

Real Time Communication of Digital Electronic Advertisement on Public Digital Display System

Tochukwu Churchill-Micheal Akubue

Computer Science department, Enugu state Polytechnic, Iwollo

Abstract- Digital advertising is a thing that we live with nowadays but a marketer having real-time control over the advert placement on public digital display screen without a direct contact with the advertising agency/display screen or having to physically make payment in the bank is yet to be achieved. This is the future of real-time digital (mobile) advertisement. This work proposes a system that offers a client the ability to place adverts on digital billboards or cab advert roof using a mobile phone (sms). This system simply requires any mobile phone user to send an advert sms to a code on the electronic billboard or cab advert roof, wait for a reply sms which states the dates and time periods the advert can be displayed including the cost per hourly slot. The Client replies with an appropriate code for the date(s) and time period(s) of choice and the advert is placed accordingly. The cost of the advertisement is taken from the airtime in the Client's mobile phone irrespective of the mobile operator he/she uses.

Index Terms- digital display board, digital electronic advertisement, mobile banking, real-time control

I. INTRODUCTION

The word advertising comes from the Latin word "ad vertere" meaning "to turn the minds of towards". According to William J. Stanton, "Advertising consists of all the activities involved in presenting to an audience a non-personal, sponsor-identified, paid-for message about a product or organization". The American Marketing Association defines advertising as "any paid form of non-personal presentation and promotion of ideas, goods and services by an identified sponsor". It is used for communicating business information to present and prospective customers. It usually provides information about the

advertising firm, its product qualities, place of availability of its products, etc. Advertisement is indispensable for both sellers and buyers. However, it is more important to the sellers. In the modern age of large scale production, producers cannot think of pushing sale of their products without advertising them. The crux to successful mobile advertising lies in targeting, traffic quality and reach. [6]

Historically, advert placement may have started with town crying, wall painting and then use of cardboard or tarpaulin at strategic places. This later evolved into the use of fliers, sign boards, bill/notice boards, newspaper, magazines, television advertisement, radio advertisement, outdoor advertising or direct mail; or new media such as blogs, websites or text messages. The advent of new technologies made the information electronic thus information (text, image and video) can now be displayed on LCD/LED display screen. Just like roads, it is impossible to have all car owners own their own private roads for their cars alone; so also, digital display screens are designed to be used by any company/individual who wishes to advertise anything thus it is called **public digital display screens**. The ability to display a short message can be a useful application to any business.

II. LITERATURE REVIEW

Digital placement of information on (scrolling) LED/LCD screens can be done in many ways which include through direct connection with a computer to upload new information, encoding information on the onboard chip in the display, wireless communication mostly GSM based (interfacing a GSM modem) etc. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM

modem looks just like a mobile phone. When a GSM modem is connected to a computer, it allows the computer to use the modem to communicate over the mobile network. [7] used a SIS300 GSM modem is interfaced with RS-232 circuit to a microcontroller which in turn is connected to the 7 segment digital display. An Arduino tool is used to program the microcontroller.

As at 2012, it was estimated that there will be 1.7 billion people with a mobile phone but not a bank account. Mobile payment is being adopted all over the world in different ways. Combined market for all types of mobile payments was expected to reach more than \$600B globally by 2013, which will be the double of the figure as at 2011, while mobile payment market for goods and services excluding contact less NFC transactions and money transfers is expected to exceed \$300B globally by 2013 [8].

Many published literatures describe the display of static or dynamic text information on digital display screen but the constraint lies in the way the displayed information is changed and the inability of any marketer that wants to place an advert on the screen to do so without direct contact with the owner of a public digital display board [1]-[5].

III. PROBLEM IDENTIFICATION

To resolve the above issue, embedded systems were employed for remote control of appliances. An embedded system is a combination of hardware and software used to perform a specific function. An advanced wireless notice board system is proposed to display notice/advertisement sent through SMS from a transmitter. A GSM receiver modem embedded into the display board will receive the SMS, validate the authentic code sent with an SMS and display the desired information after necessary code conversion. This present mode of operation for digital advert placement is the integration of a GSM modem in the LCD/LED display panel to enable information placement using SMS. This solves the problem of changing the content of digital display system through SMS but it is only one part of the limitation;

- LED can only display maximum of 12 characters simultaneously; this means that one needs to wait for a reasonable period of time to view the complete content of the advert as it scrolls.
- LED can receive only 60 characters for display; this limits the total size of the information that can be displayed.
- How can any marketer use the public digital display board to display his advert real-time

without direct contact with the owner of the board? These boards are designed to accept message only from a few registered mobile numbers.

- How can marketers make payment for displayed adverts real-time without direct contact with the owner of the board?
- There is no option of scheduling messages for future display; this means that once a new advert is received, it displaces the old one. If an advert is to be displayed by 12 noon 12/12/2016, it must be sent by 12 noon 12/12/2016.
- How can an advert be automatically replaced once its paid duration elapses? If no new message is obtained, the existing one keeps being displayed and the owner of the message will not have to pay for the extra view time.
- How can the content of an advertisement be verified to ensure compliance to the rule of law?

IV. PROPOSED WORK

I propose the future to real-time digital advert (text) placement without having direct contact with neither the display screen, the bank nor the owner of a public digital display screen and yet still be able to place adverts on real-time and also make payments.

To resolve most of the observed limitations, I propose to design a system applying the following solutions:

- The digital display board will have a code say 0000 where any mobile number can send the command “Advert” to for an interactive guided SMS process to be initialized. Interactive guided SMS is linked to all mobile operators for charging. The mobile operator charges the cost of advert payment to the available airtime in the used mobile number; take a percentage for the cost of SMS communication and transfer the balance to the account of the digital display board owner. This becomes a legal business agreement between them. This is basically the same principle used in subscription to a data plan using the voice airtime; the difference is that the two businesses (voice and data) are owned by the same person. It can be observed from the flowchart below that any marketer can send and pay for advert but schedule it to be displayed at a later date. Also, since adverts come in the form of SMS, mobile network operators in Nigeria have been instructed to verify any SMS broadcast to guide against fraud, illegal campaign, unlawful content etc. This by default

ensures content validation for compliance with the rule of law.

Algorithm for advert placement and payment using SMS direct

BEGIN

Send "Advert" to 0000
 Receive response with codes for all States
 Reply with code of preferred State for advertising
 Receive response with available date(s) and time for advert placement
 Reply with chosen date(s) and time of choice
 Receive date(s) and time acknowledge response
 Receive request for the advert text of a maximum of 100 characters
 Reply with advert text
 Advert text verification and validation
 Response with validation acknowledge and cost of advert placement
 Reply with "Yes" to confirm advert placement at stated cost
 Placement of advert with respect to chosen date(s) and time
 Airtime surcharge
 SMS notification of advert placement and airtime deduction

END

Figure 1: Algorithm for advert placement and payment using SMS direct billing

- The board by default will be designed to place a demo advert, check for and now replace the demo advert if there is a valid advert to be placed. The placed advert is then timed based on the paid duration and upon expiration of the allowed duration, it is replaced with the next valid paid for advert or the demo. This ensures that no advert is displayed beyond its approved time duration. Finally, the use of extended RAM as proposed in [5] to display more

- characters and also have two lines of display

Flowchart of Device Advert Placement (Pt. 1)

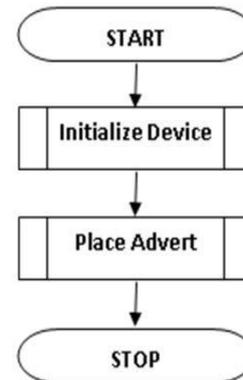


Figure 2: Flowchart of device advert placement (pt. 1)

will be observed.

Flowchart of Device Advert Placement (Pt. 2)

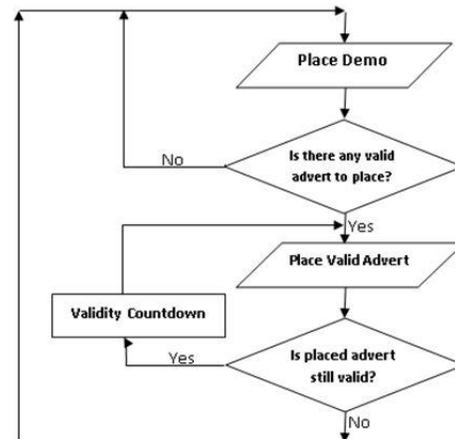


Figure 3: Flowchart of device advert placement (pt. 2)

V. CONCLUSION

This work having identified the limitations of existing literatures puts in factors to ameliorate the effects of such short falls. While proper advertising is needed for extensive sales of products and services; the number of Clients attracted by advertisement is directly proportional to the reach of the advertisement placed.

The rate of purchase of products and services is directly proportional to the ease of accessibility of

such products and services. Consequently, making the display board easily accessible to marketers through SMS guided advert placement and payment makes for a simplified advanced way of advert control.

VI. SUGGESTION FOR FURTHER READING

This work focuses on text based advert placement, how then can images and videos be placed in the digital display system without direct contact with the owner of the board? This will be the focus of my next project.

REFERENCES

- [1] Vishvendra Pal Singh Nagar, "Gsm based LED dot-matrix message display", August 2015.
- [2] Prachee U. Ketkar, Kunal P. Tayade, Akash P. Kulkarni, Rajkishor M. Tugnayat, "GSM mobile phone based LED scrolling message display system", April 2013.
- [3] Raj Hakani, "GSM based alphanumeric scrolling display system", February 2014.
- [4] Ye Chen, PavelBerkhin, Bo Anderson and Nikhil R. Devanur, "Real-time bidding algorithms for performance-based display ad allocation", August 2011.
- [5] GowrishankarKasilingam, MrithaRamalingam and Chandra Sekar, "A survey of light emitting diode (LED) display board", February 2014.
- [6] Trademob, "Optimizing mobile advertising campaigns".
- [7] VandanaPandya, DeepaliShukla, "GSM modem based data acquisition system", International Journal of Computational Engineering Research Vol. 2 Issue.5, September, 2012.
- [8] NitikaRai, Anurag Ashok, JanhviChakraborty, PrajaktaArolker and SaumeelGajera, "M-wallet: An SMS based payment system", International Journal of Engineering Research and Applications & National Conference on Emerging Trends in Engineering & Technology, March 2012.
- [9] Quasar UK, "The GSM /GPRS Modem GSM-Q2403", 2005.