Implementation of Network Monitoring and Automatic Smart Call Forwarding In Duos Mobile

Bhagya Rekha Sangisetti,

Abstract. Call forwarding is a traditional telecom service that allows a user to forward incoming calls to another mobile number in the same mobile device or to another device. In the present scenario in mobile phone technology, call divert is a phone feature that enables the user to forward or redirect their incoming calls to an alternate number, which can be either a landline or mobile phone. Users can also choose to divert incoming calls directly to voicemail. When call divert is enabled, the phone does not ring at the original number of the incoming call, but rather only at the location the call had been diverted to. This service requires the user to manually activate and deactivate the feature. This approach needs more manual intervention even in dual operating SIM mobiles as well. To overcome this problem a smart call, divert mechanism in dual operating mobile is proposed as an automatic Smart call-forwarding mechanism (SCF). In this mechanism, if one SIM is under poor signal strength call is automatically forwarded to another SIM which is present in the same Mobile device. By installing software in a smartphone, call forwarding is automatically triggered

Keywords: Android operating system, telephony subscription manager, Long term evolution (LTE),3G, 5G, Handoff mechanisms.

I. INTRODUCTION

Call Forwarding takes place within the present handset. Due to the difference in bandwidths, the telecommunication companies may provide a stronger network in some regions and time, whereas bit weaker at other. This can be taken advantage of, and when one network is unable, the call can be advanced by forwarding to another.

i. Smart call forwarding mechanisms in duos mobile are call forwarding from one SIM to other SIM in the same device while the conversation is going on with another Phone.

ii. To study and implement the Paper when cell coverage area is poor or unexpectedly call is disconnected this proposed mechanism automatically detect and connect the call to another SIM that already present in the DUOS Mobile. The method of working features of Smart call forwarding mechanism. It must be a smart device with Android operating system which supports dual SIMs. This has to detect the signal strength always when the signal strength is becoming poor before the call is disconnected. This Paper has to auto-forward the call to another SIM that should be high signal strength. Smart call divert mechanism in duos mobile that phone must be dual SIM application based, configuring the phone by selecting a dual standby mode with a specific master configuration of the first SIM application registering the second SIM application on a suitable cell of a wireless network activating a call forwarding function from the second SIM application to the first SIM application registering the first SIM application on a suitable cell of the wireless network operating the phone by processing standby functions of the first SIM application receiving an incoming call via the first SIM application and handling requests for outgoing calls from the first SIM application.

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Bhagya Rekha Sangisetti, Assistant Professor, Department of Information Technology, Vignana Bharathi Institute of Technology, Telangana, India.

II. METHODOLOGY

This project include several modules like

Network monitoring includes: Here it monitors the signal of subscribers.It also gives invoice when there is poor network.

Auto termination: When there is a poor network, ongoing call automatically.

Auto activation: After call termination, the network is switched to another subscriber that has high signal.Then it makes an outgoing call from the subscriber that has high signal.

There are four modules in the process of implementation of this project

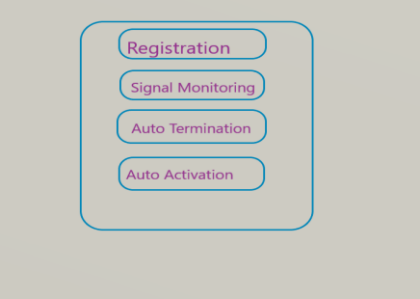

Fig.2.1 Modules in application

2.1 Registration

Register to be a Member Module. The first module is the register to be a member module which will alert a person about his register first. In this, the module comprises the mobile app which will serve as the display of information and as the input component for the details of user's. The next component is the server which will process the inputs and stores them in the database. It also obtains the data from the database and alerts according to the time at which the call is to be forwarded. Finally, the last component in this service is the following, if the number is unregistered so the user has to make changes in his phone by going to phone settings. Here the client **or** user has to go to Sim Management and make the changes, for some devices it's a by default numbers are unknown, but whereas in other phones it's editable were the user can change his or edit his sim numbers.

So for this service, it's both methods are supporting. After this service, This Paper mobile application will automatically get the contacts for your mobile device and its run's as a background process. The user just have to enter his sim

2.2 System Architecture

Below architecture diagram represents how the application works

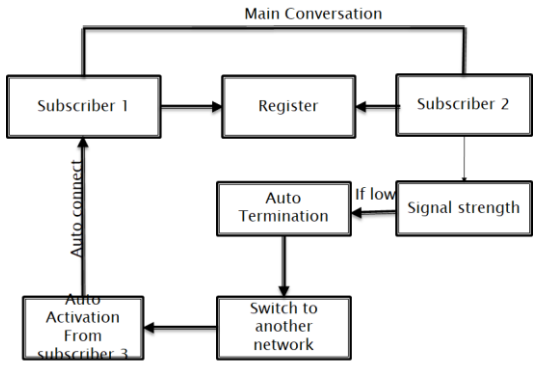

Fig.2.2. System Architecture

- Initially the subscriber numbers are automatically detected in duos mobile.
- When there is main conversation call between subscriber1 and subscriber2.
- Here application monitors the signal strength.
- If there is sudden decrease in signal at subscriber2 the main conversation is automatically terminated.

The quality of the call depends on the strength of the cellular signal in our area. The mobile displays current signal strength as a series of bars on the left-hand side of its display screen - the number of bars, the better the signal in the cellular area. If the signal strength is poor, we can try moving the mobile phone slightly to improve reception. If we are using the mobile phone in a building, you may find that reception is better near a window. Signal strength-based call forwarding for wireless phones: A mobile station monitors received signal strength from a base transceiver station, either directly or by monitoring or some other measure of received signal quality, such as the ratio Ec/Io in a CDMA network. When the signal strength drops below a threshold, the mobile station is programmed to automatically send a feature code to the wireless network to activate unconditional call forwarding to a previously programmed directory number. When the mobile station re-enters the service network, i.e., the signal strength improves to an acceptable level or goes above the threshold, the mobile station automatically sends a feature code to turn off the unconditional call forwarding. Thereafter, incoming phone calls are directed to the mobile station. signal strength from a base transceiver station in a cellular system, for instance, a subscriber's profile may indicate how the service provider should handle or respond to attempts to connect cellular calls to or from a given subscriber. For example, the subscriber's profile may indicate that the subscriber is not allowed to place calls to certain mobile phones, and so the service provider may block any attempt by the subscriber to place calls to those mobile areas. As another example, the subscriber's profile may indicate that some or all calls to the subscriber should be forwarded to another number or to voice mail under certain conditions, and so the service provider may accordingly forward an incoming call under those conditions.

2.3 Network Monitoring

SIM 1	SIM 2	P .State	Time	Date
0	29	IDLE	10:32:31	13-Feb-19
9	29	IDLE	10:32:31	13-Feb-19
9	28	IDLE	10:32:35	13-Feb-19
0	28	IDLE	10:41:54	13-Feb-19
0	1	IDLE	04:15:10	23-Feb-19
0	1	IDLE	04:15:14	23-Feb-19
0	23	IDLE	03:14:54	26-Feb-19
8	23	IDLE	03:14:54	26-Feb-19
5	18	ONCALL	04:05:22	28-Feb-19
5	17	ONCALL	04:05:23	28-Feb-19
5	16	ONCALL	04:05:24	28-Feb-19
5	14	ONCALL	04:05:26	28-Feb-19
5	12	ONCALL	04:05:28	28-Feb-19
0	15	IDLE	09:07:45	01-Mar-19
17	15	IDLE	09:07:45	01-Mar-19
17	16	IDLE	09:07:45	01-Mar-19
0	9	IDLE	10:24:47	02-Mar-19

5	9	IDLE	10:24:47	02-Mar-19
5	12	RINGING	10:24:47	02-Mar-19
5	19	RINGING	10:24:47	02-Mar-19
5	16	RINGING	10:24:50	02-Mar-19
5	9	RINGING	10:24:52	02-Mar-19
5	10	RINGING	10:24:53	02-Mar-19

Table 2.1: Signal Strength Monitoring

2.4 Auto Disconnect

The signal strength on both the network in a Dual-SIM handset is monitored in real-time, on the initiation of a call from the user of the application, the network strength is quickly monitored and if the signals are below a threshold, the call is automatically disconnected, and further corrective steps are taken. A similar approach is implemented in the case of a call in progress, considering a case wherein the call is in progress through a particular network and the strength of the signal drops, the network strength of both the SIM cards are compared, if the inactive SIM card has a strength higher than a threshold of the active SIM card then the call is disconnected and Auto Activation takes place.

2.5 Auto Activation

Auto-activation is the second step in the sequence, once a call is automatically disconnected by the application, an attempt is made to fulfill the requirement by activating a call diverting from the subscriber's network that received the call to the other idle network with a better signal strength. With pro-active signal strength measuring, the live status of both the SIM cards is known to the application and a decision can be taken quickly about which network is a more reliable option for the call connection. Based on the network strength the application uses the Smart Call Forwarding algorithm to determine the best available network and automatically enables or disables the call forwarding. This automated activation of the call forwarding feature on a Dual SIM enabled smartphone can effectively improve the quality of communication without any manual intervention or adjustment of settings.

2.6 Auto Answer

The Auto Answer is one of the important parts of the application for a seamless transition through the networks, this feature of the application comes in action once a call request is sent. The Applications on both the subscribers phone communicate actively and inform each other with information about the change in the network strength on the available networks and about the phone state, when an instance of call follows the Auto Disconnect and Auto Activation process, the subscriber that is said to receive the call is automatically informed and the application on the subscribers phone automatically accepts the call for a seamless flow. This is done by effectively communicating information about the state of the subscriber, signal strength and the unique reference number for the call.

III. SMART CALL FORWARDING ALGORITHM

We proposed a new algorithm called Smart Call Forwarding algorithm this is applicable with duos mobile phones only.

Algorithm:

Input: Two subscriber numbers to be registered in an android Handset

Step:1 Check the signal strength on both the network on the subscriber's phone and keep a track of both the signal strength.

Step:2 If the call is received on the network with low signal strength then the call forwarding feature to the other network is automatically activated.

Step:3 The call received is automatically received by the application for a seamless transition of the call.

```
While (on call) {

  If (Sim1>=Sim2)
            Present call continues….
  If(sim1<=Sim2)
            Current call auto ends
            Sim2 makes a call to incoming number
mless Transmission of call

If(sim1==sim2)
  No change in current call
}
```

IV. ANALYSIS

Signal Strength and Phone State comparison done from 28 Feb to 1 March 2019 with dual sim mobile with JIO And Airtel Networks we have monitored during different phone status like Ringing, Idle, on call and also After the switchover with our proposed smart call Forwarding algorithm.

Initially application will monitor the both the signal strengths continuously,

We simulated their signal strengths during different conditions and in different climates with different locations.

Experiment conducted with phone IDLE, RINGING and ONCALL states first it will read both subscriber signal level. Whenever a call is established between third party and sim1 in our present handset during conservation if any fluctuations occurs with the signal then signal level drops.in that case if it reaches cut off region the conversation automatically takes over by the sim2 from the current hand set to the called party.

From receivers end they should have this application and it also continuously monitors the signal level. While conversation if there is nay low signal strength of calling then it automatically receives the call from the sim2 of receivers mobile. Then there is intervention in the conversation call is continues

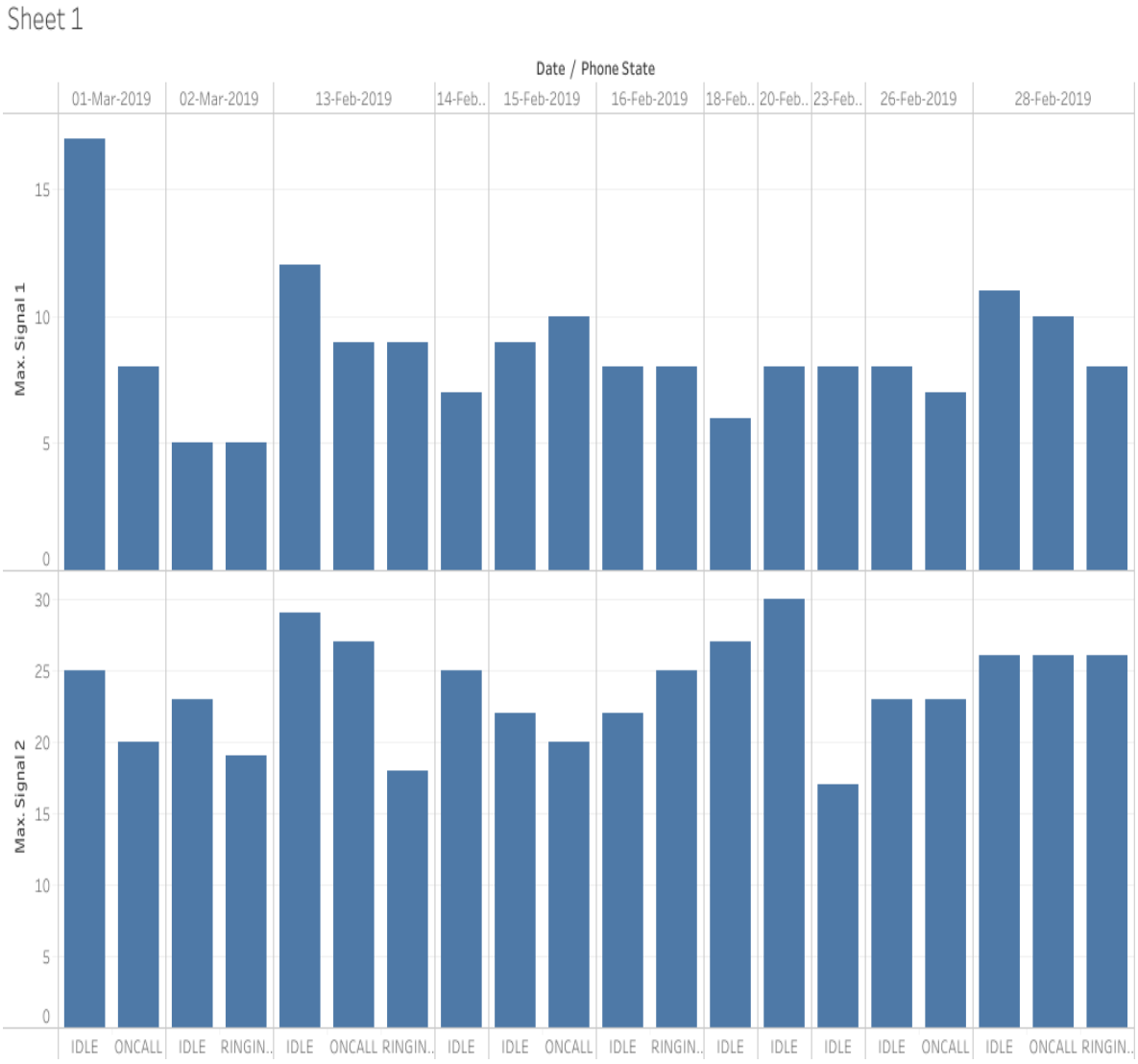

Fig.4.1. comparison between two sims signals with the phone state

V. CONCLUSION

This project describes a deployed smartphone-based activity and application monitoring Call Forwarding takes place within the present handset. Due to difference in bandwidths, the telecommunication companies may provide stronger network at some regions and time, whereas bit weaker at other. This can be taken advantage of, and when one network is unable, the call can be advanced by forwarding to another.

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AUTHORS PROFILE

Bhagya Rekha Sangisetti Pursuing PhD in Osmania University and working as Assistant Professor in Vignana Bharathi Institute of Technology ,Working with UGC Minor Research Project. Area Of specialization is Mobile Computing.