. Let's see what are the actions to be performed when various mouse clicks.

- Left click: User can give a left click on the mouse for sending mail.
- Right-click: on clicking right on the mouse user can go to send emails.
- Double click: This action is for to go to the inbox in mail.
- Scrolling button: By scrolling the mouse button the user can be able to go to Trash messages. And finally by double Right click for logging out of the mail.

There are also some predefined tasks which make user easy like for next user can give a left click and right click for going back and clicking the scroll button to go to the main page. So by this, we can compose mail: give left click from the main page to compose mail. If everything is ok, then give the left click for the next step. When your voice will be verified if there is no issue give left click to go to the next step otherwise you will be sent back.

D. Workflow Model for Object Detection in Video

In this paper, BAT denotes the task and prey denotes the resources. The frequency of a bat denotes the task size in terms of seconds. The velocity of a bat denotes when the capability of particular virtual machine is not sufficient for a task to complete, it moves to the next virtual machine. The location of a bat denotes the resource or the virtual machine.

- $F_i \rightarrow$ task size (seconds)

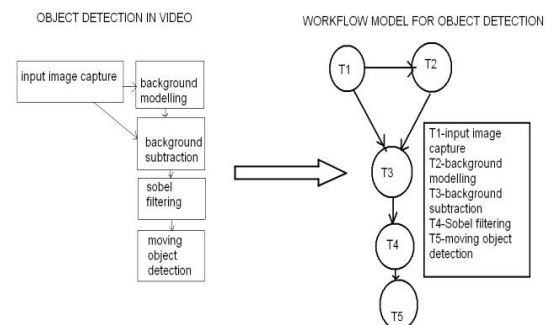


Fig. 1. Workflow Model for Object Detection

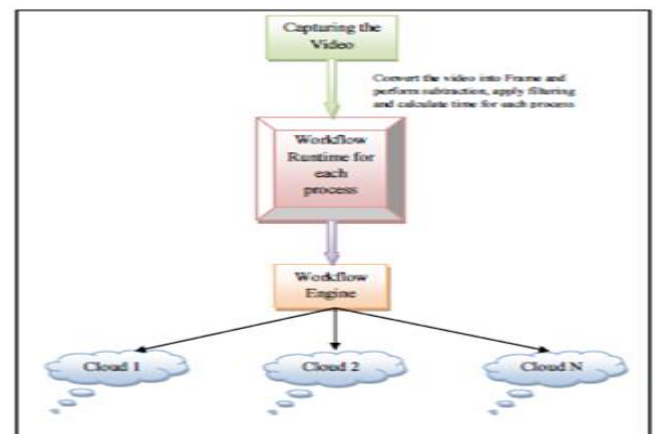


Fig 2: Architecture of Workflow Engine for Background Subtraction based Object Detection

- $V_i^t \rightarrow$ speed to jump from one virtual machine (VM1) to other virtual machine(VM2) due to insufficiency if resources of virtual machine 1
- $X_i^t \rightarrow$ virtual machine with sufficient resources

6 RESULTS AND DISCUSSION

This research work set up cloudsim with 20 virtual machine, each having dual core processing elements, to evaluate and learn the performance of various workflow models for object

detection based on background subtraction technique,. Each virtual machine is capable of 512 MB RAM and 1 Mbps connectivity. The background subtraction based object detection consists of five tasks. The first task is capturing the scene as a input and split into frames. The single first captured image is then processed by the second task to produce background model. After that forthcoming frames from video are subtracted from background model in third task. This project applies sobel filtering as a fourth task to improve the quality of subtracted image,. Finally the image is detected in fifth task. Table 1 shows that measured execution time of each task in seconds.

TABLE 1
VARIOUS TASKS AND ITS EXECUTION TIME

S. No.	Name of the Task	Measured Execution Time (Sec)
1	T1 = capturing the frame from video	5
2	T2 = create background model	5
3	T3 = background subtraction	300
4	T4 = filtering	5
5	T5 = moving object direction	5

TABLE 2
THE EXPERIMENTAL RESULT WITH WORKFLOW OF OBJECT DETECTION

Workflow Models	Turn Around Time (Sec)	Waiting Time (Sec)	Average Turn Around Time (Sec)	Average Waiting Time (Sec)
Montage	315.21	620.42	63.04	125.08
Epigenomic	2830.75	5368.23	556.25	1173.25
CyberShake	3196.61	5378.23	635.32	1173.22

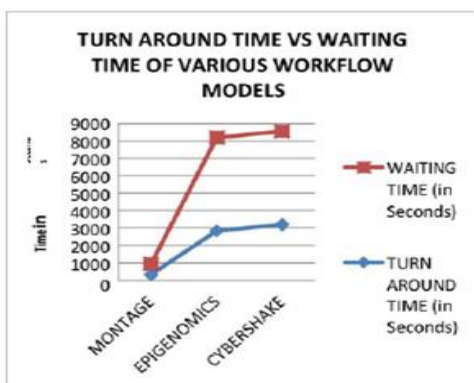


Fig 7: Analysis of Turnaround Time vs waiting time of various workflows

7 CONCLUSION

The main aim of this system is for strengthening and welfare of our society. The main theme is to help visually challenged persons to perform tasks of E-Mail for communication through the internet. This system makes disabled, blind, visually challenged people life easy. This is a very useful system in our society in the communication field. This will bring a drastic change in the field of communication. Real time object detection and tracking play a vital role in video surveillance system which keeps track of the information video data. The drawback in background subtraction is that detection time of object is tedious. Workflow Scheduling deals with the implementation of inter-reliant jobs on distributed resources. Based upon the work performed in this paper, montage workflow with bat optimized workflow scheduling is well suited for object detection based on background subtraction since computation time is very less when compared to other workflows. The method explained above is the best way out of all the solutions for this problem since it is easy to implement compared to others with accessing many features.

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