An Analysis of Content Delivery Using Pervasive Computing for Delay Sensitive Networks

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Abstract--- Transmitting multimedia messages with more speed are a challenging one nowadays. Here, we present a strategy to minimize the delay and to provide a service with more media contents within a minimal time as possible. Choosing the best location access point among many access points is the playing a key role in this. With limited and constrained access points we need to transmit large volume of services from multiple users with less delay in transmission. To take care of this issue, we break down the development example of versatile hubs and estimated it as a semi-Markov model. In light of this model, we investigate diverse segments of the fundamental administration delay and suggest that APs ought to utilize systems that will multicast and thus limiting the delay with queuing.

Keywords--- Delay-Sensitive Service, Access Points, Semi-Markov Model.

I. Introduction

Location data of each user plays a vital role by strengthening it to a wide range. Using which many new services that are based on these locations can be enhanced, so that the mobile user's experience will get enhanced, and this continues thus by exploring the next best nodes again and again.

To provide a case, take a craftsmanship display in which a client methodologies an artistic creation and, as the client approaches the access point, the media content requested is cached at a nearby wireless access point and the content is delivered to the mobile device of the user. Despite of advancements and enhancements in localization technologies over years, there are many challenges that are suppressing the vision of the pervasive wireless connectivity. Irrespective to the minimal burdens with queuing the services, we need to transmit the media contents to as many mobile agents as possible.

II. Existing System

The major problem in mobile and pervasive computing application is that, it faces more capacity of desired content to make available to other users who are at different cells as well as mobile agents. For transmitting delay-sensitive applications it needs a different approach in which it has to consider both the user related patterns as well as the hardware resources (Access points, mobile users etc.) required for transmitting in the wireless infrastructure. So as to transmit the content to the remote user with minimum delay. Further burden in transmitting these multimedia contents were, many mobile agents will try to transmit or receive such type of files and these services may lead to heavy traffic in the network and it requires a careful handling of servicing the request with an appropriate servicing strategy and thus ensuring us with a better transmission of multimedia messages to all mobile agents

III. Proposed System

In the Proposed implementation, we use AP Centric and as well as Deputy and Forward Method.

AP-centric Method

AP centric is a method, where the user sends a query to the Access point, then the data is relayed back to the user. Data requested by the user is relayed to the user is called as Unicast. If the sane data requested by multiple users, then the data is sent to all the users in parallel. This process is called as Multicast.

Three basic strategies to deliver location-based data are:

FCFS Unicast

Under this approach, every access point will act as a separate server with no limitation at the number of services to be queued. In such a way the queue length will be 1, if there is only one node that requires this location oriented service, so that that node can be serviced immediately. As another case, if more than one node requires for a location oriented service, then the queue length will be more than 1, thus leaving many nodes to wait for their turn for getting the service.

FCFS Multicast

An Access Point always serves the requesting node with the highest waiting time. The Access Point will send data to the node which has the highest waiting time, if there are many other nodes in the same location requesting the same service, then the Access Point will multicast the data to those nodes.

Max-Nodes Multicast

Always Access point will choose the location with maximum number of nodes possible to multicast. To perform this, the access point will look for a location that has maximum number of nodes. Then it sends the data to the location with majority number of nodes in it. If a tie occurs between two or more nodes while choosing the location with max-nodes, thenchoosing the location is based on the location that has highest waiting time for bursting it.

Therefore, we can observe that FCFS multicast is the better strategy when compared with FCFS unicast because all the access points in this multicast will not only serve the node that is waiting for a long time but also all the other nodes available at that location. Thus reducing the overall average waiting time for all the nodes.

In spite of its minimum drawbacks in FCFS multicast, it doesn't holds good when it is deployed in the whole system. Its measures for the entire system's performance are not at the expected level. Suppose if the first chosen location has a long waiting time, more time will be spent on serving that location, instead of considering the other locations that collectively has a very low waiting time compared to the first location. This leads to a thought of serving a location with larger number of requesting nodes, i.e. maximum nodes- multicast strategy. It may also be better when considered from system's point of view.

Deputy and Forward

This is more efficient process because, once the user request a data from the access point, the data will be downloaded to the user.

User will have the data with him. If same data is requested by another user also, then the Access Point Server will check the Previous User's Location, if the location of that user is within the Access Point Control, then the AP will compare the time interval for that user to go beyond the Access Point control with the time interval for that user to transfer the data to the secondly requested user.

If that Travel time interval is lesser then the Data transfer Time interval then the AP will send a request to that Previous User to transfer the same data to the newly requested user. Then the Previous User will start transferring the data to the newly requested user. This process will reduce the time, cost to the Access Point Server.

IV. System Architecture

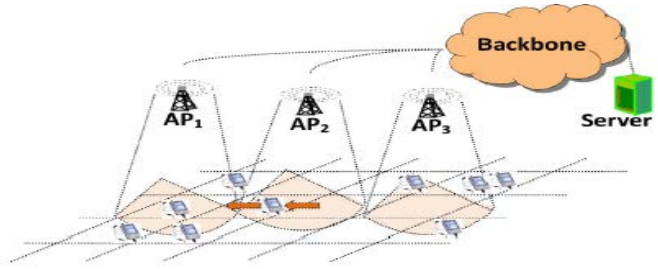


Figure 1: System Architecture

Service to the mobile agents will be provided by a collection of access points as an intermediate. Each access point will cover more than one region surrounding it in an overlapped fashion.

The System architecture of this proposed strategy is divided into four main components as given in Fig.1. The four main components are: Mobile station users, the access points (APs) through which the mobile station of one cell can communicate with its neighbour cell, a database server which has location oriented data through which it determines the best strategy for providing services.

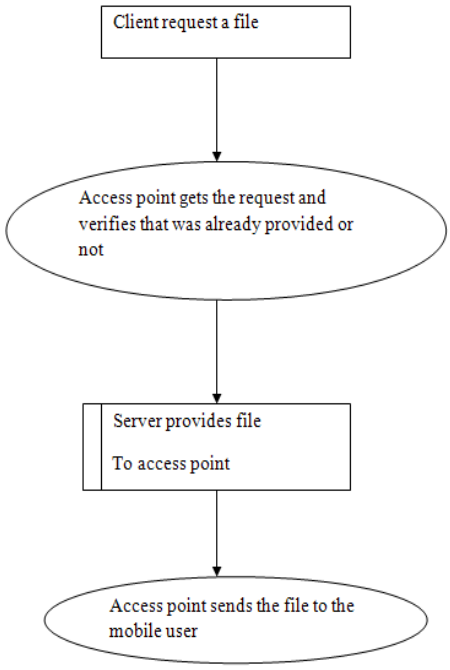
Location Oriented Service

In Location-oriented service the mobile users will request any service or media content from the server based on where it is located. Thus the proficiency to execute localization and tracking the mobile station were the required features for administration. To attain access to the location oriented media contents, the services must define the spatial regions where a user is requesting from.

In order to handle the unreliability in wireless localization these regions have to be defined with at least a minimal amount of area. This System architecture can be deployed on the present wireless technology like 802.11 Wi-Fi.

Traditional transmission scheme like CSMA/CA are enough when the volume of data on the traffic is less. But the proposed strategy is required whenever the volume of data traffic becomes heavy, and it also improves the performance in transmission.

Flow Chart



All the communication system will have two types of information: content/data and control. Our proposed system, focuses on the content/data corresponding multimedia data that has to be transmitted based on the location of the mobile agent.

Location oriented content is related to a specific location and it is the same for all the nodes within that particular cell area. For simplicity of discussion hereafter in the paper, temporal aspects related to content distribution will not be considered by us.

Instead of temporal aspects we are going to focus only on the spatial aspect of data/content delivery. Through modifications in the techniques involved in this paper, the general case of content access based on spatial temporal regionscan be handled.

Here, we assume all the foreign agent when enters a new cell gets the information from that cell and request for a location-based data for that region. After getting that request as fulfilled it will not request for the same data from that location again and again.

Advantages

1. This process reduces the Load of the Access Point Server.
2. Identifying the efficient process will also ensure, no Packet loss.
3. Effective Data Transfer.
4. Access Point can decide the Data Transfer Process according to the condition.
5. D&F node will always introduce less waiting time than the Access Point.

V. Process of Methodologies

This is more efficient process because, once the user requests a data from the access point, the data will be downloaded to the user. User will have the data with him. If same data is requested by another user also, then the Access Point Server will check the Previous User's Location, if the location of that user is within the Access Point Control, then the AP will compare the time interval for that user to go beyond the Access Point control with the time interval for that user to transfer the data to the secondly requested user. If that Travel time interval is lesser then the Data transfer Time interval, then the AP will send a request to that Previous User to transfer the same data.

The location-oriented data and data delivery assignments emerge from the server is shown in the fig 2. Fig. 2 shows the layout of the network at time t and the shaded box represents the two regions corresponding to locations where location-relevant content may be accessed. The upper region contains the Nodes a and b while the lower region contains the nodes c and d. Suppose node b moves to the lower region and node c moves to the upper region at time t + δt.

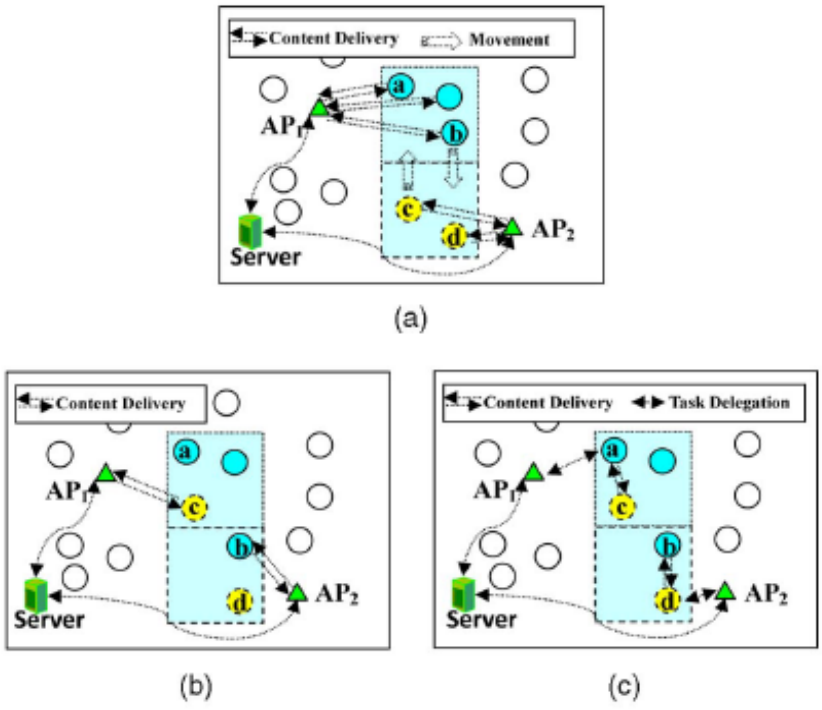


Figure 2: AP-centric and D&F Methods. (a)Layout at Time t,(b) AP-centric Method at Time t + δt, and (c) Deputy& Forward Method at Time t + δt

The nodes always choose the AP assigned to the corresponding region, as shown in the Fig. 2 that contains all APs, and thus the location-based data from AP1 is given to node c while node b gets the new location-based data from AP2.

In contrast, for the deputy& forward method, the node is still in the upper region, as shown in Fig. 2c, it will forward its stored data to node c, while node d transfers a copy of its location relevant data to node b. The deputy & forward method has some advantages over Access Point-centric method. If same transmission power was used by both the AP and D&F nodes then, (for e.g. the noise and interference levels are statistically steady) according to Shannon's capacity theorem , the much larger transmission rate can be deployed by the D&F node as there will very

likely be a D&F node that is closer to the requesting node than the AP. Or, on the other side, given a certain transmission rate, the transmission power required for a D&F node will be lesser than that of an Access Point.

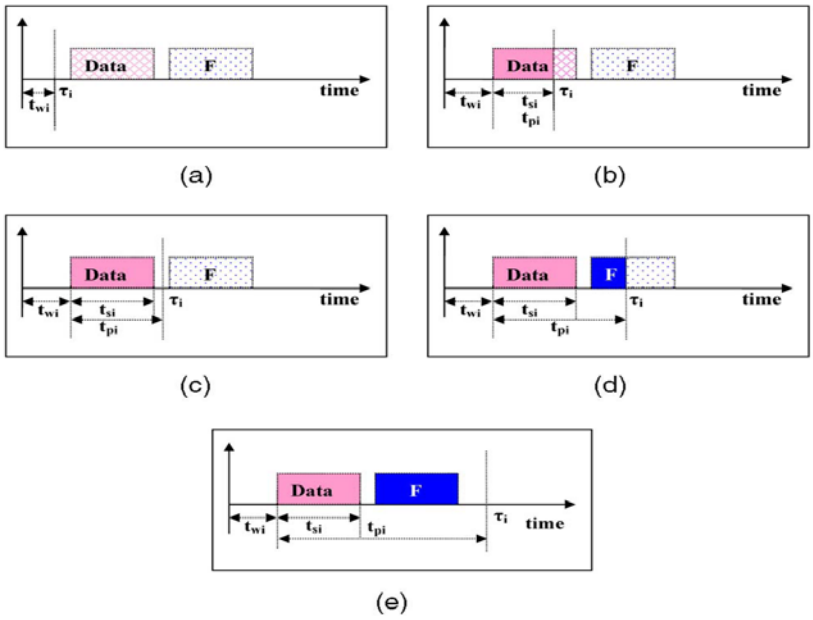


Figure 3: Holding Time τi in Location Li. (a) Node Leaves before Getting Data, (b) Node Leaves when Getting Part of Data, (c) Node Leaves when Getting All Data, (d) Node Leaves when Forwarding Part of Data, and (e) Node Forwarding all Data

VI. System Analysis

Five different strategies arises in the association among the holding time τi and the data delivery time, as clearly depicted in Fig. 3: here a node may leave the previous node without getting the location under it and its relevant data in case of Fig. 3a; then a node leaves when it gets partial information of the location-based data in Fig. 3b; whereas here the node leaves when it retrieves all location-based data, but it wont pass or forward any data in Fig. 3c; a node leaves when it starts to forward some part of data in Fig. 3d; and after forwarding all the data from that location the node will leave in Fig. 3e.

From the cases, it is found that the holding time τi is comprising of two sets to be specific, twi and tpi . Here, twi is the holding up or waiting time, which is the aggregate time from the hub enters area Li until it starts to get the area based information conveyance or leaves area Li. Then again, tpi is the data possession time, which is the time since from the primary piece of information identified with this area is controlled by this hub till the hub leaves area. The having time, in that capacity, in any event halfway comprises of the information transmission time tsi, as appeared in Fig. 4. It is concentrated that tsi could be littler than or equivalent to the time expected to convey the whole stream record. In introductory case tpi =0 and later case is tsi = tpi Taken together, we have τi = twi + tpi .

VII. Conclusion

To give a proficient technique to take care of this issue, we portray the moving example of a versatile hub as a semi-Markov model and plan a rule for streamlining the administration procedure. We at first figure this foundation for an AP-driven or AP- centric technique, where all information or data is transmitted by APs. Since an AP ought to pick an administration bunch of hubs that would present the base delay, we have proposed an enhanced multicast system. Introduced the representative and forward strategy, in which hubs that have already gotten area based information can help the framework by serving hubs that recently land at the area. The deputy and forward technique is a superior methodology as these hubs can transmit with speedier rates.

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