

Look Before You Leap

A Thesis
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By

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Foreword

The thesis report is submitted in partial fulfillment of the academic requirements for the degree of Bachelor of Science in Computer Science and Engineering to the Computer Science and Engineering Department at BRAC University, Dhaka, Bangladesh.

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As the supervisor I have approved this dissertation for submission.

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DECLARATION

I hereby, declare that this thesis is based on the research and hard work done by myself. The Thesis, neither in whole nor in part, has been previously submitted for any degree.

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Abstract

In everyday life, we often spend most of our valuable time in traffic congestions. Before using a path if one could get to know that the alternate path is much freer or having less congestion than the path, where the user is wasting his time, then he would have preferred to move on the alternate path. For this, the user needs to know the condition of the paths which was not possible till today. But the system, that I would like to propose, would let the user to know which path would be best to choose. The system would help the user to view real-time video of certain places. Places, where most traffic congestions occur every day. Along, which shortest route that the user should take to reach his or her destination can be known.

The user would be able to view a real-time video of a single place or video clips of certain places on his entire route. Or he would be able to view the clips even he is not anywhere on the route. Hence, the people of Bangladesh would not fail to attend their important meetings, classes or anywhere because of the daily traffic jams. They would be at their destination on time.

Introduction

Waking up on a shiny morning, getting a fresh bath, having well dressed-up, energizing by a good breakfast, heading for office before one hour ago and then being trapped on a bad traffic jam, this is one of the regular scenario in our daily life. Many of us have to go through such situations almost daily, especially during office hour. People get late for their interviews, important meetings. Students get late for their school, miss their important classes. Nearly on every road of Dhaka city has back-to-back traffic jam. People stay sitting on bus, cars, rickshaws under the scorching heat of sun for long time. Wasting energy, time and money. Even at morning, they become tired and exhausted. Putting goggles propped just above the forehead, they wait impatiently for their turn to move a little inch forward. Every time they leave their houses, they have to mentally prepare themselves for this phenomenon and to remain unsure that whether they will be able to reach their destination on time. There is no other option to choose except to dive on this congestion. But if one could get to know which path has less congestion among alternatives then life would have been much easier. To know which path to select beforehand under this situation, I would like to propose a system that is called – Look Before You Leap.

The System

The System

The system has three modules.

Single Area – This feature would let a user to view a video clip of a single area or place.

Route – This feature would show the entire route from a given source and destination by the user on a map.

Destination – This feature would locate the user's current position with the help of BTS to have it as a source and take only the destination from the user. It then plots the route on a map.

The difference between the Route and Destination option is that; lets say the user is not anywhere along the route. He only wants to know in which direction and how to follow the path from a given source and destination then he has to select the Route option. And if the user's current position is being taken as the source, he only needs to provide his goal from the Destination option.

The system would help a user to take a decision for selecting a route to his destination on time rather being catch and waste time in a traffic jam. He only needs to provide the source and the destination and off he goes. Along with route on a map, he can even have the opportunities to view the video clip of 5 seconds of some of the places in his route. The video clip of the areas is being updated after every 15 minutes. When the user is in his car already and wants to avoid the traffic jam up ahead he would definitely be benefited by using the system. The user would be able to know the shortest and less congested path. The technical aspects would cover the whole system in detail.

Pictorial Flowchart:

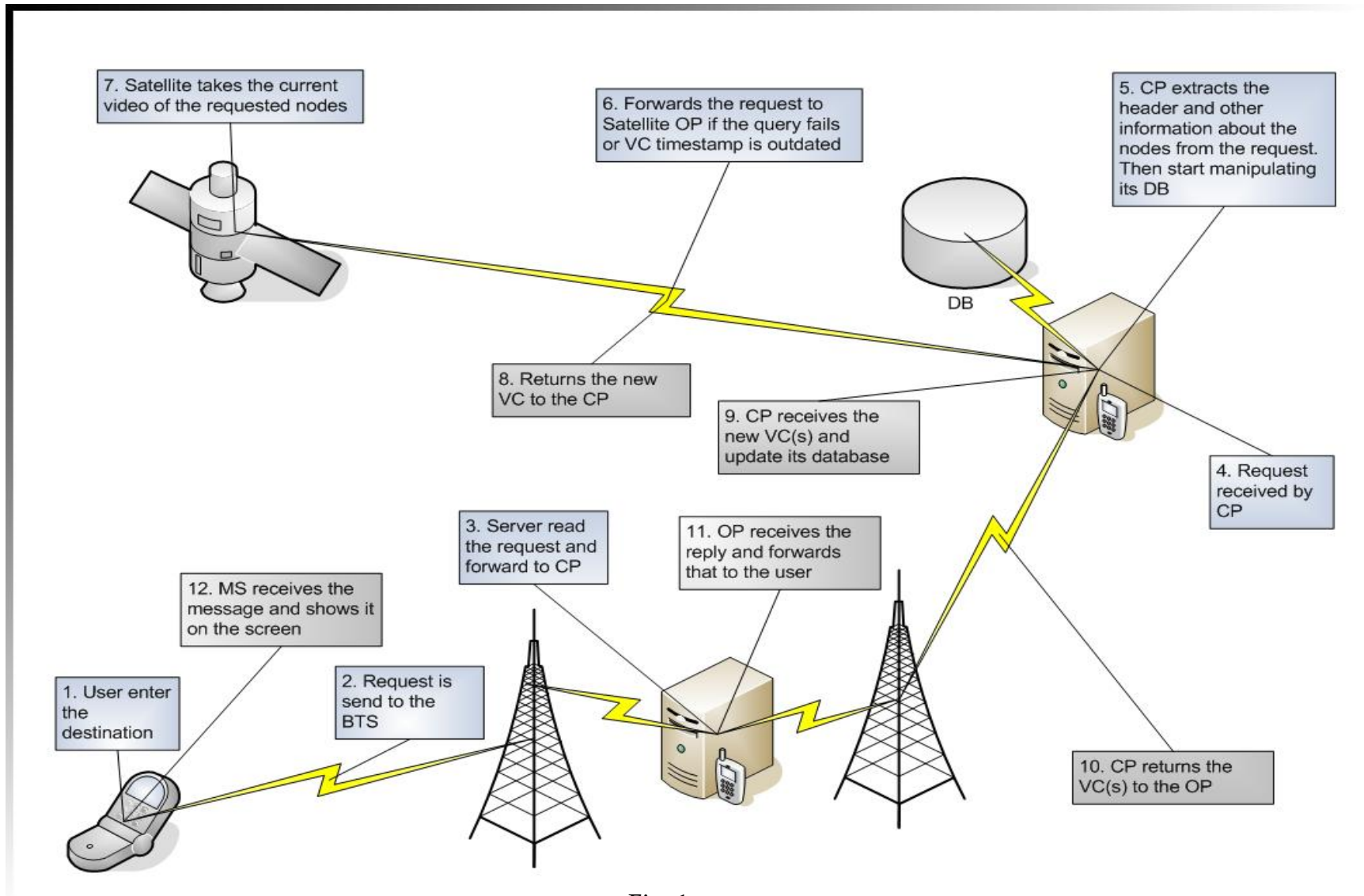


Fig: 1

Pictorial Description:

The flow in the picture above has been described in this following section. The MS or Mobile Station, i.e. the user provides the request. With the help of the BTS or Base Transceiver Station, the Operator receives the message. The Operator then forwards the message to the CP or Content Provider or VAS (Value Added Service). The Content Provider reads the message that the user has requested for. It sees the header to know what instruction the user has given; that is whether he has asked for a Single Area, Route or the Destination. If Single Area, the Content Provider checks its Video-clip Database for the area that user wants to view. It checks whether the time of the area is more than 15 minutes or not. If it is, the Content Provider knocks the Operator and asks for the update video-clips of that area.

The Operator then asks the Satellite Operator to get the new video for the area. The Satellite Operator takes a 5 seconds video of the area with the help of a satellite. It returns back the updated file to the Operator which is then forwarded to the Content Provider by the Operator. The Content Provider does two things, it update its database and send the video-clip as a message to the Operator which is then forwarded to the user by the Operator. The user or MS gets to see a 5 seconds real-time traffic video-clip of his desired area.

If the user or MS has asked for the second option, Route, then the flow would be same till to the Content Provider. As the Content Provider reads the source and destination, it creates a route from the given source to the destination with the help of the Road-link Database. There might be more than one possible path, for that the Content Provider finds the shortest path by calculating the distances

between the nodes. It then checks for the available video-clips of the nodes along the route. If the video-clips of any nodes have been taken more than 15 minutes ago, it knocks the Operator for the updated ones. The updates procedure is same as explained above. The Operator gets from the Satellite Operator the new clips of those areas or nodes that have been expired for 15 minutes or more and gives back to the Content Provider. The Content Provider updates its database and further it does give weight to each of the nodes along the route. The weight is being given according to the traffic congestion. And again the Content Provider finds the shortest path among all the possible paths and this time by using the weight of the nodes. Even sometimes, it can be seen that the shortest path can take much longer time due to the bad traffic condition than the longest path as there are less or no congestion. The Content Provider then plots the shortest route with blue mark on the map, indicating – path to be followed and red mark with the congested one. Along the route it keeps the video-clips and then sends the message to the user or MS through the Operator. The user would get to view the best path that he is supposed to follow to avoid the traffic jam and reach the destination on time.

The third option, Destination, is almost very similar to the Route ones. When the user selects this option, he is first asked about his current position and the position is detected with the help of the BTS. If the user responses with a negative action, the MS hits the Operator for the neighbor BTS and again asks the user whether he is at any of the provided location. The user selects his source from the provided BTS list if there it is and then selects the destination and MS sends the message to the Operator. From this onward the entire flow is same as the Route option.

Technical Aspect

Technical Aspects

The section describes the entire technical procedures of the software. The job of the software is being divided into three places. One at the MS or Mobile Station, the second one runs at the Telecom Operator or OP and the other one is at the Content Provider or CP. The software has two tiers, one at client or user site, where it takes requests and shows the output and the second tier is at the CP, where mapping, calculation and all sort of processing take place. The users can either download from the OP websites or can have it from the OP offices. Once the users have and installed it on his mobile device they can use it as often as they want.

The software works as follow - The user opens the software on his mobile device and gets to choose any one of the three options - Single Area, Route, and Destination. Let's say the user wants to view the condition of the traffic only of a single area, for this he chooses the 'Single Area' option. A list of areas appears from where he can scrolls on the list and can select the one he wants to view. As he presses the Ok button on the right side of the screen, the application manager of the MS starts doing its jobs. It names the header as 'SINGLE' and transfers the header and the name of the chosen area as a message, SMS (Short Message Service), to the OP. And waits till it gets any reply from the OP.

The work of the OP software is to forward the message to the CP. When it gets the message, the OP makes the status of the message to '-1' in its message database, named MSGDB. It means that a new message has arrived and no operation has been done yet. When the Request button in the interface of the OP

software is being pressed, the message appears on the text area, showing that it has been received and kept in the database by the OP. Meanwhile, by changing the status of the message from '-1' to '0', the OP forwards the message to the CP. Making the status '0' indicates that the operation is being going on this certain message. The OP then waits either for the reply from the CP or for any further operation or inquiry that CP might ask to do. In the demo of the OP software, an interface is being used so to understand how the OP works over here and whether the OP gets the message from the MS. But otherwise, it would work at the back-end. If the OP sees any message with status '-1', it would then automatically forward the message to the CP. There would be no need of the interface at the OP.

The CP also has the same sort of interface in its software so to understand the jobs of the CP better. The CP gets the message from the OP; it also makes status '-1' against this request in its database. When the Request button is being pressed, status changes to '0' indicating the request is under operation. And the message appears in the text area of the interface, again showing that CP has received and kept the request from the OP in its database. The CP sees the header, 'SINGLE', and reads the name of the area that was requested for. It then starts working with the video database, named Video-clip Database. It looks for the requested area under the Area field in the table and once found it checks the timestamp of the requested area's video-clip. If the time shows that it has taken 15 minutes ago, it knocks the OP. Like as said before the operator waits for further inquiry from CP. In this situation, the OP sees that the CP wants to have the recent video-clip of that particular area. It establishes a connection with the satellite operator and requests for the video-clip of that area. When the OP receives the clip, it forwards back to the CP. Having the updated video-clip, CP sets the timestamp

against this area in its Video-clip Database. It then sends the requested video-clip to the user via the OP while making the status of the message from '0' to '1'.

The OP gets the reply-message in its database. It makes the status of the message from '1' to '2' in the CP database and forwards the reply to the MS software while making the status from 0 to 1 in its own message database. In the CP database there could be other replies ready for the OP to receive and all having status '1' and for that OP makes the status '2' of those replies that it has forwarded to MS so that it would not take the same reply-message again.

When the application manager of MS gets the reply from the operator it shows the result of the user's query in the MS screen. The user hence gets to see the video clip of 5 seconds of the area he wanted to view.

The 'Route' option does work more or less like the Single Area option. The differences are in the MS and CP software. With this option the users would get to see the entire route from a given source and destination provided by the users. They would also be able to view the video clips of some of the area, where the congestions usually take place, along the route. The user would be provided the shortest path along with other possible paths. In the demo, the software has worked only with the shortest path; the alternate paths would be not shown. The software works as follow - first calculates the distances between the areas of all available paths. Then the weights of all the nodes will be calculated by applying pattern recognition technology. For example, the weight of an area having congestion can be defined by calculating the number of vehicles present at the clip. The user only needs to give the starting point and the destination and the

system does the rest. It might sound simple to the user but the software works in a more difficult way.

The user has option to choose the starting point and the destination from two different pop-up lists. He selects the area names and presses OK, the application manager names the header 'ROUTE' and takes the name of the areas into consideration. Selecting CANCEL option will discard this action and will take the user again back to the Route menu. Also, the system is designed in such a way that if the user selects same area in two options then it will show an error message to the user as a route cannot be created with the same area. Having all the inputs correct when the user presses Ok, the application manager forwards the header and the name of the source and destination to the OP. The status of the message at the operator database will be '-1'.

When this message appears at CP, the CP changes the status to '0' in the OP database. It then creates all the possible paths with the given starting point and destination by using Road-Link database. It calculates the shortest path by using the distances between the areas. Meanwhile, CP checks from the video database that the video clips of the predefined areas within the routes are updated or not, i.e. whether they are within 15 minutes. If not, it requests the OP for those areas that are not updated. The updated procedure is same as in the Single Area option. With the updated video-clips, it does calculate the weight of each area and again finds the shortest path. Since the demo does not gone through the pattern recognition process, the weights have been given manually.

The shortest path finding process works as follow:

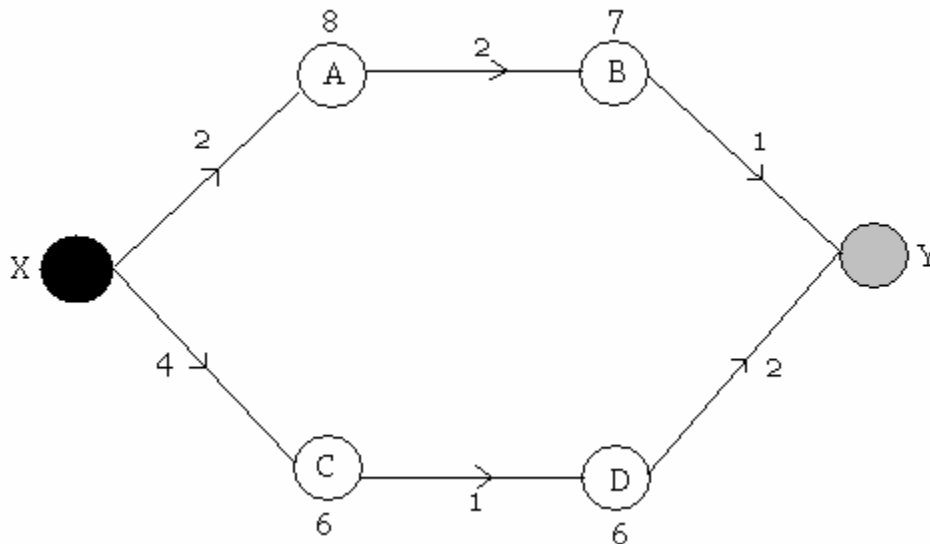


Fig: 2

From the figure it can be seen that there are possible paths from starting point, X to the destination, Y. The path XABY is shortest (5 km) comparing to the path XCDY (7 km). So anyone would prefer path XABY. But the congestion in areas A and B are denser than areas C and D. A and B weigh 8 and 7 respectively, totaling 15, whereas C and D weigh 6 and 6 respectively, totaling 12. Hence from the calculation it can be derived that the path XCDY is better option to choose although XABY is the shortest path. The CP returns the map with all possible paths marked in the map along with the video clips to the OP, OP forwards that to the user. The user would be able to view the map and the video clips of certain areas along the route.

The first phase of the 'Destination' option is completely different from the above two. In this section the MS will first check the current location of the user with

the help of BTS. The system will display a message so to get confirm from the user that the area detected is correct or not. If the user rejects the area, the system will extract all the neighbor areas of the current location from the Operator and allows the user to choose from those BTS list. After that the user will be prompted to select the destination. On selecting both the areas it will perform the same task as that of ROUTE except that the header in this case will be DEST.

Flowcharts

1. Single Area

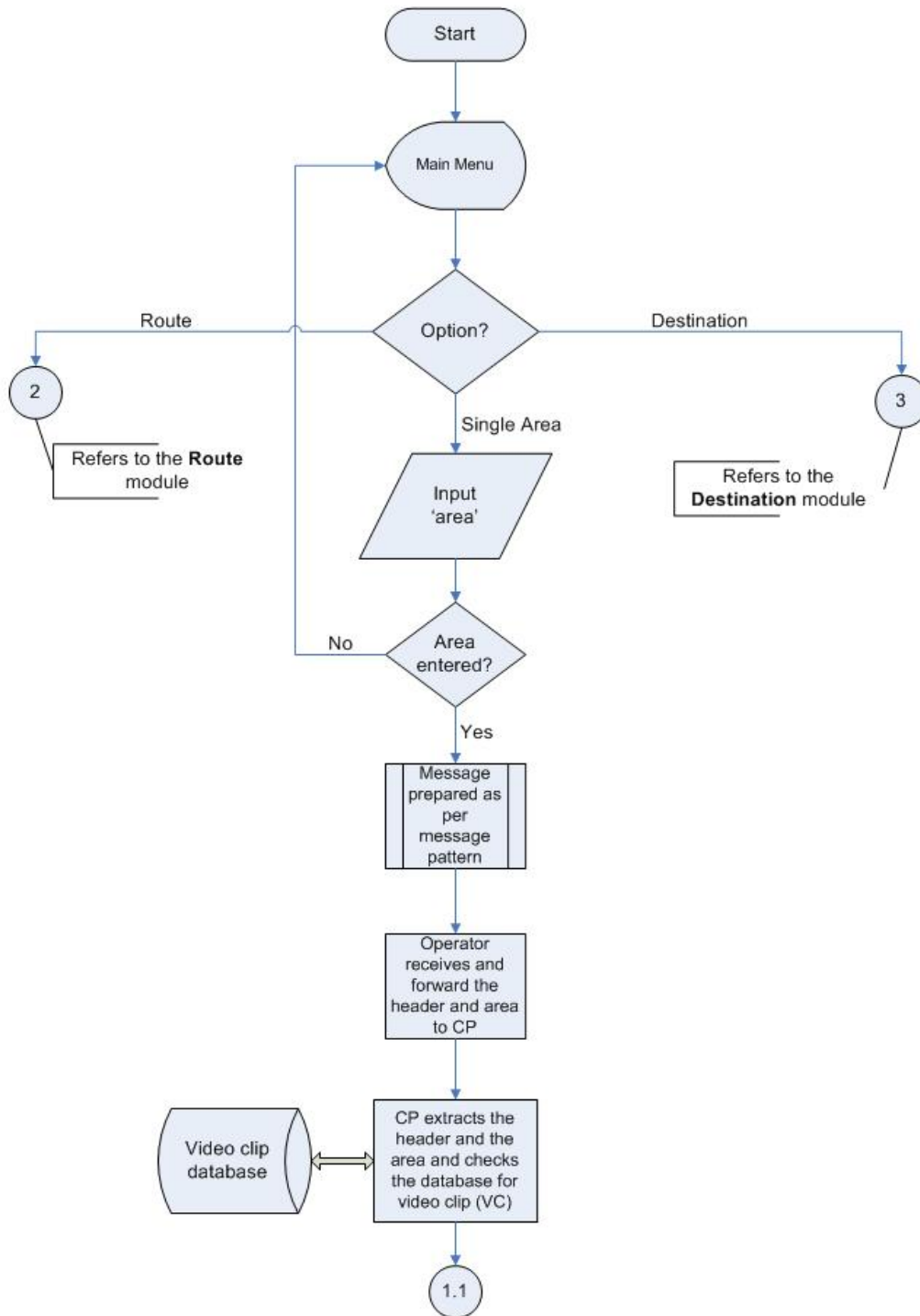


Fig: 3

1.1. Single Area (cont.)

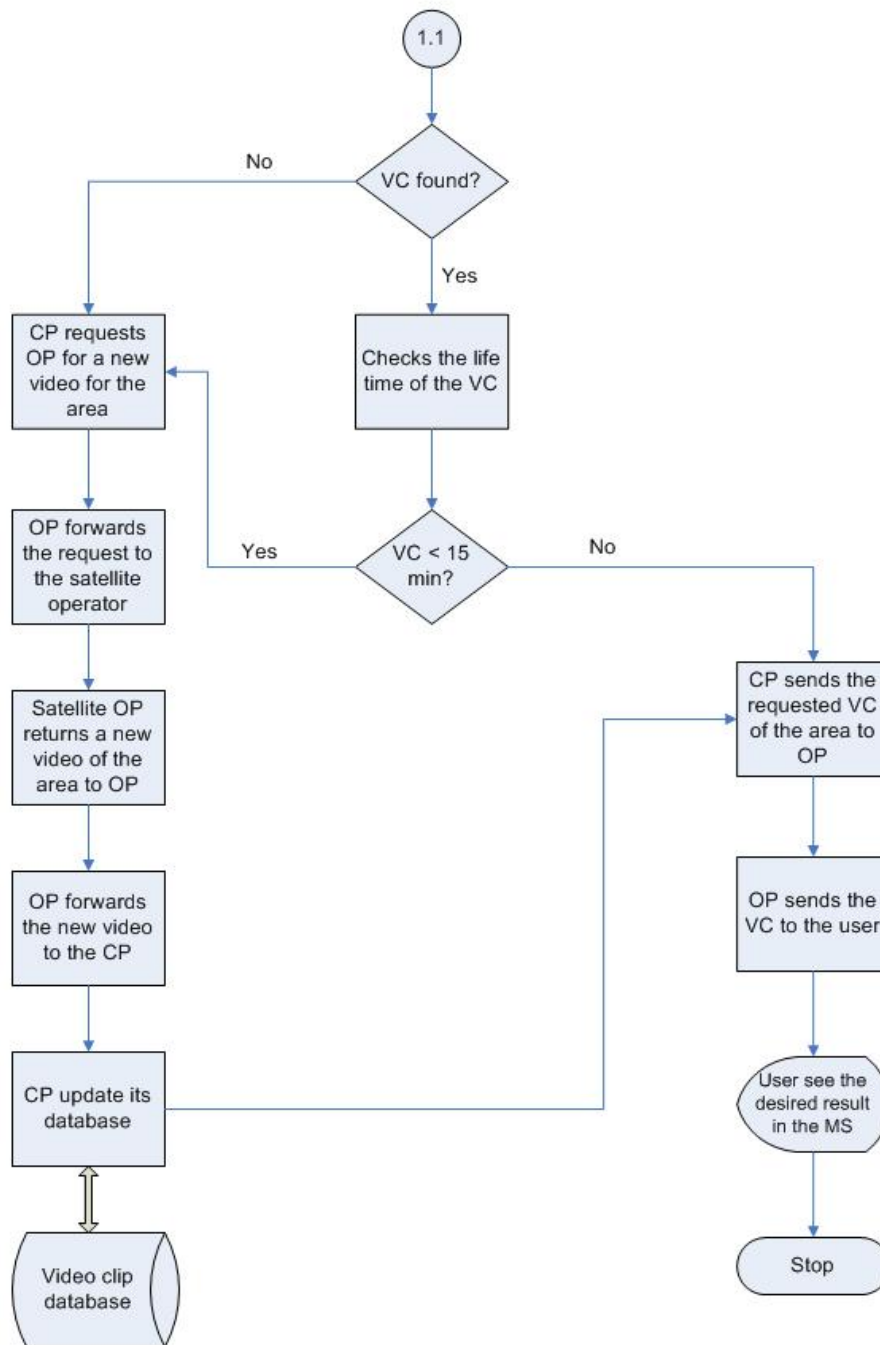


Fig: 4

Single Area:

The user starts the software and finds a Menu page. It then selects any of the three options – Single Area, Route, and Destination. He chooses Single Area and gives an input, name of a location he wants to view. He goes return to Menu page if he selects 'Back', else in case of 'Yes', the application manager prepares a message with a header – SINGLE and area name. It then sends the message to the Operator. The Operator receives the message and forwards it to the Content Provider or CP. The CP reads the header and the area name and checks on its Video-clip Database for the video-clip of the area. If video-clip of that area is not found CP knocks the Operator for it. And if is found then CP checks the time stamp of the video-clip, that whether it has taken 15 minutes back. If the time says less than 15 minutes, the CP extracts the video-clip of the specified area and sends to the user via the Operator. Otherwise, if the time exceeds 15 minutes or more, the CP knocks to the Operator for the update video of the area. The Operator requests Satellite Operator for the new video of the area. The Satellite Operator returns a new video of that area back to the Operator. The Operator gives it to the CP. The CP has it and updates its Video-clip Database. Meanwhile, the CP sends the video-clip of the specified area as a message to the user or MS through the Operator. The application manager of the MS receives it and display the video on its screen which is then the user gets to see it.

2. Route

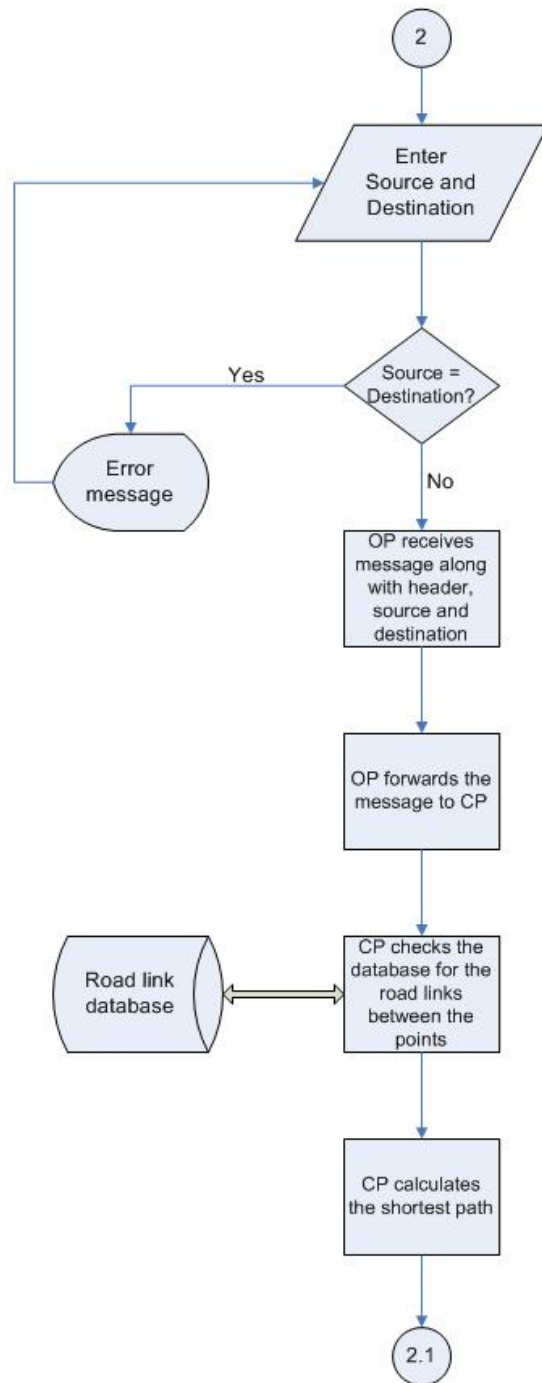


Fig: 5

2.1. Route (cont.)

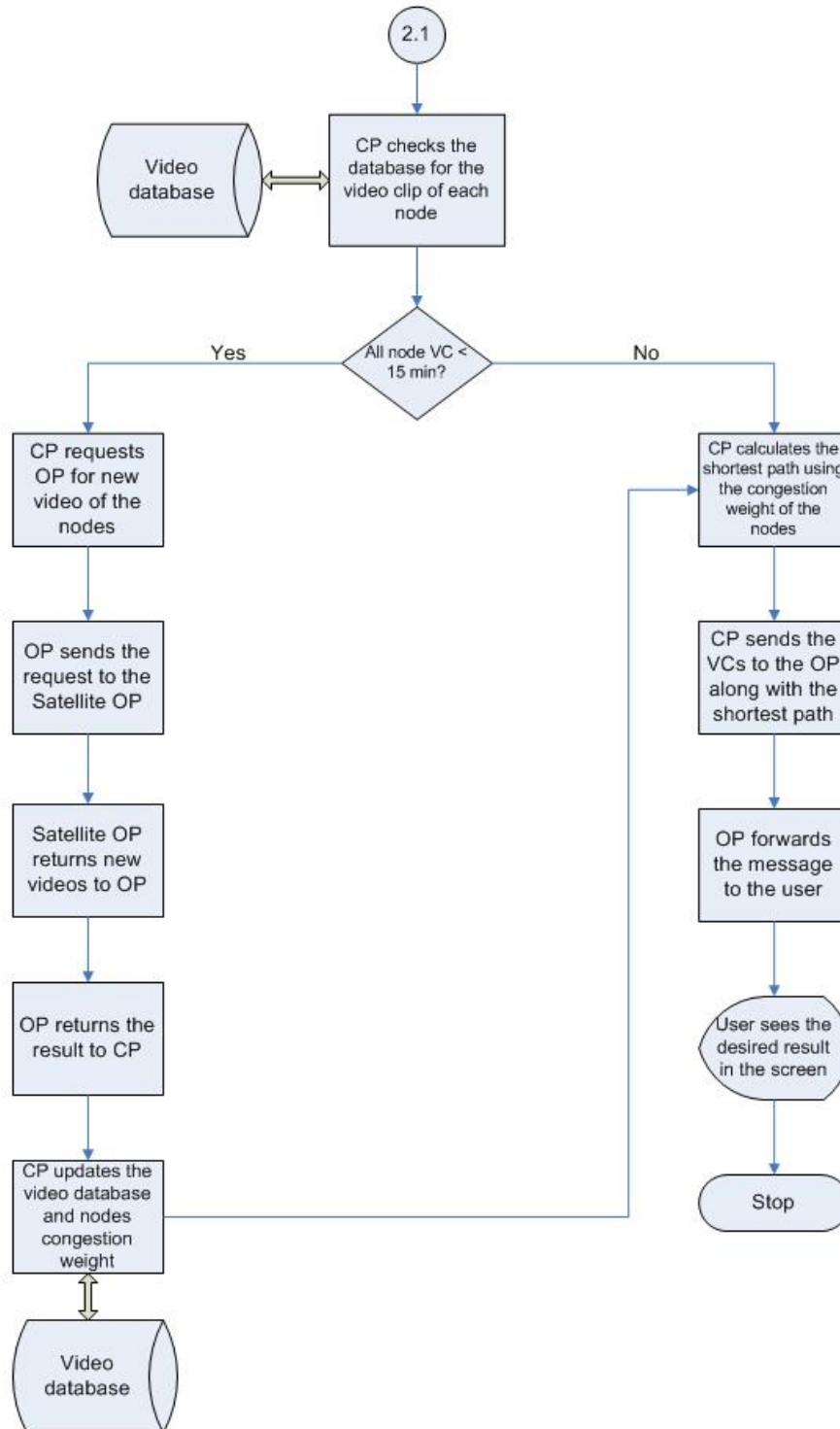


Fig: 6

Route:

The user opens the software on his mobile device. He selects the Route option and provides the area name of the source and destination. When he presses 'OK', the application manager of the MS checks if the names of the source and destination are same or not. If they are, the application manager displays an error message. And if they are not, it sends the message to the Operator, containing a header – ROUTE and the names of the source and destination. The Operator forwards the message to the Content Provider or CP. The CP creates route from the given source and destination, one or many if possible, with the help of the Road-link Database. It then finds the shortest possible path. And also checks the time stamp of each of the nodes along the route. If the time of any of the nodes is below 15 minutes, then its okay, else if it is 'YES', it requests the Operator for the new updates of the video-clips. The Operator requests to the Satellite Operator. The Satellite Operator gets the clips for the Operator and returns back to it. The Operator forwards the new updated video-clips to the CP. The CP updates its Video-clip Database. It then gives weight to each of the node according to the congestion. It then finds the shortest path, this time with the weight of the nodes not by the distances between the nodes. The CP then plots the shortest route on the map with blue marker and attaches the available video-clips on the nodes and sends it as a message to the MS or the user via the Operator. The application manager receives the message and displays it on the screen so the user could see it.

3. Destination

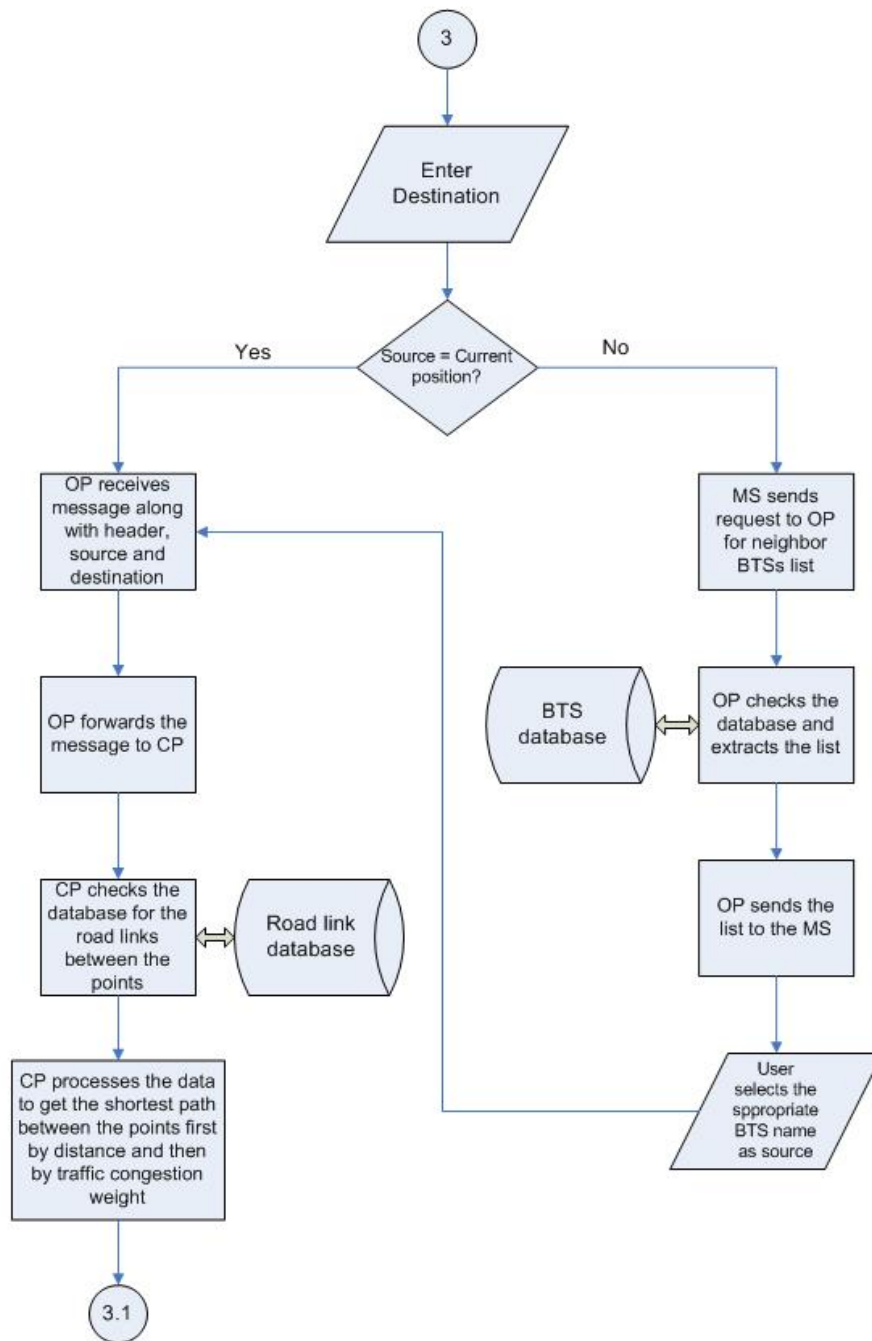


Fig: 7

3.1. Destination (cont.)

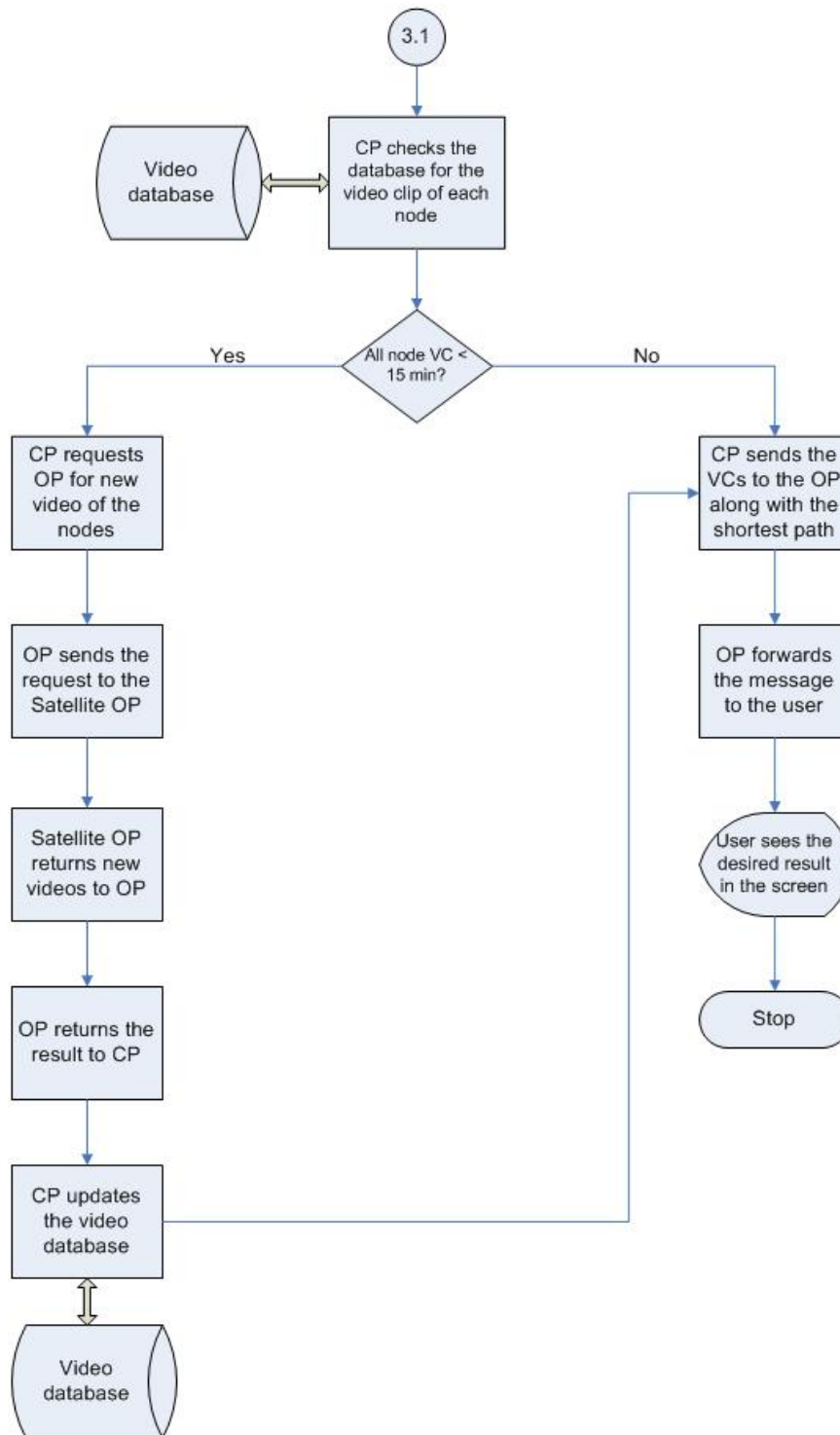


Fig: 8

Destination:

The user opens the software and selects the Destination among the three options. The application manager gets the current position of the MS with the help of the Base Transceiver Station or BTS. It then asks the user whether it his current position. If the user replies with a positive action, the application manager of the MS considers the current position as the source and then asks the user to select the destination only. And if the user gives a negative response about the current position, then the application manager asks the Operator for the neighbor BTS of the current position. The Operator checks the BTS database and extracts the neighbors and sends it to the MS. The user is then asked to select his source, current position among these neighbors BTS. Now the application manager asks the user to select the destination. The MS then sends a message containing a header – DEST, the name of the source and destination to the Operator. The Operator receives it and forwards to the Content Provider or CP. The CP checks the header and starts working to create route from the given source and destination with the help of the Road-link Database. It then finds the shortest path among the alternative paths, if exists any. Simultaneously, it checks the time stamp of each of the node on its Video-clip Database. If any of the video-clips has expired before 15 minutes ago, the CP knocks the Operator for the new video file, which is then asked to the Satellite Operator. The Operator gets the new video-clips of the expired nodes from the Satellite Operator and gives them to the CP. The CP updates it Video-clip Database and gives weight to each of the nodes according to the traffic condition. It then creates the shortest path with the weight of the nodes and plots a route on the map with blue marker. And sends as a message to the Operator. The Operator forwards it to the MS. The MS displays the map on the screen and the user gets to view the shortest route on the map along with real-time traffic videos of 5 seconds of some of the places.

Software Description

MS Software:

In the MS software, the selections that are provided by the users are considered as events which are forwarded to the application manager for processing. The MS software has user interface for handling user interactions, receiving the user's input, processing it at the back-end of the system and displaying the results on the screen. For the MS software, J2ME platform has been selected as it would help to build and implement programs to control small computing devices. It is compatible with all Java enabled devices - Ericsson, Motorola, Nokia, Panasonic, etc. One of the minimum requirements for a mobile device to run a J2ME application is that the device must have a minimum of 96 x 54 pixel display that can handle bitmapped graphics. Among the two configurations of J2ME, Connected Device Configuration (CDC) and Connected Limited Device Configuration (CLDC), the software has been implemented by CLDC, as it is use to design for 16-bit or 32-bit small computing devices with limited amounts of memory between 160KB and 512KB and which is battery powered. Usually, the user would expect to download the application quickly on the mobile device and run among other applications on the device. With the J2ME, the software would be simple and small in size, fewer bytes to download and store in memory. The application can either be downloaded or get from the Operators.

Menu:



Fig: 9

User opens the software and the Menu option would appear, from where the user would select an option from the three – Single Area, Route, and Destination. The user can select the option either by using the scroll button, at the middle of the device, or by choosing 'Select', at the right side. Choosing the 'Exit' button, at the left, the user would come out of the software.

Single Area:

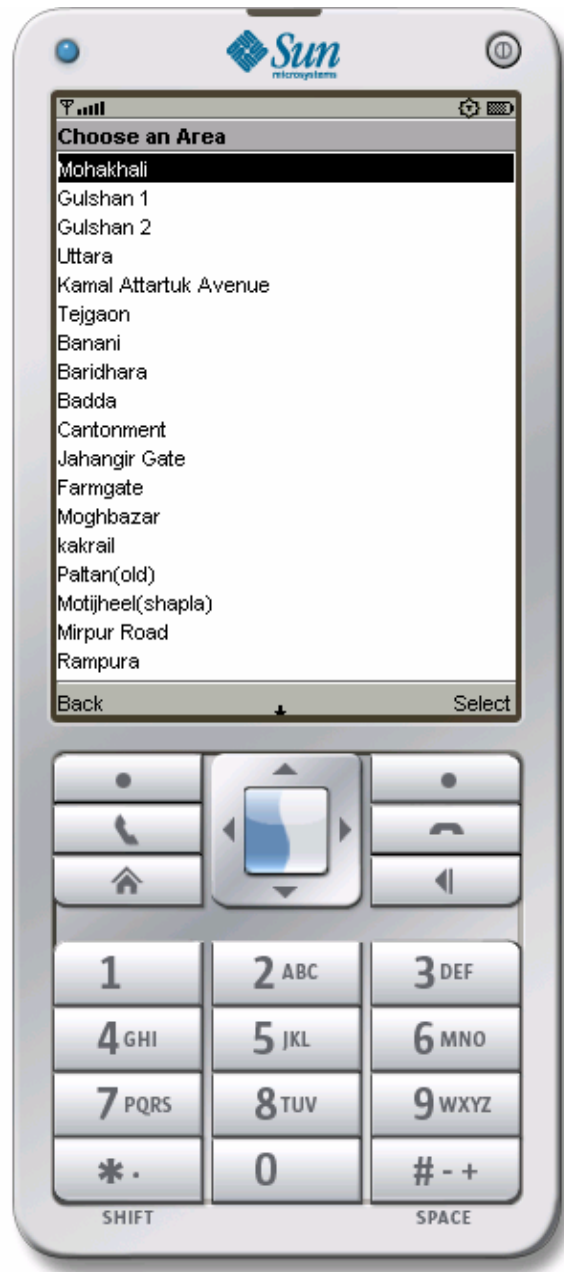


Fig: 10

As the user selects the 'Single Area' option, he gets to select the name of the area that he wants to view. Again, he can select the area either by scroll button at the middle or by the 'Select' option at the right. If he presses 'Back' button he would go back to the main page, Menu.

Single Area (option selected):



Fig: 11

After choosing an area, the user is showed with a confirmation message that what he has selected. If he presses 'Cancel', Single Area option would again appear from where the user would have the chance to select another area. Otherwise, if he presses 'Ok', the application manager of the device would send the message to the Operator; meanwhile it would show a sending message.

Route:



Fig: 12

By choosing the 'Route' option from the Menu, the device would show Route option as above. The user would choose the Source and the Destination from the respective pop down list. If he presses 'Back', it would go back to the Menu page. And after selecting Source and Destination, if he presses 'Ok', a confirmation message would say that which two options the user has selected and then the application manager sends the message to the Operator.

Route (Source and Destination):

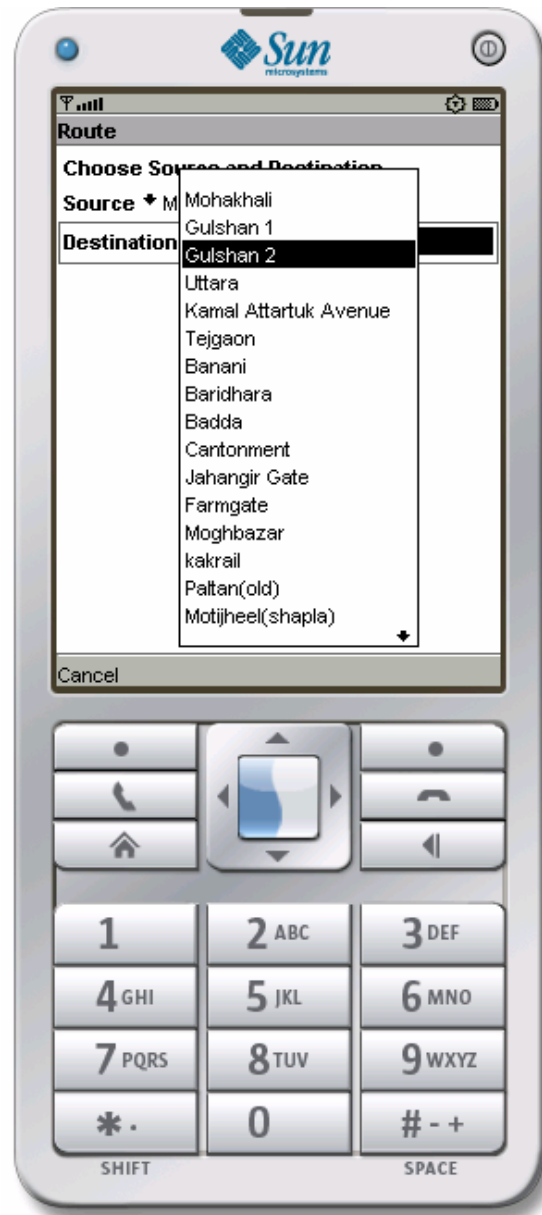


Fig: 13

The user chooses the Source and the Destination from the respective pop-down list with the help of the scroll button at the middle. If he presses 'Cancel', the user would go back to the Route page where he can again have the chance to select the Source and Destination. After he presses 'Ok', a confirmation message would say that which two areas the user has selected and then the application manager sends the message to the Operator.

Destination (Source):

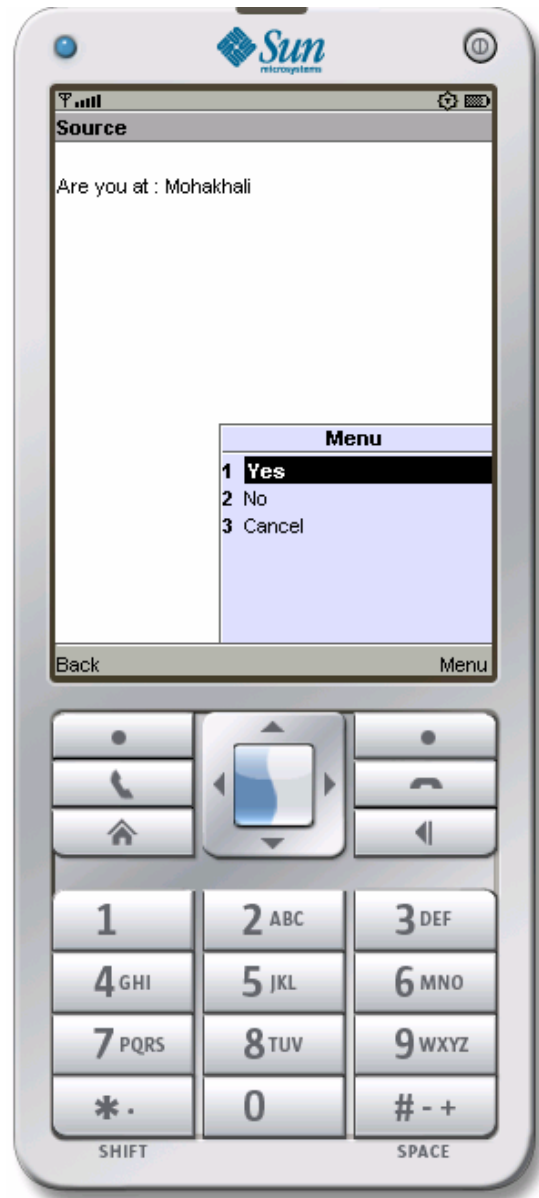


Fig: 14

At the Destination option, for the Source, the user would be asked of his current position by the help of the BTS. If he selects 'Yes', then on the next page he would be allowed to choose Destination. If he selects 'No', the application manager would knock the Operator for the neighbor BTS of the user. Pressing 'Cancel', he would remain at this page. 'Back' button would take the user back to the Menu page.

Destination (Linked BTS):



Fig: 15

While choosing Source, if the user selects 'No' option, i.e. the user is not at the position where the application manager has showed, then the Linked BTS or neighbor BTS would appear from where the user selects the Source either by the scroll button or the 'Select' option and then he would asked to provide the Destination. By pressing the 'Back', the user would go back to the Destination page.

Destination (Area name):

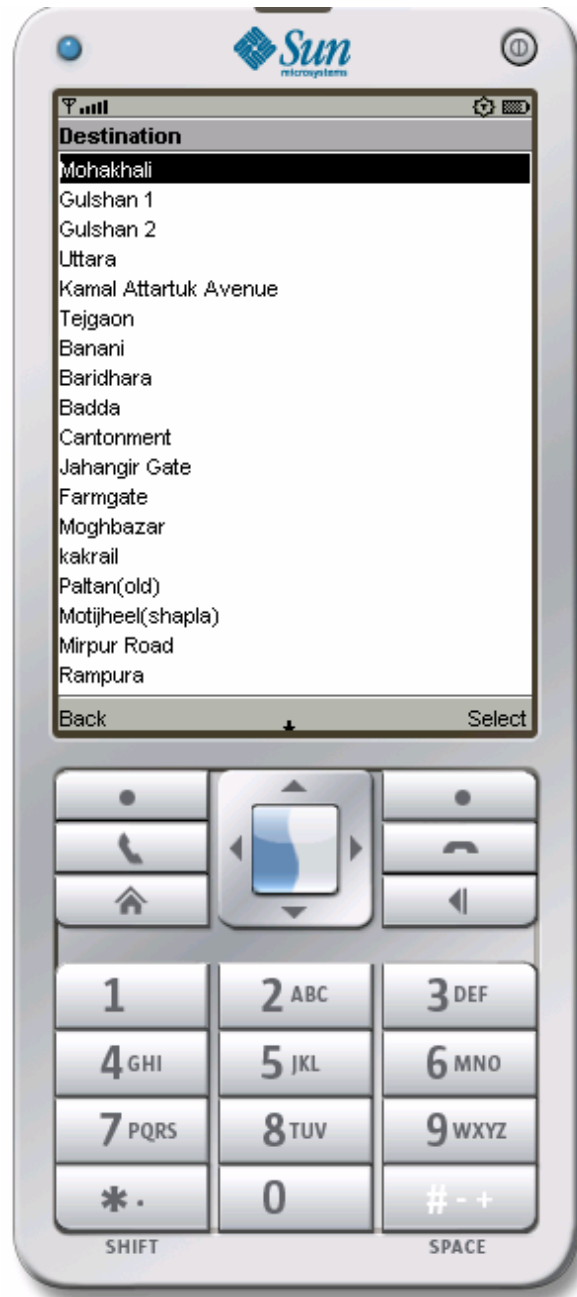


Fig: 16

Source has been selected, now the user would need to provide the Destination. He has to choose an area of where he wants to go. Choosing 'Back' would go back to the Destination page. Choosing 'Select', a confirmation message would appear.

Destination (Confirmation message):



Fig: 17

The user selects the Source and Destination and he would get to view this confirmation message that whether he wants to continue or not. If he presses 'Cancel', he would go back to the Destination menu page. Otherwise, by selecting the 'Ok' option, the application manager would continue its procedure by sending the message to the Operator.

Error:

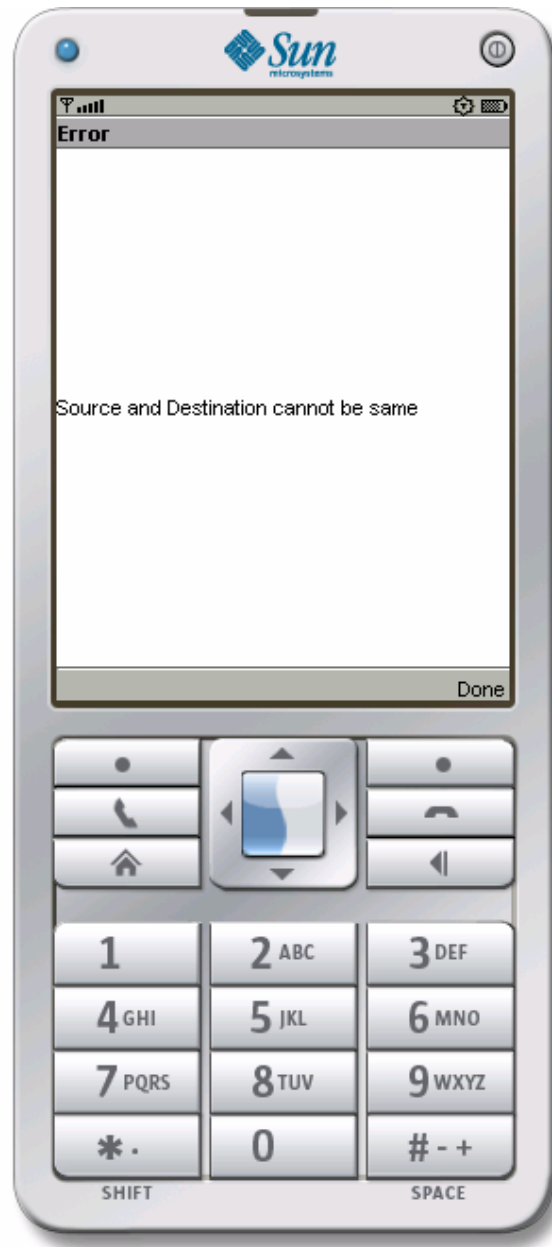


Fig: 18

From the two options, Route and Destination, if the user selects same place for the Source and Destination then an error message would appear that reads – Source and Destination can not be the same. No route can be found between the given Source and Destination so it is an error.

Sending:

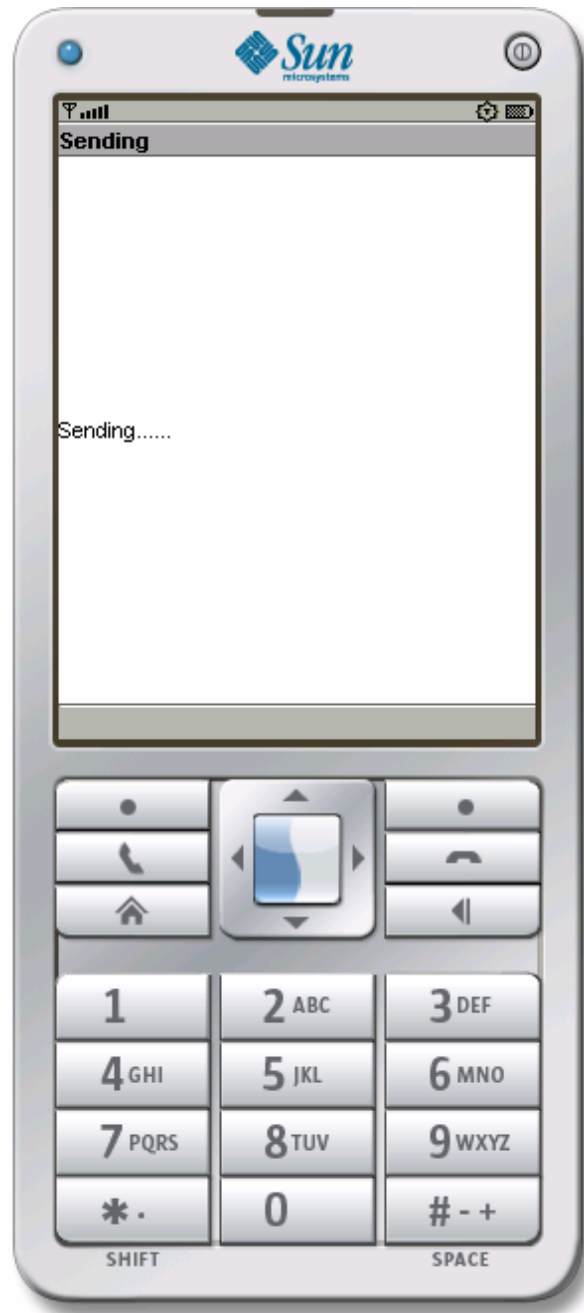


Fig: 19

When the areas have been selected, the user presses 'Ok' option, the application manager sends the message to the Operator. The user would get to view this screen while the application manager loads the map that he received from the Operator.

Map:



Fig: 20

The user would get to view the map as above. He can even move the map up, down, left and right. The blue marked line indicating the path to be followed. The example above is showing path of Mohakhali Road and the video clips that would be available along the path would be shown in the menu list as above. In this example only one video clip is available.

Video:



Fig: 21

The video would be seen somewhat like the above one. For the demo, I have used a static picture of the Mohakhali Road.

Operator server (OP server)

As the name suggests this server resides in an operator side. The main task of this server is to make the communication between a mobile station and the content provider and vice versa, and between the content provider and the satellite and vice versa.

When a user will send a request for any options among the three of the MS software, then the mobile station (MS) will send a message to the content provider via the operator. Here the operator server comes in action. When the MS sends the message it is captured by the OP server. Then this reads the message to check the content provider identification – the port number (the number where the SMS has sent) and the header. When the OP server is successful to get the information then it forwards the message to the content provider (CP) server.

When the CP server needs to contact with the satellite then it requests the OP server for it. For this the OP server receives a message from the CP server with a header – SAT along with the name of the places that needs to take picture. When the OP server receives it and sees the header then it contacts with the satellite server and requests for the clips, and waits for the reply. OP server simultaneously handles other messages. This server creates a thread to handle each request and terminates that after successful completion of the message request.

After the satellite returns the clips the OP server forwards the new clips to the CP server. Again when the CP server completed its work and return the result then the OP server sends the result to the very user who requested for.

The Interface of the server has been used in this demo only to see how the OP works otherwise there would no need of the interface in the real prototype. As it can be seen below the interface of the OP server that has four buttons, a text area and a progress bar. The buttons are as – start, restart, clear and shutdown. From the names it is understandable what there functions are. The start button will start the server software, restart will restart the server software, clear will clear the console area (text area) and shutdown will terminate the server software. The progress bar has no important function in the system. It is used only for animation so that the user is notified about the fact that the system is not hanged. Initially the restart and clear button are disabled and the progress bar is invisible, as shown in the figure below.

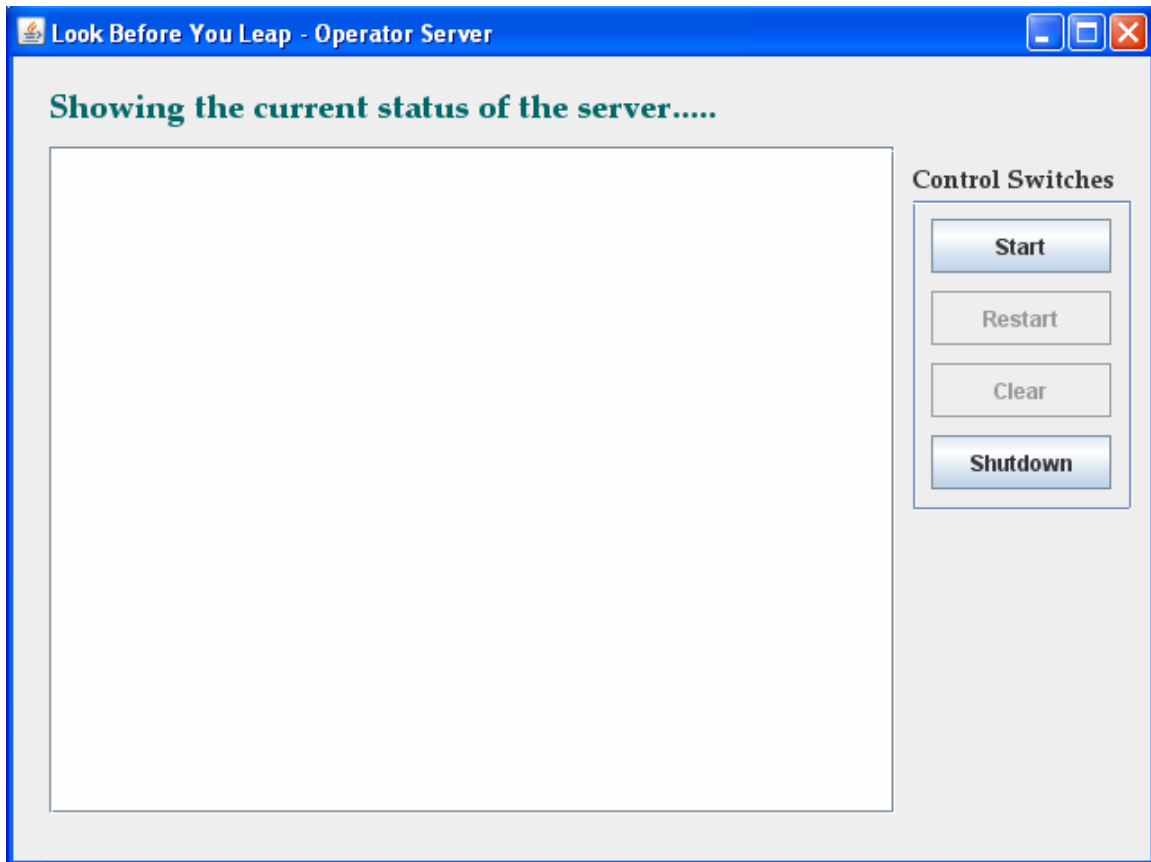


Fig: 22. Initial state of the OP server

When the start button of the server software is clicked then for the user's easiness the system gives a report in the console area and the progress bar appears. Beside this, the start button is clicked then the start button becomes disabled and the restart and clear button become enable. Next figure shows the state after the start button has clicked.

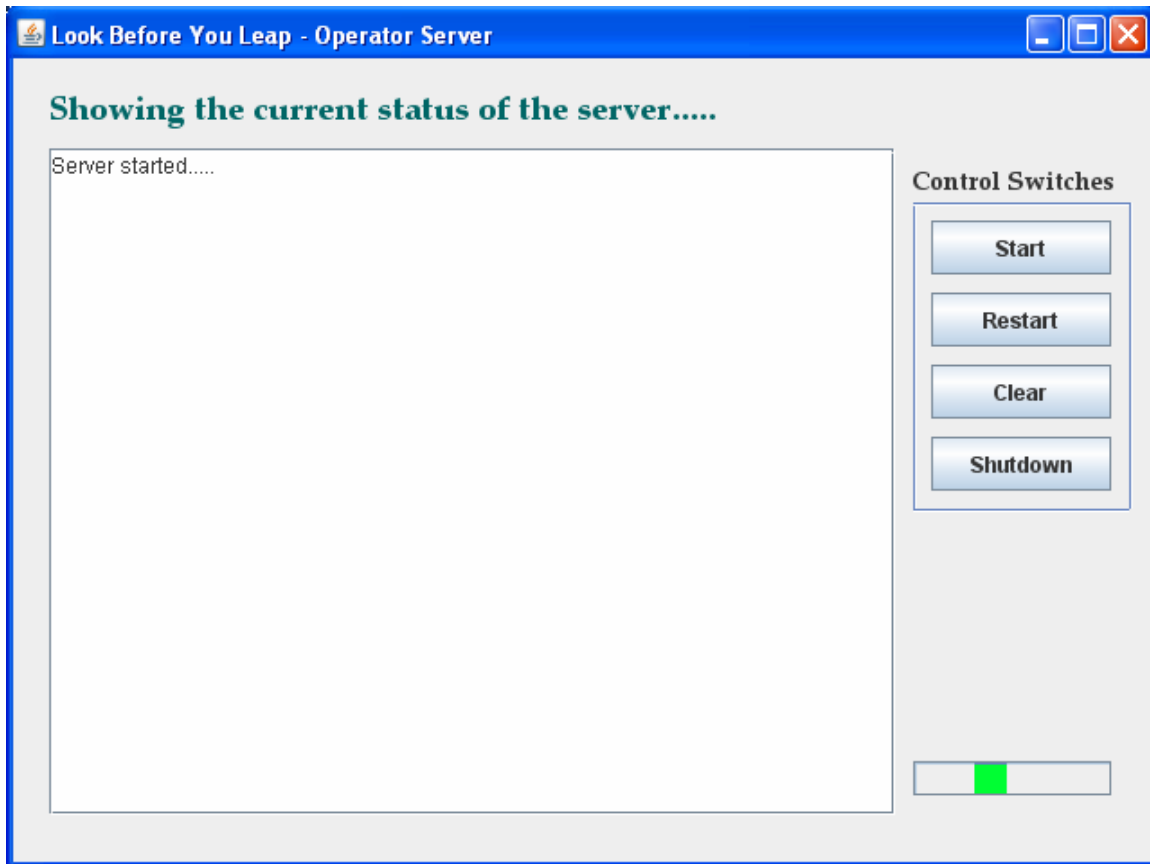


Fig: 23. OP server software after the start button has clicked

As it can be seen a message "Server started....." is printed in the console to inform the user that the action has been taken. When the user clicks on the restart button then a confirmation message appears. If the user confirms then the system restarts else the system does not take any action and returns to previous state.

The figure shows the confirmation state.

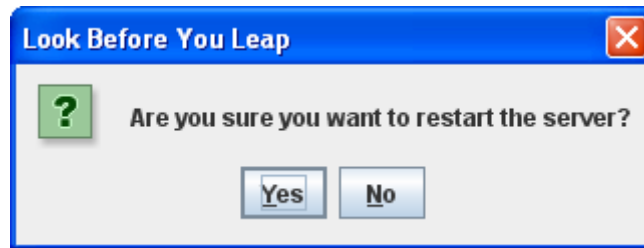


Fig: 24. Restart confirmation message

As stated above that if the user confirms the message then the system will restart. The next figure shows the state after the server restarted.

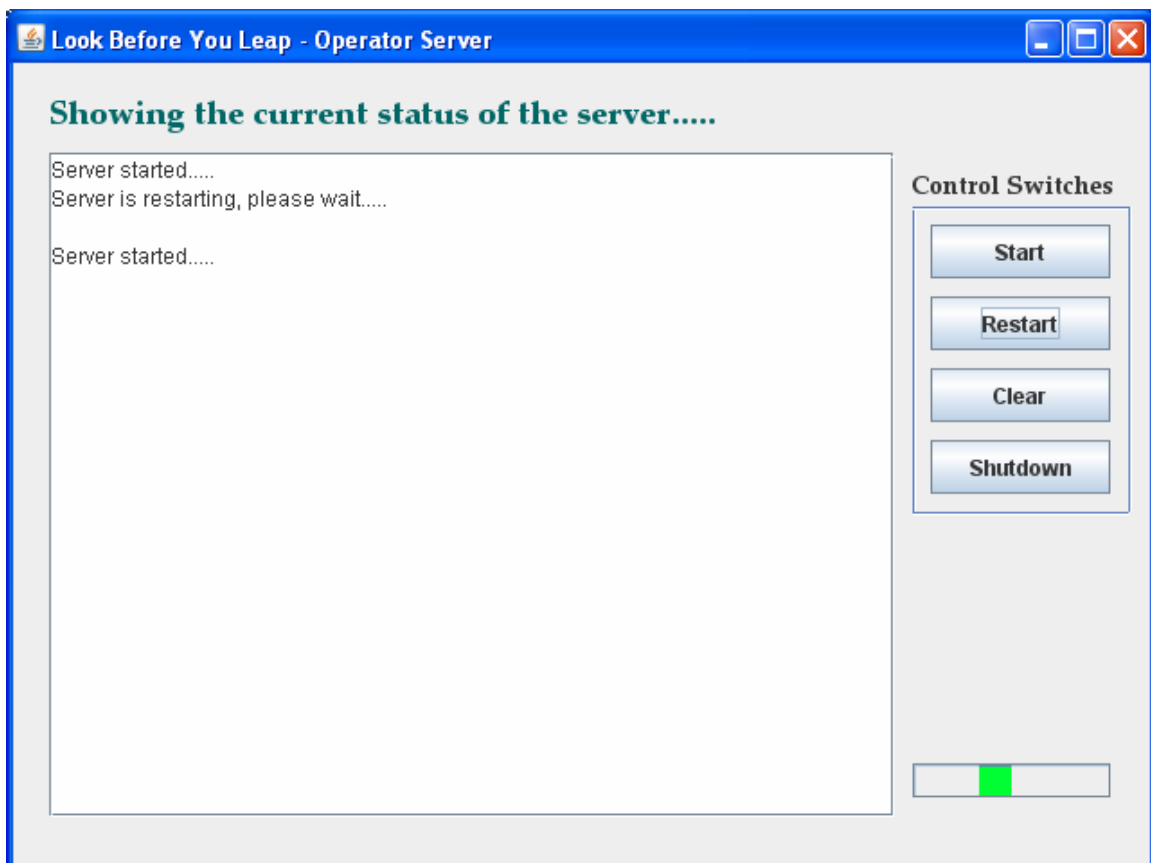


Fig: 25. Server state after it has been restarted

The clear button will clear the console area as said earlier. This means that all the text in the text area will be deleted and the user will see a clear text area.

When the user clicks on the shutdown button then a confirmation message appears and like restart one if the user confirms the message then the server would be shutdown or terminated, else the server would not take any action and will return to previous state. The figure below shows the confirmation message for this.

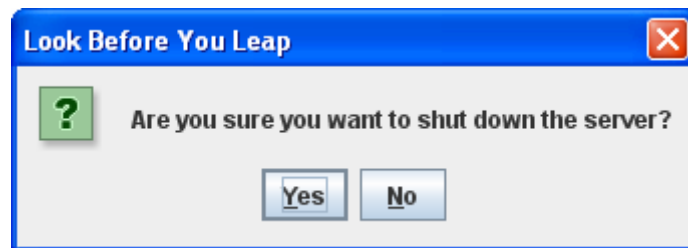


Fig: 26. Confirmation message for shutdown

These goes what will happen if the user clicks on the button of the server software. When the software runs and performs its job then also the server software shows information about the current situation of it. It prints the current job that it is performing. Figure below shows a situation like that.

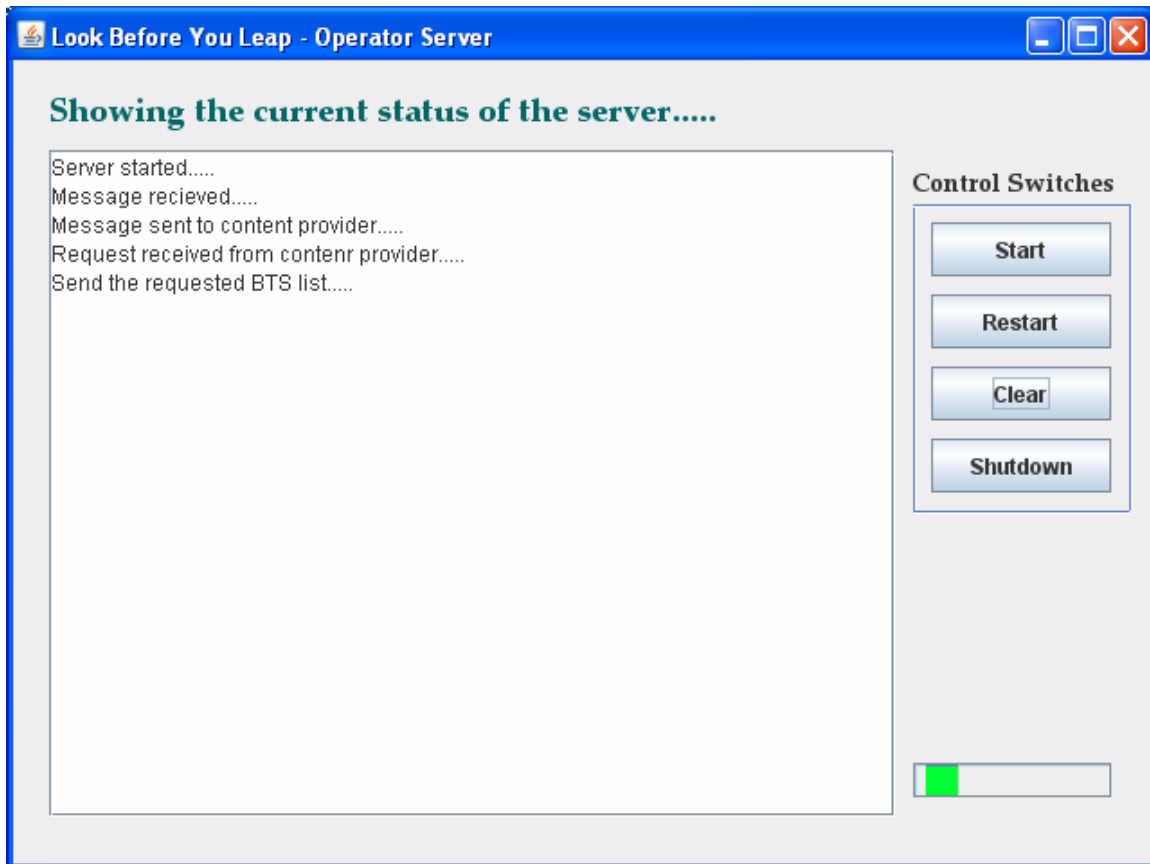


Fig: 27. Working state of OP server software

When the server receives a new message then it prints "Message received.....". After getting the destination of the message it forwards to the content provider, thus printed "Message sent to content provider.....". When the content provider sends any request to the OP server then it prints "Request received from content provider.....". When the OP server replies to the request then it action performed is printed, for example in this situation it prints "Send the requested BTS list.....".

This is how the OP server software appears while it is in action.

Content Provider Server (CP Server)

The server software that runs at the content provider's end is this CP server. The interface is more or less like the operator one. The difference is in the functionality of software. This software plays important role in this system, in one word this software is the brain of the system. This software processes the request of an user and provides the user with whatever he or she asked for. In between it also communicates with the OP server to make a communication with the satellite. The functionality of this software is explained below.

As stated earlier the process starts when the OP server receives a request from MS. After that the OP server forwards the message to the CP. Now starts the action of the CP server. When it receives a message from the OP, it checks for the header in the message. After getting the header, CP acts according to it.

For example – a message received with the header ROUTE. After reading the header CP looks for the starting point and the destination. When it successfully get these points, then it looks to the road link database to calculate the shortest path. After getting the shortest path the software looks at the video database for the important points within the calculated path. If the video is not found or the video is out dated, (the software sets a timestamp for each video and if a video is 15 minutes old from the current time then it is out dated), then it sends a request to the OP requesting to contact with the satellite and request for the videos.

When this happens then the CP server halts its process for the particular message and waits for the reply from the OP. Meanwhile the software handles other

messages that it was already processing or that arrives in the OP. Beside requesting for the video clip this software also requests the OP for the BTS list. In both the cases when it receives the reply from the OP server then it again starts its action. On getting the videos the CP server prepares the reply for the user. After the message has been prepared then it sends the reply to the OP. After getting the reply OP sends to the MS. As the user's request is being replied the software terminates the process that was dealing with the message.

As I mentioned that the interface is similar to that of the OP server so the initial state of the server software is as the OP one.

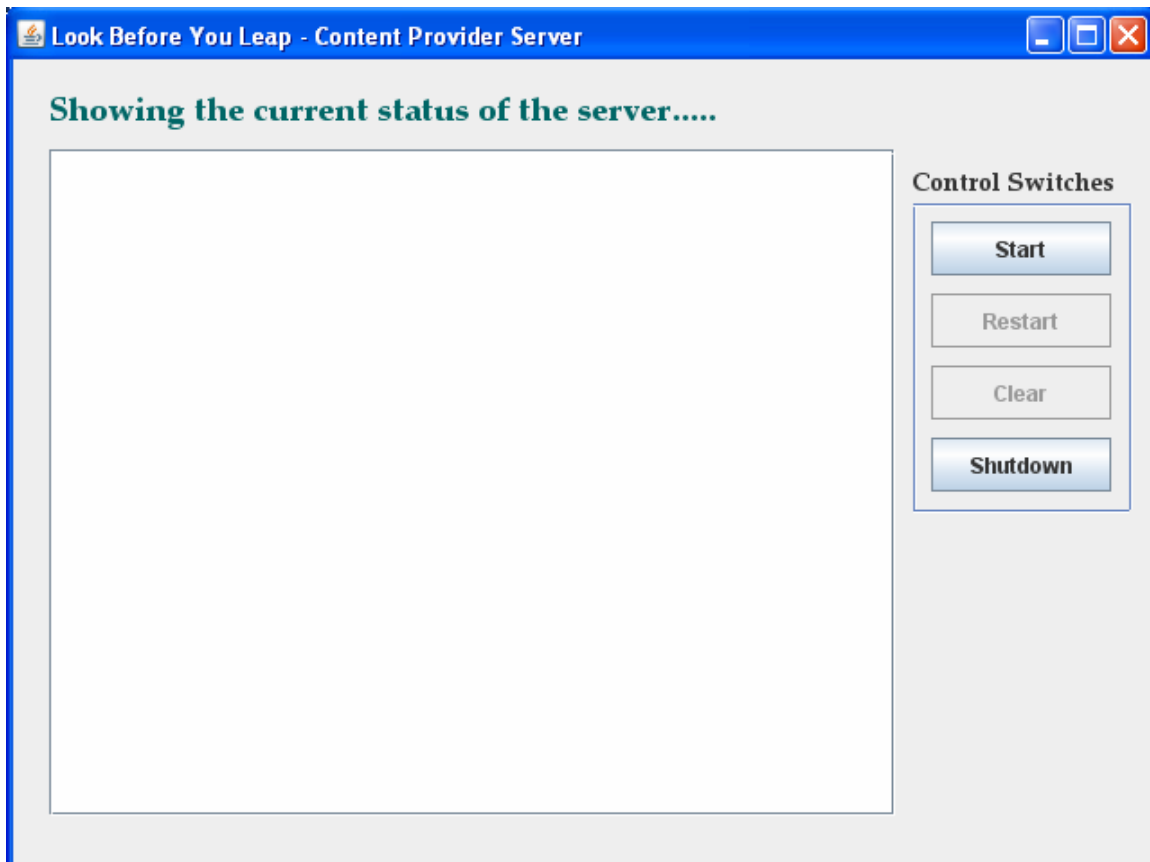


Fig: 28. Initial state of content provider server software

On clicking the start button will activate the restart and clear button and also the progress bar.

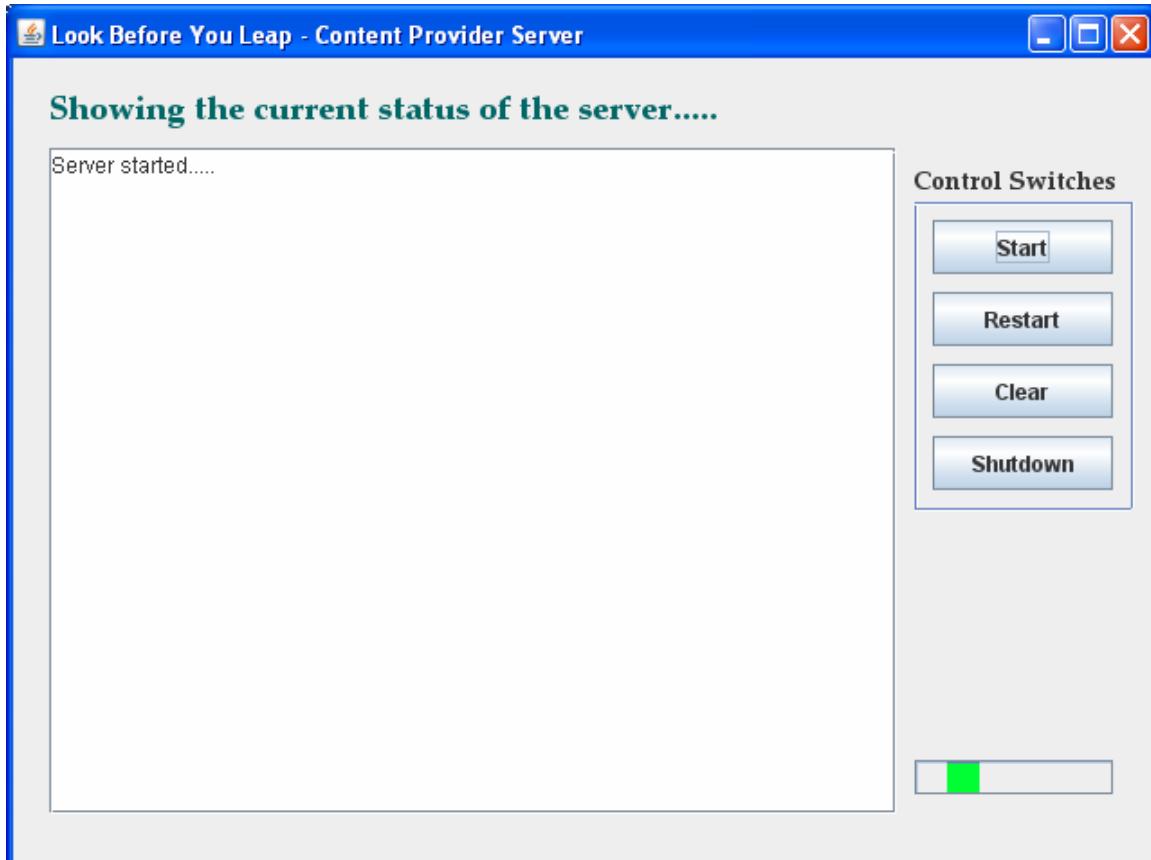


Fig: 29. CP server after it started

The functions of the buttons are similar to the OP server one. As mentioned before, the main difference is with the internal function or the job that this software performs. So on clicking the restart button will show a confirmation message. On confirming the message the software will restart otherwise the system will return to the previous state.

A confirmation message for restarting the software:

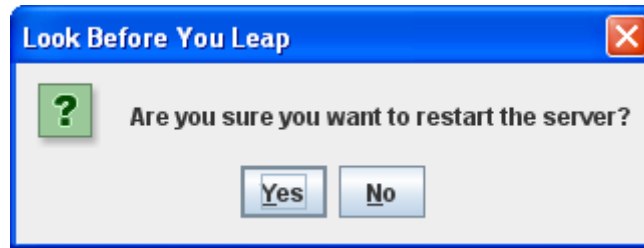


Fig: 30. Restart confirmation message

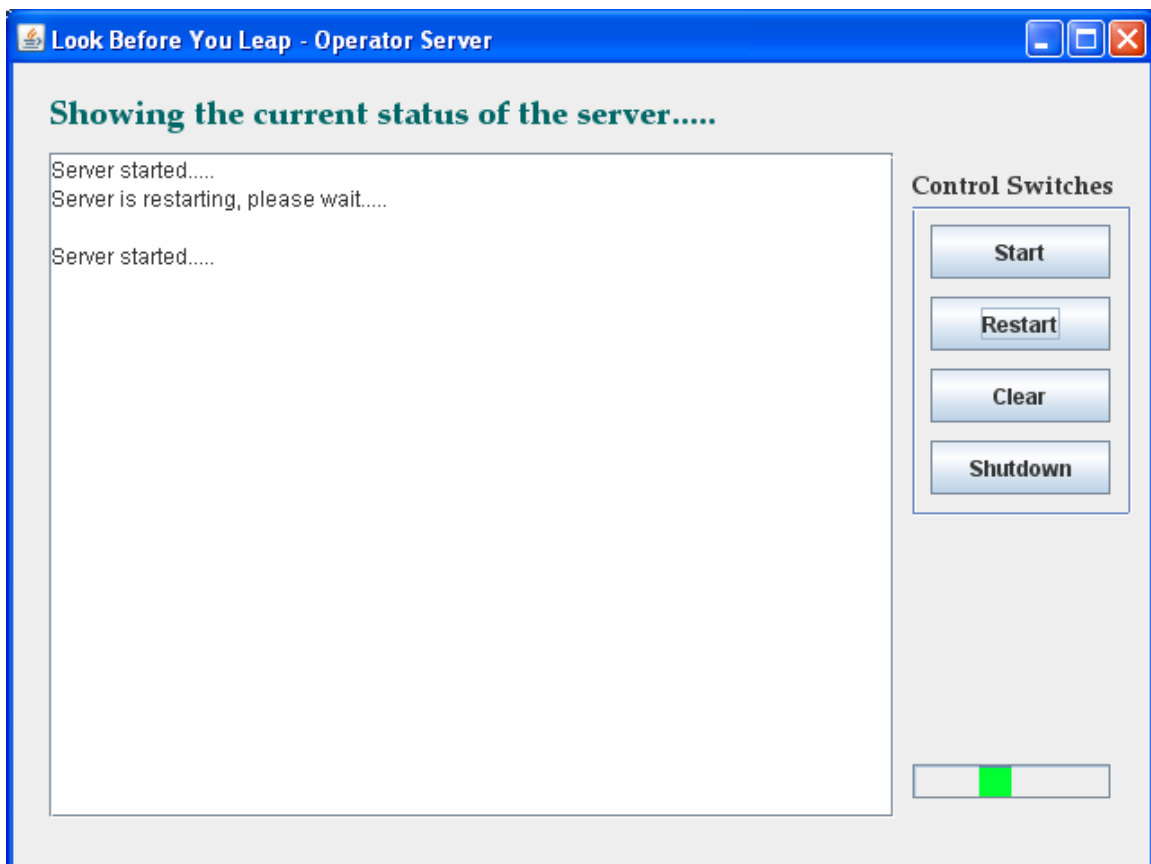


Fig: 31. CP server after being restarted

The clear button will clear the console on clicking. When user clicks on the shutdown button then a confirmation message for system shutdown appears. On

confirming the message the system terminates else the system will return to the previous state.

The figure below shows a situation when the CP server software is performing its job.

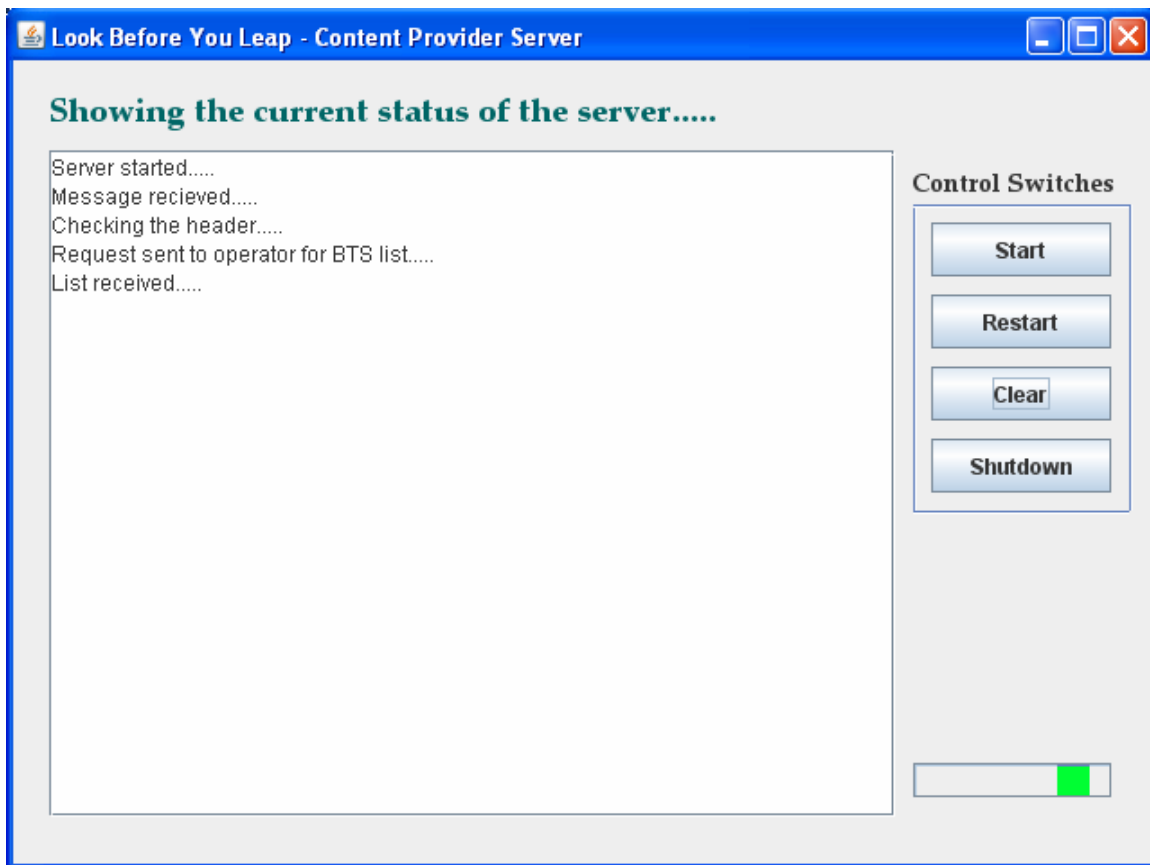


Fig: 32. When CP server software is working

The situation is the same as shown for the OP server software, except that this situation will show the content provider side. When it receives a new message from operator then it prints "Message received.....". After that it checks for the header and simultaneously prints "Checking for header....." . After header found it starts its action. In this case the header was Destination. For this it is requesting

for the BTS list to the operator. The printed line “Request send to operator for BTS list.....” tells the story. When the operator returns the BTS list then it prints “List received.....”. And after that it again starts its action.

This is how the content provider software works.

Current Happenings

Current Happenings

Information about the current traffic conditions of any places at anytime can be access easily nowadays. People can have the information from the radio stations, Radio Today or by simply browsing interactive maps at different websites. [MSN](#), [Yahoo](#), [EyeStride](#), [Google](#), and many others, they all have such websites that shows real-time traffic conditions.

Yahoo Map:

Yahoo helps with three options- map, driving directions and a business place. If one provides a name of a location then he would be able to view the map of that place and the surroundings. With the second option, if anyone wants to find a route from a given source and destination, Yahoo Map would help in the way below. It would let you know the distance between these two places along with the estimated time and even the driving directions. The example below shows the source – China Town to destination – New York. Distance: 2597.4 miles Time: 38 hours 27 mins (approx.). [2]



Fig: 33 . Yahoo Driving Direction on map

MSN Map:

It would show the map of the place that one has searched for along with an address. Below the picture is showing the location of New York and the marker 1 is pointing the address – 127 Fulton St, New York, NY 10038. [1]



Fig: 34. New York on MSN Map

Google Map:

Google maps shows where and how to reach a place from either computer or mobile devices. It also shows what one would find when he gets there. They have come up with five major sections – Maps, Traffic, Street View, Satellite and Hybrid. [4]

Maps are dynamic and interactive; it can be zooming in and out and even can be moved in all directions. It shows the route with the given source and destination and displays it on the map.

Traffic section helps one by letting know where the congestion is and estimate delays. Google is currently working over 30 major US metropolitan areas. It shows heavy traffic, slow traffic, etc.

Satellite feature helps one to have aerial images of any place around the world.

Hybrid feature is a concept of a mixture of satellite and traffic. It displays additional information of streets, street names, landmarks etc.

Street View feature allows one to select a location, take a look around; one can zoom in and out and virtually roam around the streets and neighborhoods. It feels like as if the person himself is there. They are working with five cities – San Francisco, Las Vegas, Denver, Miami and New York with this feature.

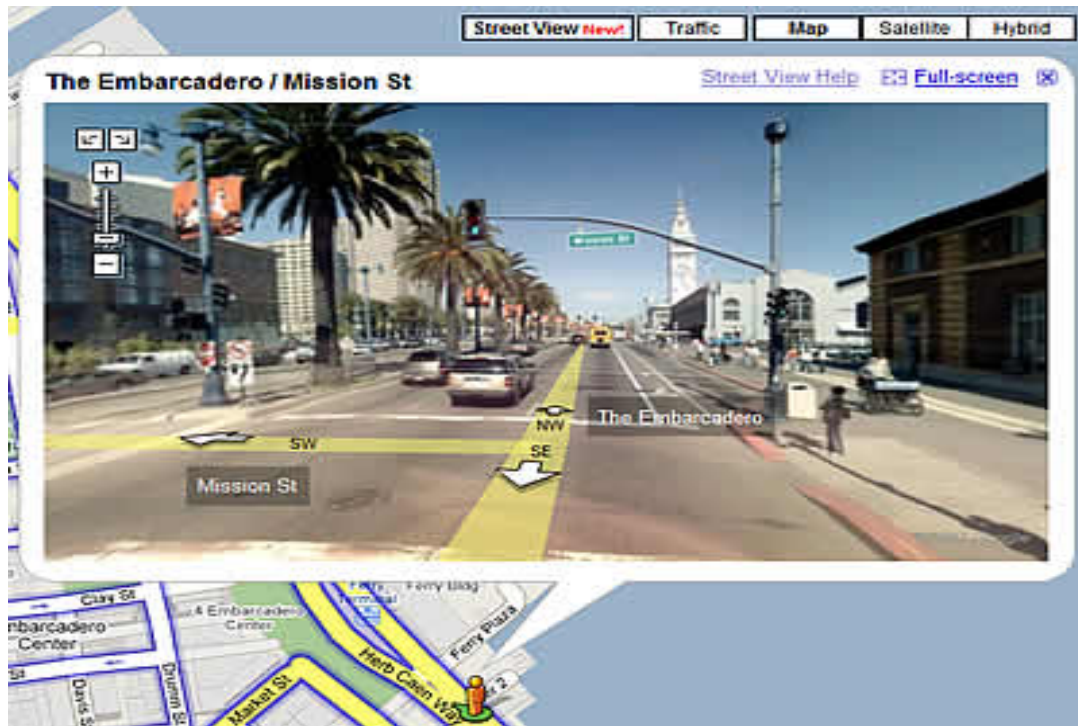


Fig: 35. Showing Street View on the map at Google. [4]

There are many other interesting things to know and explore at the websites. Any location of any place of the world can be seen. Only if an address is given, the map would display the location. It can search for an intersecting point of a street. By providing the name or category of business and the location, one would get to see the category at the location. Geographical features like cities, towns, airports, states, provinces or continents, anything can be searched. The advantages of using Google Map are lot but some of these advantages might cause people around the world to fall into trouble or feel embarrass.

Although the option of Street-level View is more fascinating and entertaining but people are feeling security threat. With this feature one can feel that as if he is roaming around the street himself. All the infrastructures of the buildings,

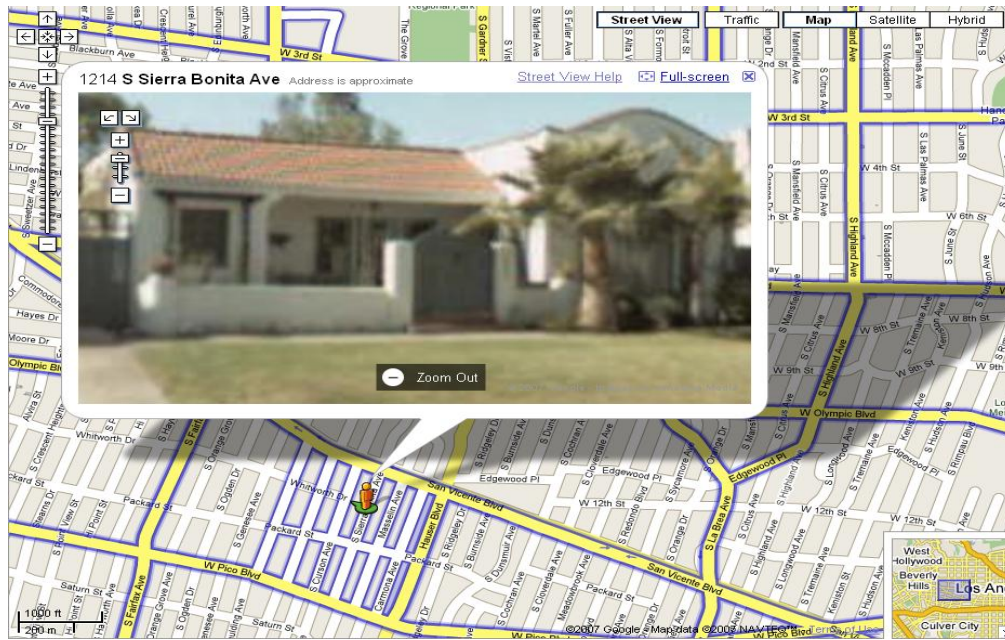


Fig: 36 [4]

houses, landmarks can be seen from a very close view. One can even get views inside of many houses. Consequently, people are lacking security.



Fig: 37 [13]

There were some of the websites that requests others to post funny and interesting photos that can be accessed by using the Google website. Such sections called 'Best Urban Images' where the pictures have been displayed. Top ranked among the pictures was people having sunbathing. Another picture shows that a man was standing outside a strip club and the picture was called 'Man leaving strip club' [7]. The hunt was on for quirky or potentially embarrassing images that could be found by wandering the virtual streets of the service. The site LaudonTech.com showed an image of a man entering a pornographic bookstore in Oakland, but his face was not visible.



Fig: 38. Metropolitan Museum of Modern Art [14]

Various governments have complained about the potential for terrorists to use the satellite images in planning attacks. There were talks in some of the blogs about the privacy considerations that rose in different news websites, bbc, telegraph, nytimes and many others.



Fig: 39. Empire State Buildings [12]

Below some of the news have been added along with their links.

From Blogs:

'Terrorists 'use Google maps to hit UK troops' - By Thomas Harding in Basra. Last Updated: 2:06am GMT 13/01/2007 - **Terrorists attacking British bases in Basra are using aerial footage displayed by the Google Earth internet tool to pinpoint their attacks**, say Army intelligence sources. **Documents seized during raids on the homes of insurgents last week uncovered print-outs from photographs taken from Google.** The satellite photographs show in detail the buildings inside the bases..... Anyone with the internet can sign up to Google Earth and **by simply typing in the name of a location they can receive very detailed imagery.....** The British security services are concerned that **terrorists will be able to examine in detail sensitive infrastructure** such as electricity stations, military basis, and their own headquarters in London. [6]

“The latest phase in Google's mission to organise the world's information — thousands of street-level photographs of major American cities — **has raised questions that the search engine is invading people's privacy.** The new feature on Google's map service, called "Street View", was unveiled this week at the Where 2.0 conference in San Jose, California, but within hours of the photographs of downtown San Francisco and New York **hitting the internet, bloggers were posting images of people, their faces visible, being arrested, sunbathing and urinating in public.....**” ([link](#)) [9].

“Doesn't anyone else find this to be **an invasion of privacy?** A burglar can case your house and know when you come and go—that's just an example of how this could be used for the wrong reasons. I can't believe google is allowed to do this.” – Commented by – Terry Hill. June 3, 2007 6:48 pm. [10]

“I wonder how Google can get away with this kind of photography at a time when **government authorities are hyper paranoid about people taking pictures of public buildings and places.**” - Posted by: Shaky Ground. Jun 25, 2007 3:51:31 AM. ([link](#)) [11].

“The question that always comes to mind with such imagery is that of privacy.” – Posted by – David Tussey, aka Roger Ball at 10.43 am. ([link](#)) [8].

“UPDATE: *I suppose this effectively counts as a second-thought.* **Internet users have been pointing to odd things caught by the new "street level" system.** One very popular link is described there and elsewhere as someone leaving a strip club. I won't link because there is in fact no evidence that the man was leaving the club, he was photographed outside the club, that's all, he might just have chosen an unfortunate time/place to park his car. But it highlights some of the **risks with**

how people may use this technology, this man, whether he visited the club or not, has had his imaged plastered around the internet with the description "man leaving a strip club." as **this case illustrates there must be some privacy concerns.**" - Posted by: Chris Vallance. 30 May 07, 11:05 AM. ([link](#)) [7].

OAKLAND, Calif., May 31 — For Mary Kalin-Casey. Ms. Kalin-Casey. was a **bit shaken when she tried a new feature in Google’s map service called Street View**. She typed in her address and the screen showed a street-level view of her building. As she zoomed in, she could see Monty, her cat, sitting on a perch in the living room window of her second-floor apartment.

“The issue that I have ultimately is about where you draw the line between taking public photos and zooming in on people’s lives,” Ms. Kalin-Casey said in an interview Thursday on the front steps of the building. **“The next step might be seeing books on my shelf. If the government was doing this, people would be outraged.”**

Her husband quickly added, **“It’s like peeping”** **Web has been buzzing about the privacy implications of Street View** — with varying degrees of seriousness. **Several sites have been asking users to submit interesting images captured by the Google service**, which offers panoramic views of miles of streets around San Francisco, New York, Las Vegas, Miami and Denver. ([link](#)) [5].

Advantages and Disadvantages

Advantages

- To access a map, the user does not have to have web-enabled device. The system would run into any Java-enabled devices.
- Saves Energy, Time and Money
- If some people follow the different route then the traffic would ultimately decrease in the congested path hence the system would help to decrease the traffic jams.
- User can view video-clip of Real-time traffic as his wishes.
- People would be able to know the condition beforehand. They would be mentally prepared before dive into such situations.
- It focused only on roads. Before updating the video-clips into the database, the content provider renders the images and keeps only the roads. It chopped out the important places, landmarks, things that are not needed to be seen.
- No inter-operator dependencies. Any Telecom Operator can initiate the system. They do not have to depend on each other for maintaining the system.

Disadvantages

- If the weather condition is not good then the history would be used to estimate the possible conditions of certain places. For such situation no real-time video-clips would be available.
- Before sending video-clips to the user as per request, the content provider checks whether the video-clips are taken within 15 minutes. The video-clips are updated after 15 minutes. But the traffic conditions pattern can change before 15 minutes.

**Future Implementation,
Conclusion,
Glossary and
Reference**

Future Implementation

- The system has taken Dhaka city only into consideration; in the future it would cover the entire country.
- The street names would be annotated.
- The system has worked only with a single – shortest path, it would work with alternate paths, if available, in future.
- The weights on the congested area or node have been given manually; in future the system would apply pattern recognition to weight the nodes. It would work like – if an image contain 5 or more cars, the weight would be given 5 or more. Less than 5 or greater than 3, then the weight would be given 3, so on and so forth.
- The video-clips have not been chopped off. It currently shows all the houses, landmarks besides the roads. In future the images would be rendered.
- The problem regarding the weather can be overcome by using the history of the congestion of the roads/nodes. This will somewhat give the user an estimation of the situation of the places. In this case the user will not receive any video clips instead they will receive a map with the congestion density color on it.

Conclusion

Today we can speak with anyone, anywhere, anytime. We can even read any book, check out the current happenings, listen to news, and do more by using small mobile communications devices and with the help of the mobile operators. And if a system such as one that has been discussed throughout the entire paper is added then it can make a real difference. It gives one quick access to the latest traffic conditions on a map at any time. People can enjoy the benefits of such easier and faster communication system at an affordable cost. It would definitely improve the standard of living for the people of our country, Bangladesh.

Glossary

- CP Content Provider or Value Added Service. They provide services to the Operator as per agreement.
- BTS Base Transceiver Station. They are used to connect mobile telephones to the ground-based telephone system.
- OP Operator. The telecommunication companies.
- MS Mobile Station. The mobile device.

References

- [1] MSN – <http://maps.live.com/>
- [2] Yahoo - <http://maps.yahoo.com/>
- [3] Eyestrade - <http://tours.eyestrade.com/>
- [4] Google – <http://maps.google.com/>
- [5] Nytimes – <http://www.nytimes.com>
- [6] Telegraph.co.uk – <http://www.telegraph.co.uk/>
- [7] BBC - www.bbc.co.uk/blogs
- [8] Google Maps Gone Wild– <http://googlemapsgonewild.blogspot.com>
- [9] Battalion Of Deborah - www.battalionofdeborah.org/blog/
- [10] Google Earth Hacks Blog - <http://www.gearthhacks.com/blogs/>
- [11] Blog Wired – <http://www.blog.wired.com>
- [12] News.com - <http://news.com.com/>
- [13] Geo-Trotter.com – <http://www.geo-trotter.com/>
- [14] Streetview Spotting- <http://www.streetviewspotting.com/>
- [15] J2ME - The Complete Reference