AutoSilence: Using Information and Communication Technology for Silence Zone

Sumit Busa[1], Ameya Kasbekar[2], Tushar Dey[3], Parth Nikam [4] and Pratik Kanani[5].
[1, 2, 3, 4] .Student, IT Department, D. J. Sanghvi College of Engineering, Vile Parle, Mumbai, India.
[5] Assistant Processor, Computer Engineering Department, D. J. Sanghvi College of Engineering, Vile Parle, Mumbai, India.

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Abstract— Information and Communications Technology (ICT) is the field of Information Technology which telecommunicates by using the Internet, wireless networks, cell phones, and other communication mediums. Information and Communication Technology is field which is booming lately due to the emergence of high end mobile devices and novel communication protocols. But due to this, older devices are becoming obsolete. Recent surveys have shown that majority of people generally do not put their devices in the respective modes when they are in silent zone or in airplane. This paper proposes a solution to this for all the devices irrespective of how old they are. The proposed model has a wireless transmitter to detect different network carriers and process the packet. After that, message communication takes place via it to the mobile devices. Finally the mobile device will send acknowledge to it. This would benefit the mobile user as the device will automatically switch to the required mode based on the network area covered by wireless device after notifying the user.

Index Terms—Information and Communication Technology, Mobile Communication, Computer Network, Wireless Transmission, Message Communication.

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I. INTRODUCTION

In the recent years of technological advancement, ICT have become an essential part of our everyday life. Its application are omnipresent. One of the major application is the presence of mobile devices. Every year, newer and better mobile are launched [1]. But at the same time, the old phones are been ignored and no development is made on that front. There is still a sizable portion of people who still use them. So in this, a model by using the concept of ICT is proposed which will be beneficial of all the mobile device, irrespective how old or outdated they are.

Generally people have the tendency to keep their phone not in airplane mode or silent mode or required mode when there is need to do so, like when they are in silent zone. Sometimes they forget to put it back to normal mode for a long time once they are allowed to. This is the problem statement which the proposed system tries to solve by using concept of ICT. The proposed model will automatically switch to required mode and give acknowledgement to the user before doing so.

ICT can be defined as all the devices, components of network and systems that combined together allow people to interact with each other in this digital world. Internet access, cloud computing, data, mobile devices are all considered as components of it [2].

The paper is structured as follows. Section 2 introduces the proposed architecture and the in depth explanation about the working of each module in the architecture. In Section 3, flow of the operational system that is script and architecture in action is given. Finally the paper ends with conclusion in Section 4.

II. ARCHITECTURE

In order to provide an efficient and cost effective solution for the problem stated in the previous sections, the paper proposes the architecture consisting of three main components namely Wireless Transceiving Device, Community and Mobile Units within the Community. The major component in this architecture is the Wireless Transceiving Device. This Device will be responsible for implementing the functions of the proposed architecture for the Mobile Units within the Community.
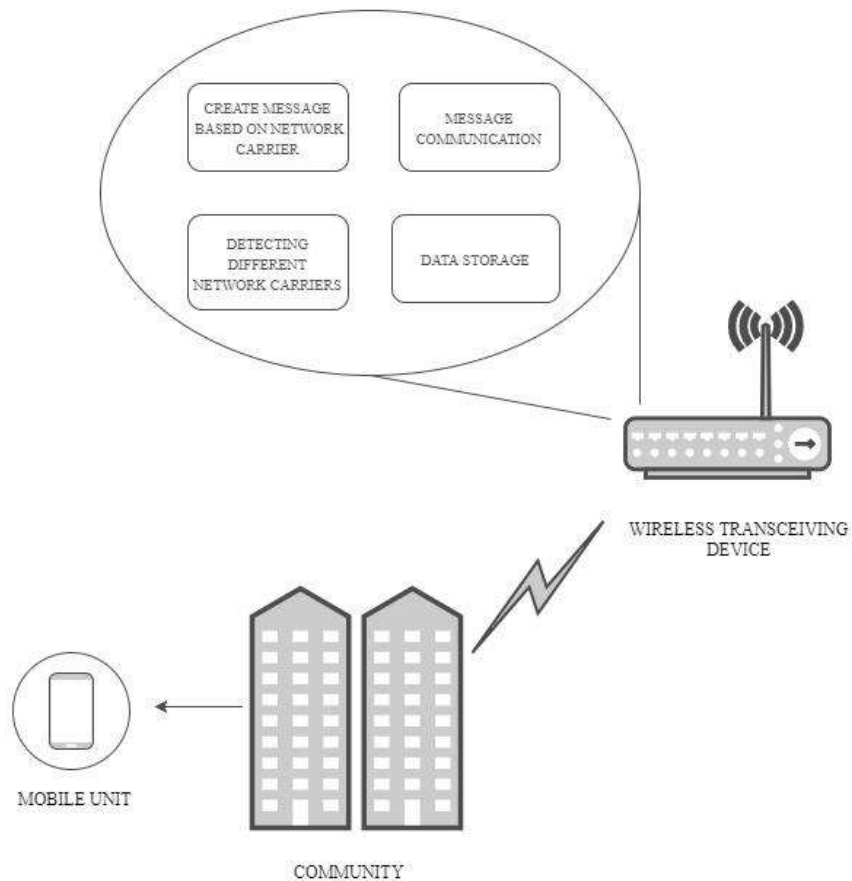
Figure 1: Autosilence Architecture

A. Wireless Transceiving Device (WTD)
Wireless Transceiving Device can be considered as heart of the architecture [3]. WTD architecture is based on combining the concepts of transmitter and receiver .It uses radio frequency used by mobile units, for transmission and reception of data [4]. The efficiency of WTD depends of specific conditions in its surrounding. Performance of such a device can vary widely based on factors such as

1. Proximity of the mobile unit to WTD
2. Indoor or outdoor settings
3. Temperature
4. Humidity
5. Presence of artificial structures [5]

The proposed architecture consists of following components in the Wireless Transceiver Device:

a) Detect Different Network Carriers
It should be noted that as different network carriers uses different frequency bands. Frequency bands varies from country to country based on the type of equipment and conditions available to transmit within these frequency bands. For example, in India carriers use 900 MHz and 1800 MHz frequency bands for GSM based architecture .Canada uses two frequency bands, the 1900 MHz band and the 850 MHz band with 1900 MHz being the primary band in use. For USA it is 850 and 1900 MHz bands and both are used, specific to characteristics of the area. Europeans posit that they use the GSM 900 and 1800 MHz bands as standard similar to that of India [6].Hence this component of WTD detects these carriers based on their frequencies in order to create a carrier specific message for the Mobile Units operating on these frequencies. In order to implement this function below mentioned formula can be used to calculate the required values [7].

$$F= 1/ (2*pi*sqrt (L1*C1)) \qquad\qquad (1)$$

Once we have the required frequency (F) value we can calculate the inductor (L1) and capacitor (C1) values. These values can then be used to decide the build the Wireless Transceiving Device (WTD) circuitry. For example, if mobile units works on 450 MHz, then we can calculate L1 and C1 values based on it [8]. The circuitry must be built to broadcast messages to all Mobile Units based on which network carrier provides service to them. For example, consider a scenario where a network carrier called Alpha has a

transmitting frequency of 500 MHz and therefore this carrier will sends all its messages on a frequency of 500 MHz. By substituting the value of F= 500 MHz in formula mentioned above, the values of L1 and C1 can be calculated to build the circuit.

b) Create Message based on Network Carriers

To broadcast a message to a cellular device, a cell broadcaster come into the picture. Normally all cellular device communicate with the SMS-CB (Short Message Service- Cell Broadcast) using the Base station. Hence, all Cellular device are always connected to the Base Station. Using the Wireless Transceiving Device (WTD), we can detect our nearest Cell Broadcaster Base Station on network IC.

Network IC will be used for finding the nearest network Cell Broadcaster in area which is covered by the WTD. Area covered by the WTD is based on a wireless adaptor, which is already included in it. Wireless adaptor should contain an internal, low-gain, omnidirectional antenna.

Message will be broadcasted by the base station i.e. Wireless Transceiver Station(WTD) to the available Cell Broadcaster i.e. the Mobile Unit(MU).It will then send an acknowledgement back to base station and finally the base station send message to SMS-CB.

Now, let us consider the structure and syntax of the message. In order to change the mode for the cellular phone, we have to include script in message body part.

The code can then be sent to any Mobile Unit irrespective of carrier network the device operates on. To accomplish this task, we are using scripting language. Following is a generic code for a Mobile Unit:

<.>script/<>%100.15.25.000.87.:

"Request for change of mode"

Begin<>

Request Name="Changing the Mode of the" phone^<excerpted cell broadcast key> run?yes /void-progindex{Nokia+32bits#.00000&%> Str:STOP/Config-Never><>

After broadcasting this message, it will,

1st Action: The phone will ring consistently as it is asking for a request to change.
2nd Action: This makes sure that user knows the change in mode.

c) Message Communication

A transceiver is a combination of a transmitter and a receiver. In most of the transceivers, an electronic switch permits the transmission and reception to be applied to the same antenna. This can injure multiple components of the circuitry such as the receiver. With this kind of a transceiver, it is difficult to get signals while transmitting and this mode is named as half duplex.

Hence in order to address this problem, the proposed architecture uses a transceiver that is designed to let reception of signals through transmission periods. Such transceivers are called as full duplex transceivers. In this type of transceivers, the transmitter (TX) and receiver (RX) work on different frequencies, so the signal which is transmitted doesn't interfere with reception [9].

After the message is created, it is broadcasted by the WTD within its range using this component. Circuitry of this component can be implemented using a generic framework of any ideal Transceiver. Once the message has been received by the mobile unit, transceiver will receive an acknowledgement which will contain the Media Access Control (MAC) address of the mobile unit. The paper is proposing to use the MAC address instead of Internet Protocol (IP) address, because of the consistency and accuracy provided by the MAC address, which is not possible using the later.

d) Data Storage

This component will be used to store MAC address of Mobile Units who have received the message. The receiver in the WTD will receive an acknowledgement from the Mobile Unit after it receives the message. This acknowledgement will provide MAC address of Mobile Unit to the WTD. All MAC addresses can be stored in log files of the transceiver. This component should be implemented in order to avoid duplication of messages sent to a Mobile Unit. The WTD will not send the message to a Mobile Unit, whose MAC address is already registered in the log files.

B. Community (COM)

Communities (COM) are real life locations where the proposed architecture of WTD can be used. It can be a hospital which is a stationary location or an airplane which is constantly changing locations. The function that is to be performed by the WTD can be executed unless and until a stable electricity supply is provided to it.

C. Mobile Unit (MU)

Any device which can send and receive messages can be considered as a Mobile Unit (MU). The architecture is proposed by analyzing that even though internet connection can be sparse for many MUs, the basic facility of messaging is provided by all of them. This allows the architecture to provide a uniform service to all MUs [10]. One exception to this is that nowadays more and more security updates are included in smartphones. Hence because of that, above script is not supported in new smartphones. So

for that some basic services need to be created which will be running on background. It'll scan the requested message and process accordingly.

For such smartphones this paper has proposed an algorithm as follows:

a) Smart Algorithm for Mobile Unit's service
1. Start background services if exception, found exit;
2. Scan Message sender ID. If ID found equivalent to cell broadcaster ID, then capture message script.
3. If convert into string if it's null, then exit;
4. Decode encrypted key (append inside message) if decoded not equal <available key> then exit;
5. If script tag found then, if IP found before ';' then, capture subject name <Keyword>
6. If keyword = '<Mode>' then, if run = yes then exit
7. If run = no then check hardware permission, if found then, change mode<Mode> else ask to user;
8. Notify user, if mode is changed via Vibration Effect.
9. Exit

b) What are Patches?
Patch is bunch of code or a small software which is developed specifically to amend the system. They are developed and executed on the system where vulnerabilities exist with sole purpose of improving the performance of the system.

Different types of patches are:
1. Hotfix
It is a quick update usually developed to fix a critical bug or vulnerability in a software. In some scenarios the customers discover an issue in the software but cannot wait until the next significant update. For this the developer releases an update specifically for that issue, this update is known As Hotfix.
2. Point Release
Sometimes the software contains too many minor bugs which forces the developer to release a patch which focuses solely on this minor fixes. This update is known as Point Release.
3. Service Pack
It is a software patch majorly focusing on making the system more reliable. Service pack allows installation of bunch of updates and enhancements with a single file. Because of the number of features it includes, the frequency at which they are developed and released is less compared to the other patches.
4. Security Patch
Security in mobile devices is one of the essentials aspects of digital technology. Not all software and programs are perfect. They have glitches and loopholes which are exploited by hackers to damage the system or gain illegal access to the system. In order to repair these security vulnerabilities, Patches are released. Patches related to the safety and security of the software are known as Security Patches.

III. FLOW OF THE OPERATIONAL SYSTEM
For the implementers to have a fair understanding of how the system will work as a whole, a flow diagram of the system in operation is included.

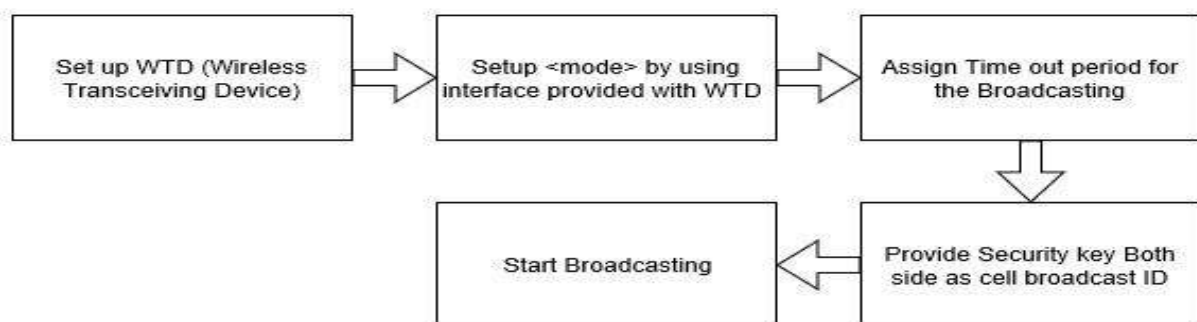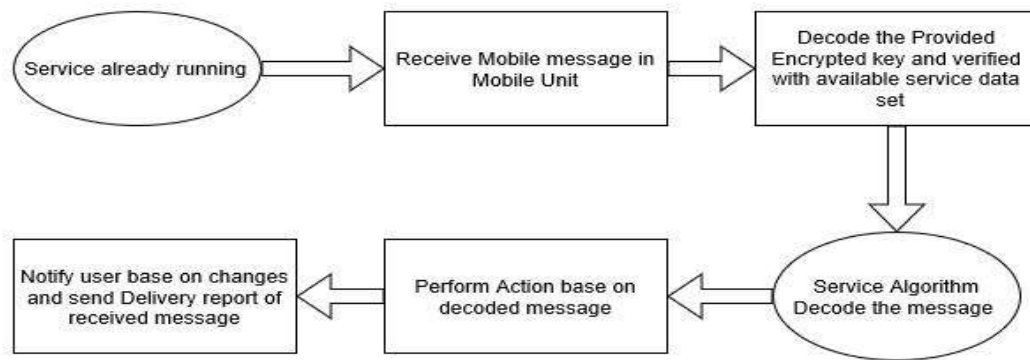Figure 2: Steps for General Setup Guide

Figure 3: Flow of the Operational System

IV. CONCLUSION

In this paper, we have proposed a solution to the problem where people do not switch their phones in silent mode when required. The main idea of this paper is to propose an architecture that will provide an effective and efficient solution by using wireless transmitter to switch the sound profile of a phone. This architecture can detect individual carriers and the location where it's used in, thus making it an appropriate solution.

V. REFERENCES

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