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RESEARCH ARTICLE

Call Admission Control and Resource Utilization in 3G Networks

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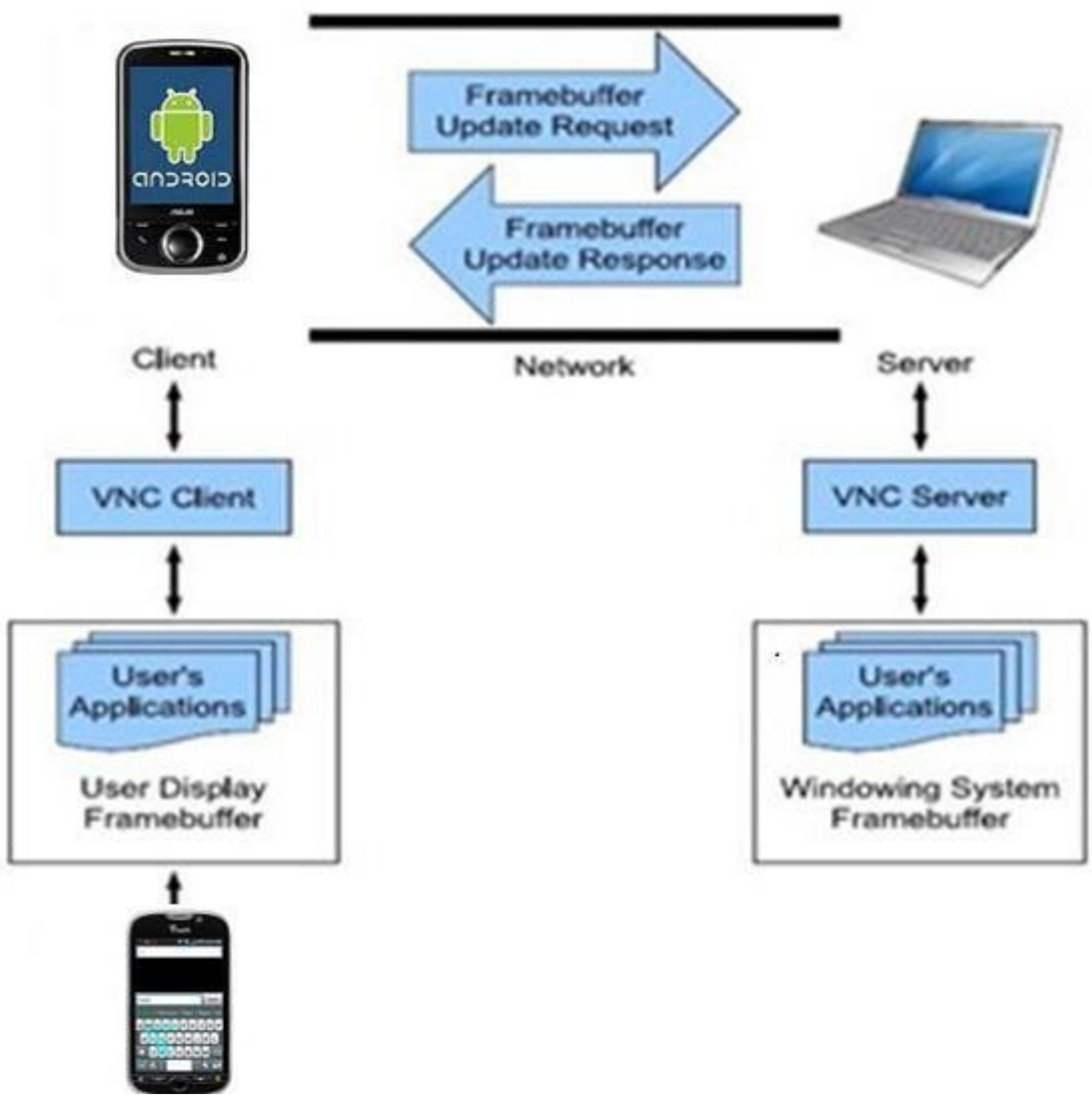
Abstract- Every newly developed technology faces the challenges to justify its potential and become alive in a real working environment. Combining two of the leading new technologies, GPRS and multicasting in the field of mobile communications makes this challenge even more exigent. At a time when radio and core network resources are utilized at maximum, multicasting has the potential to improve overall resource utilization and as result to provide more channels for voice or data transmission. This also significantly improves the quality of the service and allows applications with high bandwidth demands such as streaming video and viceo conferencing to be widely promoted. In this we will focus on studying the impact of multicast implementation on GPRS platforms. From the analyses of the output results from the system simulator we will determine the multicast influence on a GPRS and different network loads, number of users and multicast density modes. We have studied the impact of packet delays and packet overflow which is in close relation to the Quality of Service provided by the system.

Keywords: Mobile Ad Hoc Network, Security, Intrusion Detection, Secure Routing

I. INTRODUCTION

In recent years, there has been a rapid increase in wireless network deployment and mobile device market penetration. With various research that promises higher data rates, future wireless networks will likely become an integral part of the global communication infrastructure. Ultimately, wireless users will demand the same reliable service as today's wire-line network provides. Through our device controller we can represent a safe & secure wireless communication with proper authentication and less loss of data.



Third Generation (3G) Networks

Universal Mobile Telecommunications System (UMTS) provides broadband, packet-based transmission of text, digitized voice, video, and multimedia at data rates up to and possibly higher than 2 megabits per second (Mbps), offering a consistent set of services to mobile computer and phone users no matter where they are located in the world. Based on the Global System for Mobile Communications (GSM) standard, UMTS is endorsed by major standards bodies and manufacturers and is the planned standard for mobile users around the world. Once UMTS is fully implemented, computer and phone users can be constantly attached to the Internet as they travel and, with roaming service, have the same set of capabilities no matter where they travel. Wideband code division multiple access (WCDMA) is the standard to be used for multiple access in these networks.

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To support various integrated services with a certain quality of service (QoS) requirement in these wireless networks, resource provisioning is a major issue. The Universal Mobile Telecommunication Systems (UMTS) supports QoS provisioning through four basic classes of service:

- Class 1: Conversational (high sensitivity to delay).
- Class 2: Streaming (medium sensitivity to delay and high sensitivity).
- Class 3: Interactive (low sensitivity to delay, high sensitivity to round trip delay time and Bit Error Rate (BER)).
- Class 4: Background (no delay sensitivity, high sensitivity to BER).

At the present time, the wireless communication research community and industry discuss standardizations for the fourth mobile generation (4G). The research community has generated a number of promising solutions for significant improvements in system performance [2]. One of the most promising future technologies in mobile radio communications is multi antenna elements at the transmitter and at the receiver.

The main objectives are:

- some causes of unsuccessful Call Admission and Resource Allocation over WCDMA networks. In particular issues of soft capacity and service prioritization.
- Survey some of the improvements to Call Admission and Resource Allocation mechanisms proposed in the literature.
- Investigate the performance of modern schemes and identify areas for improvement.
- Introduce and develop improvements to the existing schemes to further reduce loss rates and further prioritize services according to user requests.
- Investigate through simulations the performance achieved by the suggested improvements.
- Investigate possible applications of Control Theory in Resource Reservation mechanisms.
- Discuss the strengths and weaknesses of the proposed controller mechanism.

II. APPROACHES FOR MOBILE INFORMATION RETRIEVAL

A. Problem Description

In recent years our modern life style becomes so busy and full of task schedule that we often forget to do some simple duties. Such as forget mobiles or switch of our household appliances. We don't bother about these types of carelessness every time, but this can give us real trouble sometime. Unnecessarily energy is consumed. For too much consumption of energy, the generated heat can damage the device. This damage causes a serious interruption in our task schedule, besides some loss of money and time also. But it is not always possible for us to switch off the devices from the remote place. So our aim is to control the household devices or mobile devices from the remote places in a phone conversation, echo is the sound of your own voice being played back to you after a delay. This paper discusses how the echo of telephonic line would be minimizing using RLS algorithm with Matlab implementation.

We will define the speech of speaker A as the near end signal for hybrid A and the speech of speaker B as the far-end signal for hybrid A. For hybrid B, the near-end and far-end signals are the signals of speaker B and of speaker A, respectively. The speaker at the far-end hears not only what the speaker at the near-end says, but also an echo of his own voice[1]. The signal from the near end signal will be denoted by v(t). The signal from the far-end speaker is x(t). The echo of the far-end speaker is y(t). The echo can be modeled as the result of the signal x(t) passing through a linear filter h(t):

$$y(t) = h(t) * x(t)$$

Where * denotes convolution. The signal which is sent back to the far-end speaker is:

$z(t) = v(t) + y(t)$ - (2)

Another possibility is to identify the impulse response h(t) of the hybrid or the acoustic coupling between the loudspeaker and the microphone, then estimate the echo signal y(t) and subtract it from z(t). Let the estimated echo and impulse response be ˆy(t) and ˆh(t), respectively [2]. The signal sent back to the far end is:

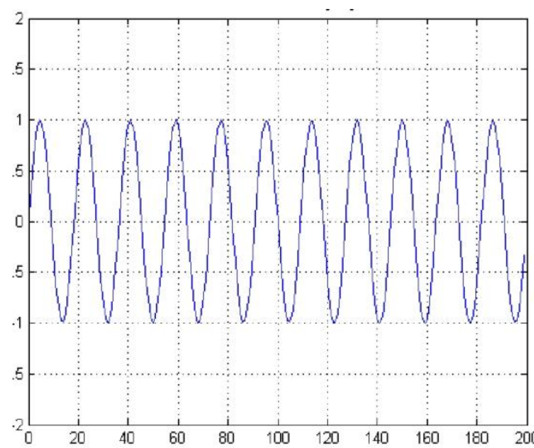
$$e(t) = z(t) - \hat{y}(t)$$
$$= v(t) + y(t) - \quad (t)$$

The estimated echo ˆy(t) is:

$\hat{y}(t) = \hat{h}(t) * x(t)$ - (4)

If ˆ h(t) =h(t), then the cancellation is complete, i.e.

$e(t) \equiv v(t)$) - (5)



Research Objectives

b) Query Suggestion

Query suggestion deals with identifying what the mobile user require. It will be effectual for the system to confine the users input before forwarding it to the search engine. The query suggestion can come from the database, ontology, previous user pattern or past history and from other users.

The fundamental for query processing is to provide indexing which makes query suggestion easier. Designing of the ontology must be done cautiously, because it is necessary to make the domain knowledge explicit. Preprocessing of the user query can be done easily with the help of better ontology structure.

c) Mobile User Interface

The mobile user interface must be developed based on the search engine or the information retrieval application like meta-search engine etc. The whole retrieved information of the users query might not fit the small mobile screen, so categorization like tree-form, result window etc., can be done to minimize the small screen problem.

d) Content Delivery Techniques

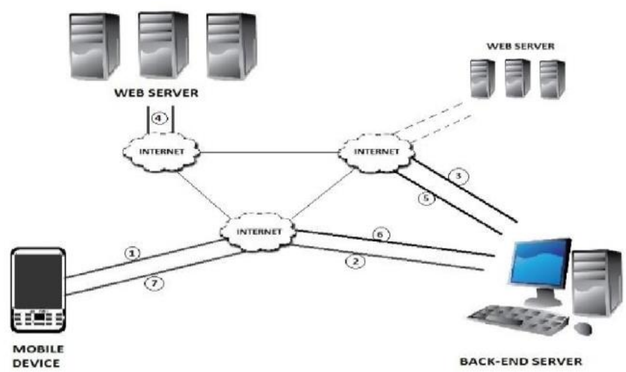
The content delivery technique mainly focuses on delivering the best content to the users. This can be made possible by the approaches like using a back end server, having good algorithmic models for processing the results and better clustering systems for better results.

The main task of back end server is to redirect the request from the mobile user to its server and act as intercede between the mobile and the web search engine. The back end server then processes the requests and sends it to the web agent or the web search engine. This is done because the algorithmic operations cannot be done in the mobile domain due to its size and processing speed. Fig 5 explains the processes that come to pass during retrieving information from and through mobile devices.

Large numbers of algorithms are used in information retrieval. Most of the algorithms cannot be applied for mobile devices. Few algorithms like Real Time Query Expansion system [9] can be used by mobile users. It delivers appropriate suggestions to the mobile users if they are using the custom build user interface.

The step by step procedure of retrieving information through mobile using a back-end server is as follows;

1. When the mobile user wants to retrieve information, he first opens his application that has a search interface. The request typed by the user is directly routed to a back-end server through internet.
2. The users request reaches the back-end server. The back-end server is responsible for processing the request.
3. The back-end server searches the web (using crawlers, spiders, etc.,) for the relevant information.
4. The relevant information is retrieved (by crawlers, spiders, etc.,) from the web the web servers.
5. The retrieved information reaches the back-end server through internet.
6. The retrieved information is compressed or processed such that it fits the mobile users screen resolution, processing speed etc., the compressed information is then send to the mobile device through internet.
7. The user receives the retrieved information that supports his mobile device.



Step by Step Method of Retrieving Information

Clustering the systems is done to obtain better results. A system called Mobile Find ex provides an efficient mobile user interface device. This system presents the result set or cluster to the mobile users by clustering content and user interface.

e) Search Interface

For every mobile device there need to be a search device to perform information retrieval. Mobiles user interface is connected to the back-end server by web services.

In CARSA Retrieval system, it submits its query to the Meta Searcher. Meta Searcher users User Profile, Intelligent Bookmark and Sense folder classification to process the mobile users query. Ontology facilitated Interoperation is carried out by the Meta Searcher to strengthen user mobile experience.

f) Grouping of the documents

Grouping of the information retrieved from the documents can improvise the performance of retrieval operations for the user. The grouping of the documents can improve the search speed by 50%.

III. RETRIEVING OR EXTRACTING THE INFORMATION FROM THE WEB PAGES

There are many papers discussing how to extract or retrieve information from web pages. Document Object Modal based Content extraction from html pages or documents focus on removing medley and arranging the content into a more readable format like changing the font size and font type or removing the html and data factors like pictures, advertisement etc., so that the content can be made available to mobile screen size.

Another paper called Extracting Structured Data from Web Pages used an algorithm for extracting the information based on the set of words that have similar event arrangement in the given input, and it uses that to extract the information and develop a template.

Preliminary Discussion

In our paper we used back-end-server as computer and tested using that with a mobile phone. Both mobile phone and computer were tested individually to find the difference.

a) Cosine similarity

Cosine similarity is widely used to find the similarity between two documents. Cosine similarity is a similarity measure; we can convert the similarity measure to a distance measure. Thus by doing it we can use it in any distance based classifier like nearest neighbor classifier. The cosine similarity is used to select the topic and is also used by crawler to search for links that does not exceed the minimum similarity score.

The cosine similarity between a topic and page is as follows

a) Other Mobile Intelligent Agent

Hewlett-Packards Site On Mobile to create specific kind of task called "task sets" which extract the relevant data from web site and make it available to the mobile users. This can be used by people who want to get specific set of information. Apple iPhone uses a personal assistant application called Sire to send message, to make appointments, call a person, to reserve a ticket or to hire a cab and many more just by the voice instruction in natural language. There are still many intelligent agents going to mount in the market as the mobile usage is going on massive up rise.

b) Pros

Reduced search: Having information retrieved through and for mobile devices makes the search easy. Suppose we want buy a digital camera we need to do a lot of search like opening various websites, checking the price, selecting our desired camera with specific requirements like resolution, lens, pixel etc., this will take a pretty much time. But having all our information retrieved through mobile can make our work and search simpler. Anywhere anytime use: We can use the mobile anywhere and anytime, no need to go and sit in front of a personal computer or a laptop. Consider a scenario where there is no laptop or a personal computer like museum or a movie hall and we want to book a holiday travel pack. We can do that manually but the thrill of the movie might go, so just tell the mobile agent to search for travel destination and hotels in the current place and continue watching the movie.

c) Cons

User privacy: In some cases the mobile users are required to give their passwords, bank account details etc., which affects the privacy of the mobile user. User security: There can also arise some security issues like identity theft etc., some fraud mobile agents can also send our internet history, personal details etc., to unknown people or they can use it for other malicious purpose. User acceptance: Because of the above problems it is a challenging task to make mobile users welcome the information retrieval through and for mobile.

Network and Mobile processor speed: Network speed and processor speed act as the barrier in retrieving information through and for mobile device. In some cases the person might have a better processor and might not have a better internetwork and vice versa.

IV. CONCLUSION

A small technique for retrieving information through mobile is discussed in this paper. We analyzed how pages are retrieved using Topic-Sensitive PageRank Algorithm. Combing it with Page Freshness and Age gave us a more efficient and well-run results. Our method combines Topic-Sensitive PageRank with Page Freshness and Age, which can be found useful in retrieving updated information using a crawler. Best results can be obtained from the mixture of Topic-Sensitive and Page Freshness. An experimental proof done by us also implies that it can retrieve relevant information. Future works can also be done using other search algorithms and combing it Page Freshness and Age. Comparative study can made between search algorithms combined with Page Freshness and Age.

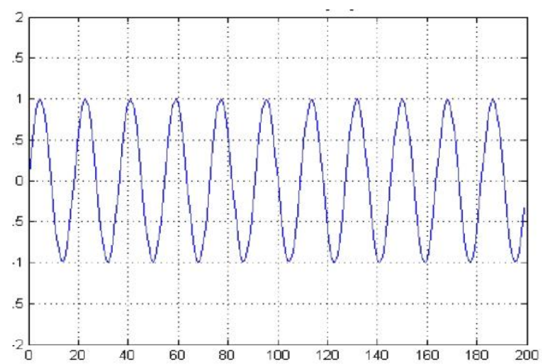
Retrieving information through and for mobile devices is an emerging field as the mobile users are on aggrandizement. As the security increases people will normally start retrieve information and through and for mobile. In this field there are plenty of adventitious channel for research.

V. MATLAB IMPLEMENTATION

An important feature of RLS filter is that its rate of convergence is typically an order of magnitude faster than that of the simple LMS filter, due to the fact that the RLS filter whitens the input data by using the inverse correlation matrix of the data, assumed to be of zero mean. This improvement in performance, however, is achieved at the expense of an increase in computational complexity of the RLS filter**.** By considering the information bearing signal as a telephonic voice signal which should be of sine wave in nature**.** After this signal passes through the echo path so we get the corrupted output. One wave of 0.055

Simulation Model Statistics of All Results Presented

In our model Power is considered to be the only limited resource and other resources such as spreading codes and buffering capacity are assumed to be available in plenty. A single caller is assumed to request a single service. The Base Station is assumed to be located at the centre of a cell with an omnidirectional antenna. The model was implemented in a MATLAB simulation environment.

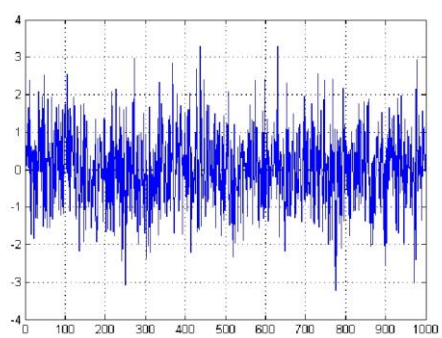


Assumed voice signal

User requests are processed on a "first come, first served" basis. The cell radius is 300m. The decision of accepting or rejecting a request is based on the QoS profile attached to the request, the maximum power available in the system and the QoS requirements of users being served. In the uplink direction the total interference measured at the base station is used as the load indicator. In the downlink direction the only power level that needs to be considered is that emitted by the base station.

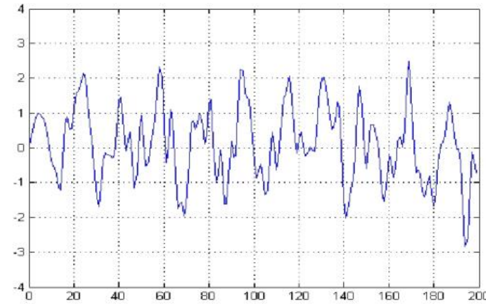
Feedback Control

The purpose of a controller is to keep a controlled variable at its desired value in the presence of disturbances from various sources and to cause it to follow changes in said desired value as closely as possible the bulk of the control work in the process industry is done by members of the proportional-derivative-integral (PID) control family and this will continue to be true in to the future owing to their combination of simplicity, familiarity and robustness.

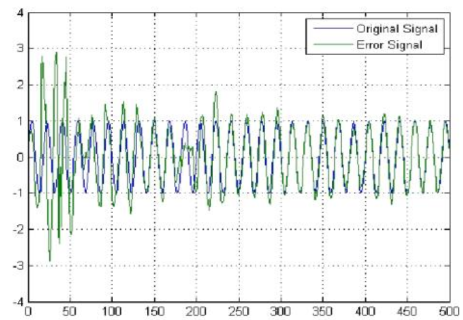


Echo path

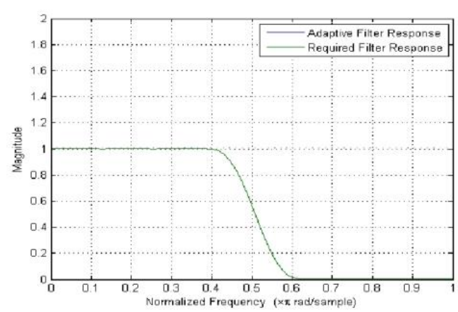
The noise picked up by the far end is the input for the RLS adaptive filter. The noise that corrupts the sine wave is a low pass filtered version of (correlated to) this noise. The sum of the filtered noise and the information bearing signal is the desired signal for the adaptive filter



Voice signal + Echo signal



Error signal



Filter response

VI. CONCLUSION

When the voice is passing through the telephone the echo is added with the signal. So that at the far end we would not able to receive the signal of actual voice but we get the signal. Now our aim is to cancel the echo path. The plot shows the convergence of the adaptive filter response to the response of the FIR filter in by computing we get the error signal. The plot shows the convergence of the adaptive filter response to the response of the FIR filter By computing we get the error signal, we conclude that the echo would be almost cancel from the original signal so we can listen the actual voice of the near end signal.

Call duration and the target *SIR* are assigned according to the class shown in. **Class**	**Bit-rate**	**Duration**	**Velocity**	SIR_{tar}
1	384 Kbps	120 s	16.7 m/s	4 dB
1	144 Kbps	120 s	27.8 m/s	4 dB
1	64 Kbps	16 s	33.3 m/s	4 dB
1	16 Kbps	256 s	44.4 m/s	4 dB
2	384 Kbps	120 s	0 m/s	7 dB
3	144 Kbps	120 s	27.8 m/s	5 dB
3	64 Kbps	16 s	33.3 m/s	5 dB
3	16 Kbps	256 s	44.4 m/s	5 dB
4	64 Kbps	16 s	33.3 m/s	5 dB
4	16 Kbps	256 s	44.4 m/s	5 dB
Chip-Rate	3.84 Mcps			
P_{max}	35 W			

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