Journal of Electronic Networks, Devices and Fields

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Aims and Scope

Journal of Electronic Networks, Devices and Fields is a journal that publishes original research papers in the fields of electronic networks, devices and fields. Journal of Electronic Networks, Devices and Fields is a new journal which publishes research papers in the areas of from electrical distribution networks to integrated circuits in VLSI design, and from static electric and magnetic fields through microwaves to optical design. Areas included (but not limited to) are information networks, analogue and digital circuits, power distribution, solid state devices, electronic tubes, electrical components, moving boundary problems, coupled problems, network modelling, energy and moment methods, element and ray methods, graphs, and pre- and post-processing of data.

Journal of Electronic Networks, Devices and Fields

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Journal of Electronic Networks, Devices and Fields

(Volume No. 12,   Issue No. 1,   January - April 2024)

Contents

A Case for the "Proportional Technologies" Paradigm: Adapting Mobile Phone Devices for African Needs

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A B S T R A C T

This paper is part of a work in progress that attempts to articulate a more pertinent framework for understanding information and communication technology (ICT) practices in Africa. We argue that the appropriation research paradigm has reached its limits in the continent and cannot account for some of the most significant ICT development there. For instance, Africans are increasingly influencing the production process of mobile phone devices designed for their market. The broader framework of proportional technologies opens the way to identify and account for the ways of such influence.

1. INTRODUCTION

If the growth of mobile phones in the developing world is facilitated by more and more affordable technologies, its sustainability appears to depend on how the technology as a device is shaped by a transforming society. Based on this basic assumption we articulated the concept of proportional technologies, which we presented in an international conference held in Bangkok (2010). It appeared to us as a more fitting framework within which to analyse information and communication technology (ICT) practices in Africa. We argued that the appropriation paradigm was saturated, and therefore unable to account for some of the technological practices taking place in Africa, unable to account for the variety of trajectories that ICT practices have been taking in African countries. By appropriation paradigm, we mean every approach that focuses on socioeconomic and cultural context as a way to understand technological practices in a given environment. Here, the works of Silverstone have been significant, notably with his concept of domestication, which "describes the process whereby advanced information and communication technologies are appropriated by users through their consumption", and "implies a politics of meaning and practice which engages consumers throughout the 'careers' or life-cycles of these technologies" (Silverstone and Haddon, 1996: 9).

2. THE DOMESTICATION PARADIGM AND ITS LIMITS

In this paradigm, the central argument is that technologies and communities entertain an intricate relationship, whereby uses of technology transform the society as they are transformed by it. Domestication approaches gives central role to how cultural practices and values determines the appropriation process. Haddon (2001:5) noted that one of the themes in domestication framework is that while the relationship between individuals and ICTs is obviously a key interest, considerable attention is paid to those individuals in context. It recognises that beyond 'end users', others make some contribution to the whole experience of ICTs. [...] So in general, individual use and individual strategies of control take place in a context where various household members have both commitments, routines and general demands on time and space as well as values, hopes and concerns which all interact and in so doing shape consumption.

Studies in such paradigm think of technology users in Africa as consumers who, at most, developed "tactics" (de Certeau, 1991) or authentic modes of consumption. The hypothesis of "art de faire" or the art to do with by which Michel de Certeau (1991) have been very influential in this tradition. It examines the inventiveness of regular people in their day-to-day routines and suggests that no matter what level of constraint an individual is subjected to, he will still find the way to "poach" with the system in order to accomplish a self-fulfilment. Madeleine Akrich (1993) articulated this view in terms of the user's "frameworks of action", which suggests that even if the designer anticipated the framework in which the user will exploit his/her device, the environment of the usage always offers specific circumstances, specific conditions of appropriation. Flichy (1995) describes this in terms of the adjustment of the user to the technical object, which goes beyond technical performances.

The assumption in the appropriation paradigm is that what matters is not the technology per se, but practices developed around it, and these practices depend on a whole range of social values, economic and intellectual resources users bring to the table, as well as on the existing power struggle in a given situation. From the works of Silverstone and Haddon, Ling (2004) identifies five stages of the domestication process: imagination, appropriation, objectification, incorporation and conversion. Each of these stages deals with the psychological component of the appropriation process, as well as the forms of usage that take place. For instance, imagination occurs when a person is aware of the existence of a technological object and thinks of getting it; incorporation deals with the ways in which technologies are used, their functionalities, as well as the purpose they serve, whereas conversion refers to how the technology transforms its owner's social status.

It is noteworthy that in this paradigm, the technological device itself is not envisaged as evolving. In each of the above stages, new perceptions and attitudes toward the technology and its owner may appear, new usages may take place, but the device itself does not evolve, it remains unchanged. This is where the insufficiency of the appropriation framework is made more apparent, especially given what we have been observing in the African context since the introduction of the mobile phone technology. In this approach, the user always appears at the end of the technological development process. The paradigm does not take into account (or not sufficiently so with regard to Africa) the important work done by theorists of socioconstructivism who argue that each technological device is socially constructed; that it results from a "technological framework" (Pinch and Bijker), namely "the social and cognitive environment within which constructors and users conceive and use the technical object." (Flichy, 1995: 85)

3. THE PARADIGM OF PROPORTIONAL TECHNOLOGIES

In a previous paper (Kamga, 2006), we articulated how the uses of the mobile phone in the continent go beyond the standards set by the structures of determination, i.e. the developers, promoters and suppliers of the technology and the related services. Our focus then was on users' ability to "poach" (de Certeau, 1991) the systems put in place by the structures of determination, using their mobile phone and the operators' networks for purposes not anticipated upstream. It eventually appeared to us that this form of analysis, undertaken within the framework of appropriation, wasn't taking into account social ICT practices where the technological device itself was simply incidental. Haddon (2001:6) rightly recognizes that "there are other levels of analysis derived from those studies which go beyond the type of observations made about domestication."

It is with such observation that we attempted to articulate a new framework, that of proportional technologies, which refers to "fitting practices, born within a given context and consistent with other established useful practices of the context." (Kamga and Cishahayo, 2010) In many African countries, booth practices for instance, initiated by users, forced the service providers to implement structural adjustments, bringing them to totally change their economic model, and became a constitutive part of the mobile phone landscape. The operators first introduced the prepaid phone, and then the possibility to transfer phone credit between customers. Also, the practice of transferring money via mobile phone first started with booths owners and quickly multiplied before the operators figured out programs and procedures to integrate this specific service in their offer. Today, in Côte d'Ivoire, for instance, any subscriber can open a financial account with major operators and make a money transfer from his phone. Africa is leading in the so called mobile money practice. The Economist (April 28th, 2012) reported that

a survey of global financial habits by the Gates Foundation, the World Bank and Gallup World Poll found that of the 20 countries in which more than 10% of adults used mobile money in 2011, 15 were African. It then noted: "If you think of banking by phone as just a way of using financial services, then these African countries—where people sometimes live several days' walk from the nearest branch—are much more financially literate than you might think, just by looking at how many banks they have."

The proportional technologies paradigm insists on the organic character of emerging communicational practices, that is, their emergence as an intrinsic component of the social fabric, as a more secure way to sustainability. The concept of proportional technologies "entails the recognition that a technological practice may change trajectory in an evolving social system, as well as the suggestion that both (the practice and the system) have to remain in constant adequacy for tangible results to be sustainably produced." (Kamga and Cishahayo, 2010) In this sense, the transformation of the technological device itself becomes part of the process.

4. WHEN THE DEVICE IS RESHAPED BY THE CONTEXT

The methodology to identify and analyze the way in which ICT practices in Africa are contributing to shape the technological devices sold in the African market remains to be articulated. However, in the meantime, we can point out some concrete cases of technological adjustment in the continent. In the recent years for example, Dual and multiple SIM mobile phones designed specifically to deal with the high cost of networks interconnection have entered African markets. Before their introduction, the custom for users was to posses multiple phones or to remove and install a different SIM as required. A user can now have subscriptions with more than one operator without the need to carry different phones or to keep the other SIM in his pocket as was previously the case. In Kenya, an operator has developed a service that provides the ability to call someone and let his phone ring long enough for him to understand that he should call back. This development has been inspired by the practice of beeping common among Africans. The technique of "beeping," consists of calling two or three times and hanging up each time before the correspondent has had a chance to pick up the phone. He then traces the call and calls back. What is noteworthy with the emergence of such user-centered technological development is that it is inspired by contextual practices it seeks to facilitate. The trend is there to stay, since manufactures such as Nokia, Samsung and Motorola have set up regional offices in Africa aiming to "facilitate local development of new features in phone models." We can therefore anticipate that ICTs in Africa will remain in step with social transformation.

5. CONCLUSION

In the end, the concept of proportional technologies, though a theoretical framework, is also ideologically driven; ideological because it was also formulated as a way to get around the condescending attitude of Western theorists toward people of the Third World, which is reflected in appropriation approaches. These theorists view technological innovation as preceding appropriation. From such a standpoint, Africans are always placed at the end of the spectrum as recipients, not as contributors to the processes of technological development itself. Such perspective has been lacking in analyzing the increasing input Africans have in shaping the technologies they are now using. In other words, if appropriation approaches recognize the inventiveness of users, they fail to acknowledge that such inventiveness is increasingly finding its way into the device itself. The proportional technologies paradigm addresses such limitation and, on the epistemological level, opens the way to new questions in the field of ICTs for development research.

REFERENCES

[1] AFRICA BUSINESS PAGES, "The Market For Mobile Phones In Africa",

http://www.africa-business.com/features/mobile_phones_africa.html

[2] M Akrich (1993), «Les objets techniques et leurs utilisateurs, de la conception à l'action», Raisons pratiques, n°4 « Les objets dans l'action », pp. 35-57.

[3] M Certeau (de) (1991), L'invention du quotidien 1. Arts de faire, Gallimard, Paris.

[4] P Flichy (1995). L'innovation technique. Récents développements en sciences sociales. Vers une nouvelle théorie de l'innovation, La Découverte, Paris.

[5] L Haddon (2003), "Domestication and Mobile Telephony", in Machines that Become Us: The Social Context of Personal Communication Technology, (J Katz, Ed), Transaction Publishers, New Brunswick, New Jersey, pp.43-56.

[6] O Kamga (2006), « Mobile phone in Côte d'Ivoire: Uses and Self-fulfilment», Proceedings of the International Conference on Information and Communication Technologies and Development, (ICTD, 2006) Berkeley, CA. pp. 184 – 192.

[7] O Kamga, F Cishahayo, Information And Communication Technologies For African Development: Proportional Technologies And An Ethics Of Uses,

Http://203.131.210.100/Conference/Wp-Content/Uploads/2011/06/11-03-Kamga-Cishahayo-Information-And-Communication-Technologies-For-African-Development.Pdf.

[8] R Ling (2001), "It is 'in.' It doesn't matter if you need it or not, just that you have it: Fashion and the domestication of the mobile telephone among teens in Norway", At the conference: Il corpo umano tra tecnologie, comunicazione emoda" (The human body between technologies, communication and fashion). January 2001 at Triennale di Milano, Milano, January, 2001.

[9] R Ling (2001), "We release them little by little: Maturation and gender identity as seen in the use of mobile telephony", Personal and Ubiquitous Computing, 5, pp. 123-136.

[10] R Ling (2004), The Mobile Connection: The Cell Phone's Impact on Society, Morgan Kaufman Publishers, San Francisco.

[11] R Silverstone, L Haddon (1996), "Design and the Domestication of Information and Communication Technologies: Technical Change and Everyday Life" in Communication by Design. The Politics of Information and Communication Technologies, (R Silverstone, R Mansell, Eds), Oxford University Press, Oxford, pp. 44-74.

Wireless Sensor Network in Medical Field

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A B S T R A C T

Wireless sensor networks are an emerging technology in existing research and have the potential to transform the way of human life. As the world population ages, those suffering from the disease of the elderly will increase. In-home and nursing home pervasive networks may assist residents and caregivers by providing continuous medical monitoring, memory enhancement and emergency communication. This paper discusses Wireless Medical Sensor Network Architecture and highlights some popular healthcare projects using wireless medical sensor networks. The security and privacy issues in healthcare application have been discussed.

Keywords: healthcare security issues, patient privacy issues, medical sensor networks, wireless sensor network, wireless body area network.

1. INTRODUCTION

Wireless Sensor Network is the part of infrastructure less Network consisting thousand wireless nodes distributed with geographical area. A wireless sensor is the smallest unit of a network that has unique features such as it supports large scale deployment, mobility and reliability. Wireless sensor network applications are going to revolutionize the healthcare system.fig 1 shows the world revenue forecast and growth rate .we can see that sensor network have a great future ahead with tremendous growth rate. WSNs are not limited to science and engineering, but they are also included in other applications such as the military, water monitoring, infrastructure monitoring, government security policy, environment monitoring, and earthquake monitoring. We have discussed wireless system in medical field. Researchers in computer network and medical field are working to make the broad vision of smart healthcare possible. Smart Healthcare provides the properties like Portability and unobtrusiveness, Real-time and always-on, Ease of deployment and scalability. The system of Medical Healthcare from the traditional clinical hospital setting to nursing and retirement homes is replaced by telecare without the prohibitive costs of retrofitting existing structures.
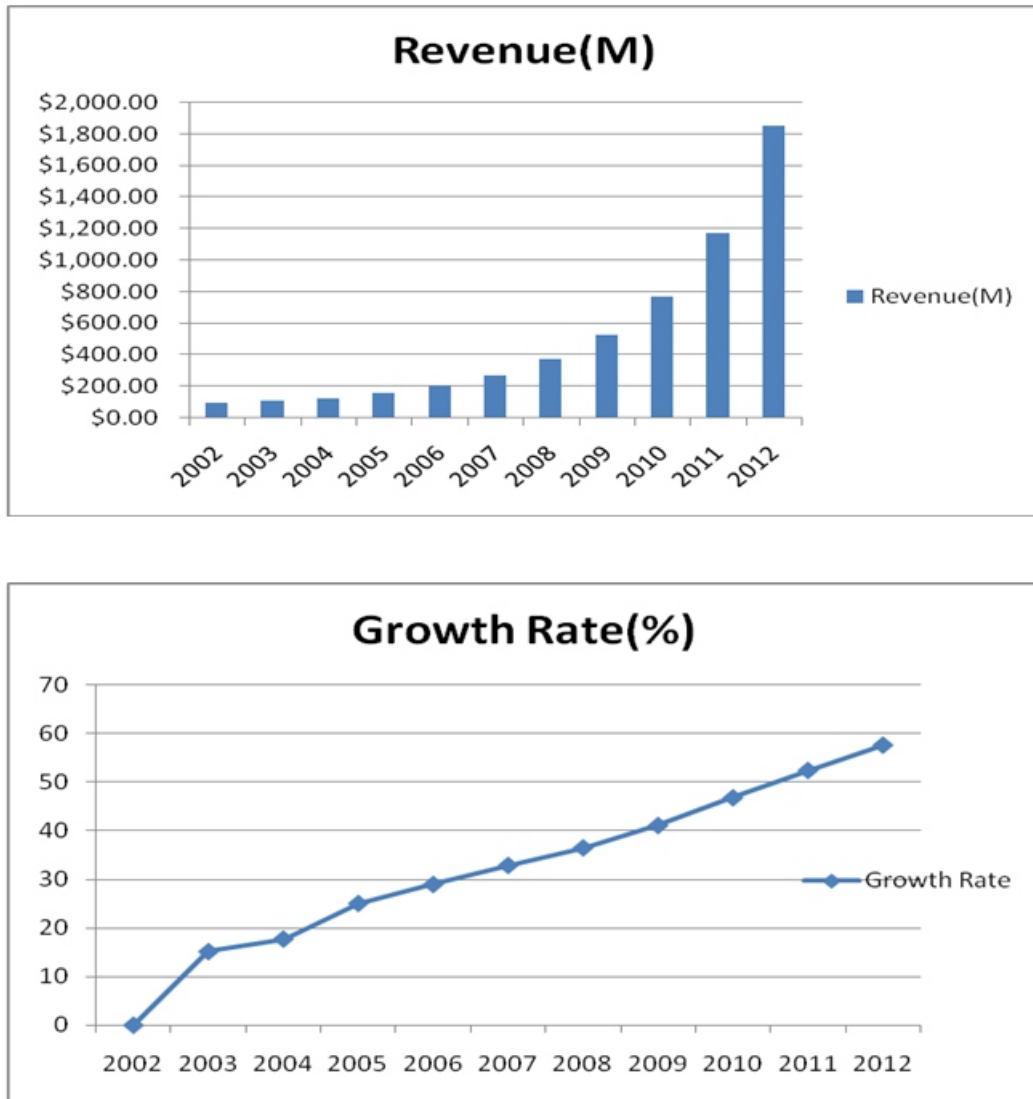
Figure 1. Wireless sensors and transmitters market: revenue forecast and growth for healthcare, medical and biometric (World), 2002 to 2012

Source: - http://www.fuentek.com/technologies/SAW/SAW-Sensor-Arrays-Market-Opportunity-Report.pdf

2. WIRELESS MEDICAL SENSOR NETWORK ARCHITECTURE

A wireless sensor network is a wireless network consisting of spatially distributed autonomous devices that use sensors to monitor physical or environmental conditions.

2.1   Hardware Platform

2.1.1   Pulse oximeter

Pulse oximetry has been used as a medical diagnostic .This non-invasive technology is used to reliably assess two key patient health metrics: heart rate (HR) and blood oxygen saturation (SpO2).

2.1.2 Electrocardiograph (EKG)

Two different types of electrocardiograph (EKG or ECG) are used in clinical and trauma care to measure the electrical activity of the heart [1].

2.2 Software Platform

A scalable software infrastructure for wireless medical devices called CodeBlue. CodeBlue is designed to provide routing, naming, discovery, and security for wireless medical sensors, PDAs, PCs, and other devices that may be used to monitor and treat patients in a range of medical settings. CodeBlue must also operate on a range of wireless devices from resource-constrained motes to more powerful PDA and PC-class systems. CodeBlue system includes MoteTrack for tracking the location of individual patientdevices indoors and outdoors, using radio signal information.
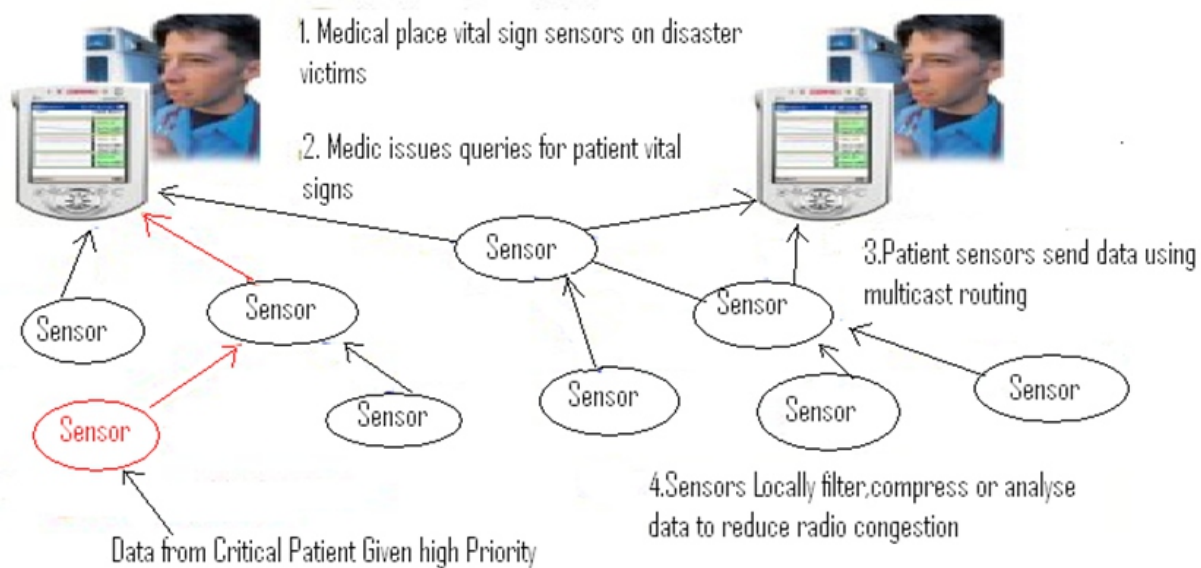
Figure 2.Wireless sensor Network Architecture

Medical sensor network design depends greatly on the specific application and deployment environment. Medical sensor networks include following properties:

- Wearable sensor platforms: Medical applications require very small, lightweight, and wearable sensors.
- Reliable communications: Intermittent packet loss due to interference may be acceptable, persistent packet loss would be problematic. Depending on the sensors in use, sampling rates may range

anywhere from less than 1 Hz to 1000 Hz or more.

- Multiple receivers: We expect that the data from a given patient will typically be received by multiple doctors or nurses caring for the patient. This suggests that the network layer should support multicast semantics.

- Device mobility: Both patients and caregivers are mobile, requiring that the communication layer adapt rapidly to changes in link quality. For example, if a multihop routing protocol is in use, it should quickly find new routes when a doctor moves from room to room during rounds.

3. CURRENT ENVIRONMENT

In the 21st century, the healthcare industry has seen the drastic improvements due to the involvement of wireless medical sensor networks (WMSNs) in healthcare applications. As the world's aging population is increasing at an unprecedented rate in the developed and developing countries. According to the "An Aging World: 2008" report, in 2008 the number of aging people worldwide (i.e., 65 years and older) was estimated at 506 million, and by 2040, that number will touch 1.3 billion. Thus, in just over three decades, the percentage of older age people will increase two times from 7% to 14% of the total world population. Although the aging population signifies, a human success story of increased longevity, the steady, sustained growth of the older population also poses health challenges. As more and more people will be entering an elder age, the risk of developing certain chronic and debilitating diseases is significantly higher. For example, Alzheimer disease symptoms typically first appear after age 60, Heart disease and stroke rates rise after age 65, diabetes, like those of many other conditions (e.g., blood pressure, blood glucose levels etc.). If aged populations prefer to live alone they do however require long-term monitoring for better independent life. Thus the aging population desperately demands independent life and good quality-of-care without disturbing their comfort, while reducing their care costs. Wireless sensor technology could provide highly useful tools for elderly people health monitoring and patients who need continuous monitoring [2].

4. PROJECTS AND RESEARCH GROUPS ON WIRELESS MEDICAL APPLICATION

The advancement of WMSNs in healthcare applications have made patient monitoring more feasible. Several wireless healthcare researches and projects have been proposed, few of the popular research projects about healthcare systems using medical sensor networks.

4.1 CIMIT

CIMIT is a center conducting research in order to improve patient care. CIMIT teams have produced truly novel, cost-effective healthcare solutions, many of them are networked sensor solutions, wireless

monitoring, and tracking systems. These novel solutions will be implemented in real-world in the near future from hospital to home. CIMIT teams have been designing and constructing "Operating Room of the Future, a fully functioning operating room in which novel, integrated technologies and new processes are introduced, evaluated, and improved, and through which patients move with far greater comfort, speed and safety.

4.2   Capsule endoscope

This is a novel application of wireless technology into in-body patient monitoring. It is a result of collaboration among NICT, Olympus Medical Systems Corp., FUJIFILM Corp., Yokohama City University, and Yokohama National University. Capsule endoscope can be used to monitor digestive organs by video and images transmitted from inside body to the outside over WBAN.

4.3   Code Blue

CodeBlue is a popular healthcare research project based on a medical sensor network developed at the Harvard Sensor Network Lab. In this architecture, several medical sensors (e.g., pulse oximeter, EMG, EKG, and SpO2 sensor board onto the Mica2 motes are placed on the patient's body. These medical sensors sense the patient body data and transmit it wirelessly to the end-user devices (PDAs, laptops, and personal computers) for further analysis [3].

4.4   Alarm Net

A heterogeneous network architecture named Alarm-Net was designed at the University of Virginia. The research is specifically designed for patient health monitoring in the assisted-living and home environment. Alarm-net consists of body sensor networks and environmental sensor networks. Three network tiers are applied to the proposed assisted-living and home environment. In the first tier a resident wears body sensor devices such as ECG, accelerometer, SpO2, which sense individual physiological data; and in the second tier environmental sensors such as temperature, dust, motion, and light are deployed in the living space to sense the environmental conditions. In the third tier an internet protocol (IP)-based network is used which is comprised of Stargate gateways called AlarmGate [4].

4.5   MobiCare

MobiCare provide the patient privacy, data integrity and authentication. The project aims to monitor the

activity signatures of patients with bipolar disorder. The personal ambient monitoring has two levels, namely, a personal ambient monitoring infrastructure (PAM-I) and a personal ambient monitoring programming architecture (PAM-A). PAM-I is composed of body and environmental sensors, mobile phones, and personal computers. The medical sensors are planted on an individual's body and environmental sensors are placed in the home environment. The Bluetooth protocol used to connect the body sensors and mobile phones. Mobile phones are responsible for data aggregation from body sensors and send it to the PC for storage and analysis. It (the mobile phone) controls sensor collection, i.e., mental illness, using rule-oriented applications. The environmental sensors transmits data to the PC using multiple communication protocols (i.e., IEEE 802.11 b/g, X10, Bluetooth, etc.). This is the first attempt to obtain activity signatures from the mentally ill patient using worn and environmental sensors networks [6].

4.6   MEDISN

This system is designed at Johns Hopkins University named MEDiSN, especially designed for patients' monitoring in hospital and during disaster events was reported. It comprises multiple physiological monitors (called PMs), which are batteries powered motes and equipped with medical sensors for collecting patients' physiological health information's. MEDiSN is connected with a back-end database that constantly stores medical data and presents them to authenticated GUI clients[5].

5. SECURITY AND PRIVACY ISSUES

This section discusses which would be the possible threats to a wireless healthcare application without implementation of proper security and privacy issues.

5.1   Security Threats

WMSNs improve patient's quality-of-care without disturbing their comfort. The medical sensor senses patient *sensitive* body data and transmits it over the wireless channels which are more susceptible than wired networks. The possible security threats that would be harmful for the wireless healthcare success are:

5.1.1   Monitoring and Eavesdropping on Patient Vital Signs

By patient vital sign snooping, an adversary can easily discover the patient information from

communication channels like the physical location of the patient, message-ID, timestamps, source address, destination address and other relevant information.

5.1.2 Threats to Information When in Transit

In wireless healthcare applications medical sensors sense the patient and environmental data and send it either to the physician or the hospital server. While sending the sensor's data it may be attacked.

5.1.3 Routing Threats in WSNs

CodeBlue and MEDiSN architectures need a multi-hop environment from body sensors to a remote server. A malevolent user could attack the network layer. He may steal or modify the packets, and forward the altered packets that may cause a false alarm.

5.1.4 Masquerade and Replay Threats

In this threat, an illegal rely node acts as a real node to the network. This can lead to false alarms to remote sites and an emergency team could start a rescue operation for a non-existent person. If a masquerade relay node captures the patient physiological data, later, these captured messages can pose replay threats to the real-time healthcare application. The patient treatment depends on fresh received messages from medical sensor networks. If masquerade nodes replay the old messages again and again, this could cause of mistreatment and over treatment of the patients.

5.1.5 Activity Tracking Threats

Based on a sensor's captured data a user can guess the current activity of a patient and he may send the wrong exercise tips to the patient. For example, an athlete is being monitored using a wireless sensor network while he is practicing in the club. Medical sensors are placed on the athlete's body, which sense health data e.g. heart-rate, time and location, and send health feed back to the base station, so it might be possible for an adversary to modify the athlete's health data, which may bring the athlete under suspicion in doping tests that could even spoil the athlete's career.

5.1.6 Denial-of-Service (DoS) Threats

DoS attacks may damage the wireless healthcare application network, and can lead to the loss of the

patient's life. DoS attacks are harmful to the mission-critical applications, such as location tracking, ambulatory and home care monitoring. DoS can attack at any layer:

- Physical layer: Jamming and tampering are the most common attacks on the physical layer.
- Link/medium access control layer: This layer suffers from collision, exhaustion, and unfairness attacks.
- Network and routing layer: The routing attacks involve spoofing, altering routing paths or replaying packets, selective forwarding, sinkhole, warm-hole, etc.
- Transport layer: It controls end-to-end links, and suffers from two types of attacks, namely, flooding attacks and de-synchronization attacks.

5.2 Privacy Issues

Deploying new technologies in healthcare applications without considering security makes patient privacy vulnerable. The patient's physiological vital signals are very sensitive so any leakage of individual disease data could makes him embarrassed. Sometimes revealing disease information can result in a person losing his job or make it impossible for him to obtain insurance protection. A patient's body sensors transmit his body data to a nurse/caregiver; it may happen that an attacker is also eaves dropping the patient data while the data is transmitting, and the patient's privacy is breached. The attacker can post the patient data on a social site (Face Book or Twitter, etc.), and thus pose risks to the patient's privacy. Thus a patient security and privacy is the central concern in healthcare applications [7].

6. CONCLUSION

Wireless healthcare can offer many advantages to patient monitoring, but the physiological data of an individual are highly vulnerable, so security and privacy become big concern for healthcare applications. Many important challenges such as, reliable data transmission, node mobility support and fast event detection, timely delivery of data, power management and node computation in implementing a secure healthcare monitoring system using medical sensors reflects the fact that if a technology is safe, then people will trust it. Otherwise, its use will not be practical, and could even endanger the patient's life. We discussed WMSN healthcare projects that have been introduced over the last decade and discuss their security flaws.

7. REFERENCES

[1] K.K Tremper and S.J barker Pulse oximetry.Anesthesiology,70(1):98-108,January1989.

[2] *An Aging World. Available online:*   <http://www.census.gov/prod/2009pubs/p95-09-1.pdf> *(Accessed On 2 October, 2011).*

[3] *J. Hill, R. Szewczyk, A. Woo, S. Holler, D. E. Culler, and K. S. J. Pister. System Architecture Directions for Networked Sensors. In Proc. the 9th International Conference on Architectural Support for Programming Languages and Operating Systems, pages 93–104, Boston, MA, USA, Nov.2000.*

[4] *Wood A., Virone G., Doan T., Cao Q., Selavo L., Wu Y., Fang L., He Z., Lin S., Stankovic J. ALARM-NET: Wireless Sensor Networks for Assisted-Living and Residential Monitoring. Department of Computer Science, University of Virginia; Charlottesville, VA, USA: 2006.Technical Report CS-2006-01;*

[5]   *Ko J., Lim J.H., Chen Y., Musaloiu-E. R., Terzis A., Masson G.M. MEDiSN: Medical Emergency Detection in Sensor Networks. ACM Trans. Embed. Comput. Syst.   2010; 10:129.*

6]   *Blum J.M., Magill E.H. The Design and Evaluation of Personalised Ambient Mental Health Monitors. Proceedings of IEEE CCNC 2010; Las Vegas, NV, USA. 9–12 Jan 2010.*

7] *Security and privacy issues in wireless sensor networks for healthcare Applications.*
  [J Med Syst. 2012]

Application of RFID Technology in Library

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A B S T R A C T

Present paper explains the application of RFID technology in library. It also describes in detail the need for RFID in library, its advantages and limitation. Various components required and their functioning in RFID system is also discussed. RFID technology has replaced the barcode technology in library operations. The RFID system can be used for faster charge, discharge, inventorying, security and tracking of library material. The RFID tags are placed in books and generally covered with a property sticker. Antennas of different size, based on application, are used to read the tags and manage the various library functions.

Keywords: RFID (Radio Frequency Identification), Automatic Identification Technology, Smart RFID labels, RFID Tag, Security Systems, Electronic Security System

I. INTRODUCTION

RFID stands for Radio- Frequency Identification. RFID is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. (Kumar 120). Radio Frequency Identification is one of the most exciting technologies and faster growing technologies and for increasing the efficiency in the library work environment. This technology help to reduce the valuable staff time spent on scanning the barcode while charging and discharging the library material. The RFID tags are placed in book and generally covered with a property sticker. Antennas of different size, based on application are used to read the tags and manage the various library functions. The RFID helps the library materials processing in very speedy way, which will in turn increase the user satisfaction.and. This wireless automatic identification data capture systems allow for non-contact reading or writing of data and they are highly effective in manufacturing and other hostile environments where barcode labels cannot survive. (Rajasekar et al 170).

An RFID- system consists of a transponder and a read/write unit. Both have internal intelligence and an antenna, which receives, sends and stores data. The read/write unit sends out signal causing the transponder to respond and transfer its own signal, containing encoded information (Doraswamy, Sreenivasulu and K Usha Rani, 2006)

II. RFID Concept

Radio frequency identification is a generic term for technologies that use radio waves to automatically identify people or objects. RFID tags/ transponders that can be attached to or incorporated into a product and the antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can be passed on to computer that can make use of it (Nagarathinam and Santhi, 2009). RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology regardless of item orientation or alignment and distance from the item is not a critical factor except in the case of extra-wide exit gates (Sumi and Jatinder, 2007). There are several methods of identification, but most common is a unique identification number that identifies an object on a microchip that is attached to an antenna. The antenna enables the chip to transmit the identification information to a reader. The reader converts the radio waves reflected back from the RFID tag into digital information that can be passed to computers to make use of it (Bharat Kumar, 2012).

Working of frequency capacity of RFID

Some facts about RFID as given by A. K. Varma and M Imtiaz Ahmed (2006) are as listed below:

- Provides wireless link between products, management information system and consumable transponder consists of an IC and an antenna.
- It involves use of tags or transponders which collects data and manages it in changeable or portable database.
- Unlike BARCODE, RFIDs can identify and track the products.
- Does not need contact or line-of-sight as information exchanged is done through radio waves.
- RFID tags can withstand harsh and rugged environment.

The RFID tags can be of the following frequencies:

Frequency Classification	Band	Reading Range
Low Frequency	125 KHz	0.3 Meters
High Frequency	13.56 MHz	1 Meters
Ultra High Freq.	433 MHz to 2.45 GHz	1-3 Meters
Microwave Freq.	2.45 GHz to 300 GHz	2+ Meters

Functionality of RFID

As a part of technology implementation, an RFID tag is implanted in each and every book and reading material of the library and complete book information is entered into the software installed in server or workstation. Now whenever a library member brings the book for issue return purpose, the RFID reader from the tag reads the information pertaining to that book and transmits the data into the software and books is smoothly issued in a few seconds with a minimum of manual intervention. As the member takes the book outside the library, the antenna placed at the exit gate automatically read the information contained on the RFID tag to verify whether the book is properly issued or not. In case the book is not issued to the member as per library norms or it is being stolen from the library the antenna sense it and give an instant alert. Thus the technology resulted successful theft reduction of books (Sumi and Jatinder, 2007).

Objectives

Every library's needs and objectives are different, so purpose of implementing RFID technology will vary from one library to another. Thus it is not possible to state each and every objective for implementation of the technology, but Bharat Kumar (2012) explain the major common objectives as follows:

    (i)   To improve operational efficiency;

    (ii)   To achieve accuracy;

    (iii)   To reduce operational cost; and

    (iv)   To make stock verification an easy process.

Advantages

The use of RFID technology increases efficiency and speed of operations. There are several multiple and multiplicative improvements possible as listed below (Bharat Kumar, 2012):

(i)   Improves efficiency of the staff and quality of services;

(ii)   Faster Circulation Transactions

(iii)   The Perfect Tracker

(iv)   Simplified Self-Charging/Discharging

(v)   Better than Bar-Code and High-Speed Inventorying

(vi)   Ensures Perfect Entry and Retrieval of Data;

(vii)   Helps in Strengthening Security;

(viii)   Improves Shelf Collection Management

Limitations

Some of the limitations in implementations of RFID technology, as given Bharat Kumar (2012) are as follows:

(i)   High Cost of RFID System;

(ii)   Lack of Standards;

(iii)   Chance of Removal of Exposed Tags; and

(iv)   Lack of Technical Knowledge and Exposure,

Components of RFID

According to A. K. Varma and M Imtiaz Ahmed (2006) a comprehensive RFID system has four components:

(i)   RFID tags that are electronically programmed with unique information;

(ii)   readers or sensors to interrogate the tags;

(iii)   Antenna

(iv)   server on which the software that interfaces with the automated library system is loaded.

It is also possible to distribute the software among the readers and sensors (Sumi and Jatinder, 2007).

(i)   Tags

The heart of the system is the RFID tag, which can be fixed inside a book's back cover or directly onto CDs and videos. This tag is equipped with a programmable chip and an antenna. Each paper-thin tag contains an engraved antenna and a microchip with a capacity of at least 64 bits. There are three types

of tags: "read only", "WORM," and "read/write" . "Tags are "read only" if the identification is encoded at the time of manufacture and not rewritable. "WORM" (Write-Once-Read-Many) tags are programmed by the using organization, but without the ability to rewrite them later. "Read/write tags," which are chosen by most libraries, can have information changed or added. In libraries that use RFID, it is common to have part of the read/write tag secured against rewriting, e.g., the identification number of the item (Varma and Ahmed, 2006).
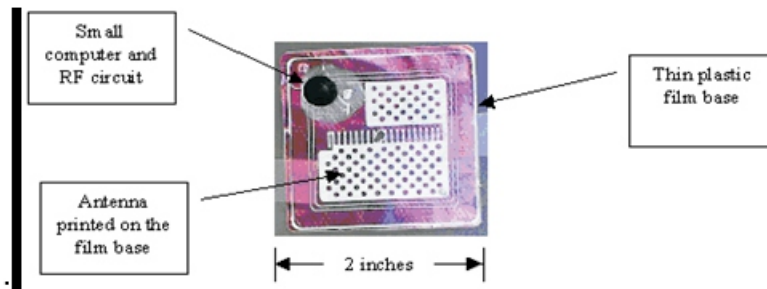
Tags

(ii)   Readers/sensors

RFID readers or receivers are composed of a radio frequency module, a control unit and an antenna to interrogate electronic tags via radio frequency (RF) communication. The reader powers an antenna to generate an RF field. When a tag passes through the field, the information stored on the chip in the tag is interpreted by the reader and sent to the server, which, in turn, communicates with the integrated library system when the RFID system is interfaced with it (Boss 2004). RFID exit gate sensors (readers) at exits are basically of two types. First type reads the information on the tag(s) going by and communicates that information to a server. The server, after checking the circulation database, turns on an alarm if the material is not properly checked out. Another type relies on a "theft" byte in the tag that is turned on or off to show that the item has been charged or not, making it unnecessary to communicate with the circulation database (Varma and Ahmed, 2006).
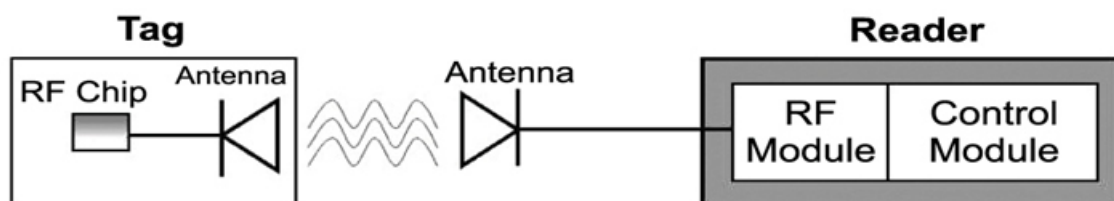
a.   Self check-in/check-out station

The Self check-in/check-outstation means allowing users to borrow books without assistance from the library staff. It is an interactive station/kiosk with touch screen which prompt the user to enter library card. The validity of the library card is checked and user is prompted to place the books on to the deck of the Borrowing Station. The status of each book as checked-out is automatically updated on the Library Management database: The theft detection system of the RFID tag for that book is deactivated to enable smooth passage from the security gate. A receipt may be issued to the user confirming details of borrowed books along with due date (Chaurasia and Chaurasia, 2012).

b.   Exit sensors gate

Exit sensors at exit are of two types; one reads the information on the tag(s) going by and communicates that information to a server. The server, after checking against the circulation database activates an alarm if the material is not properly checked-out. Another type relies on a "theft" byte in the tag that is turned on or off to show that the item has been charged or not. It is then not necessary to communicate with the circulation database. The security system will work even though the online library server is not working. This gates security system composed of the desired number of pedestals i.e. generally 2 to 4. It may also be used to count the incoming/ outgoing people with a facility to record their movement (Chaurasia and Chaurasia, 2012).

Exit Sensors gate

(iii)   Antenna

The antenna produces radio signals to activate the tag and read and write data to it. Antennas are the channels between the tag and the reader, which controls the system's data acquisitions and communication. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. Antennas can be built into a doorframe to receive tag data from person's things passing through the door (Varma and Ahmed, 2006). Antennas are of two types:

a. Long-range reader; and

b. Medium-range reader,

Antenna (right) and reader module (left)

(iv) Server

The server is the heart of some comprehensive RFID systems. It is the communications gateway among the various components. It receives the information from one or more of the readers and exchanges information with the circulation database. Its software includes the APIs (Applications Programming Interface) necessary to interface it with the automated library system. The server typically includes a transaction database so that reports can be produced (Sumi and Jatinder ,2007).

Server

Optional components

Optional RFID system includes the following three components given by A. K. Varma and M Imtiaz Ahmed (2006)

I. RFID Label Printer

II. Handheld Reader

III. External Book Return

RFID label printer

An RFID printer is used to print the labels with an individual barcode, library logo, etc. When the print is applied, it simultaneously programs the data in to the chip. After this process, the RFID label is taken from the printer and applied to the book (Varma and Ahmed, 2006).

Handheld reader/inventory wand

The portable handheld reader or inventory wand can be moved along the items on the shelves without touching them. The data goes to a storage unit, which can be downloaded at a server later on, or it can go to a unit, which will transmit it to the server using wireless technology. The inventory wand will cover three requirements: Screen the complete book collection on the shelves for inventory control Search for books, which are misshelved Search for individual book requested (Varma and Ahmed, 2006).

External book return

Libraries can offer a distinct service that is very useful for users, such as the ability to return books when the library is closed. An external book return is a machine with a slot with a chip RFID reader integrated into the wall. It works the same way as the self checkout station. The user identifies himself/herself (if required by the library), and then puts the book(s) in to the slot. Upon completing the return, the user will receive a receipt showing how many and which books were returned. Since they have already been checked in, they can go directly back onto the shelves. These units can also be used with sorter and conveyor systems (Varma and Ahmed, 2006).

Conclusion

RFID (Radio Frequency Identification) is the latest technology to be used in library theft detection systems. RFID-based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster charge and discharge, inventory and handling of materials. And other words we can say that RFID system may be a comprehensive system that addresses both the security and materials tracking needs of a library. RFID in the library is not a threat if best practices guidelines followed religiously, that it speeds up book borrowing and inventories and frees staff to do more user-service tasks. The technology saves money too and quickly gives a return on investment. And its applications is increasing efficiency, accuracy of library staff, improving the safety, security, productivity, of library and increasing of its applications is

increasing efficiency, accuracy of library staff, improving the safety, security, productivity, of library and increasing user satisfaction.

References

- *Bharat, Kumar. (2012). RFID: An Innovative Technology for Library and Information Centers. New Delhi: Bookwell.*

- *Chandrashekara, K.R. (2006). Application of RFID in libraries for physical. 4th International Convention CALIBER-2006, Gulbarga, 2-4 February, 2006, 501-506.*

- *Chaurasia, N.K. & Chaurasia, P. (2012). Implementation of an Innovative RFID Technology in Central Library, lIT Delhi. New Delhi: Bookwell.*

- *Doraswamy, M., Sreenivasulu, R, & K Usha, Rani. (2006). RFID Technology in Libraries: An Overview. In 4th. International Convention CALIBER-2006, Gulbarga, 519-521.*

- *Erwin, E. (2005). Radio frequency identification in libraries. Aplis, 18(1), 7-21.*

- *Kumar, R. (2008). Role of RFID in Academic Libraries. In 6th International CALIBER-2008, University of Allahabad, Allahabad, February 28-29 & March1, 2008, 120-126.*

- *Nagarathinam, R. & Santhi, J. (2009). Future concept of library and information services. New: Ess Publication.*

- *Nisha, F.S. (2006). RFID system: a boon for librarians. In 4th International Convention CALIBER-2006, Gulbarga, 2-4 February, 549-557.*

- *Sumi, J. & Suman, Kumar. (2007). Application of RFID Technology in Libraries. In 5th International Caliber, 08-10 February. Chandigarh: Panjab University, 459-467.*

- *Varma, A. & Ahmed, M. (2006). RFID Applications in Libraries. In 4th International Convention Caliber, 2-4 February 2006. Gulbarga¸ 739-746.*

- *Yu, S.-C. (2007). RFID implementation and benefits in libraries. The Electronic Library, 54-64*

Review of QoS Parameters in the Mobile Ad-Hoc Network and its Applications

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A B S T R A C T

A Mobile Ad-Hoc Network is a collection of Nodes or Devices may or may not be of same hardware and software configurations which are communication and sharing the information on the network which is independent on the infrastructure and toplogy.as the nodes are communicating on a wireless network. The objective of communication is successful delivery of data packet from source to destination. Since each node in the network can independently behave as a Host and Router so it is very important that data packets should be successfully delivered at the destination. In this reference there are number of Challenges and issues in Mobile Ad-Hoc Network and to achieve the goal discussed above the nodes in the MANET should follow certain parameter collectively called QoS Quality of Service for the Development of Standard Mobile Ad-Hoc Network. This paper discuss the major metrics of QoS and it implementation in the Real Time Applications.

Keywords: MANETs, QoS, Routing Protocols.

I. INTRODUCTION

MANETS are the collections of different or same nodes or devices that creates a wireless network independent of infrastructure and topology being used in communications between the devices.in MANET each mobile node acts a router and host both so there are various difficulties and constraints known in conventional wireless network are frequent to occur in MANET due to topology change behavior, limited bandwidth, interference etc.

In the last decades tremendous research have been done and still running in the area of Mobile Ad-Hoc Network that has automatically opened a gate of research in the field of QoS which guarantees to meet all the parameters needed for a successful communication in the Mobile Ad-Hoc Network however finding the route between source to destination which will fully satisfies all the parameters and QoS requirement is a biggest challenge and often considered to a NP Complete Problem [1].

A Simple Definition of Quality of Service (QoS) is a set of service requirements to be met by a network while Transporting a Data Packet stream from the source to destination.it is an agreement by a network to provide a set of Measureable prespecified service performance constraints for the users in terms of end-to-end delay, delay variance, available bandwidth and probability of Packet loss. Transmitting of a real time traffic over MANETs is a biggest task because it requires a high bandwidth, time delay and latency and this is a requirement of a guaranteed service quality.

II. QUALITY OF SERVICE IN MANETS

The most challenging task in MANET is Routing i.e. finding of a most efficient path from source to destination for the delivery of Data Packets. Since in the last few decades and in the current scenario there is an exponential rise in the field of Mobile Ad-Hoc Network. Currently most of the application especially small devices like Tablets, Mobile Phones etc. that performs various tasks like audio video conferencing and other multimedia activities. So it has become a mandatory requirement for the reliable delivery of data packets. The guarantee of QoS is more challenging in wireless Network than a wired Network because of its dynamic topology, distributed nature, interference, multihop mode of communication, and contention for channel access. Particularly for routing protocols, it is important to provide QoS guarantees in terms of performance metrics, such as achievable throughput, delay, packet loss ratio,and jitter [10].

Although a large number of theoretical solution is available for MANET but the practical implementation and use in the real time application is still a big challenge.

III. CHALLENGES/ISSUES TO THE QOS ROUTING MECHANISM

The Major Challenges in Providing the QoS routing Mechanism for MANETs [2] are discussed below.

1) Mobile Topology

The Topology in MANET is changing continuously due to the constant change in the location of nodes. And this continuous change may lead to the transmission overload, Congested limited bandwidth and loss of the battery life of a nodes. And this type of challenge may severely degrade the network quality. The application of topology management [15] can be a possible solution for the issues raised due to the mobility of topology.

2) Unpredictable Wireless Channel.

Wireless channel may be unreliable due to the interference phenomena by other transmission, thermal noise, multi-path and shadowing all these issues may severely effects the packet delivery ration and longevity guarantees and may effect both of them.

3) Absence of Centralized Control.

The absence of centralized control in Mobile Ad-Hoc Network may lead to several type of issues like load on the Routing Protocols, lack of Integrity of QoS.

4) Insecure Medium

Security is the major challenge in any type of Network Topology. MANETs are susceptible for the attacks like spoofing, eavesdropping, denial of Service, message distortion and impersonation.

5) Channel Contention

When two or more nodes in MANETs communication on a common channel the problem of channel contention arises .this can be resolved by resorting the protocols such as CDMA, TDMA.

6) Unknown Terminal Problem

An unknown terminal problem arises when two nodes not within the transmission range of each other tries to transmit a data packet which simultaneously reach to the third common, due to which collision can occur.

7) Node Mobility

The nodes in the MANETs is frequently moving from one position to other. Due to which Packet delivery ration and link guarantee will be   effected. So topology must be updated.

IV. QUALITY OF SERVICES METRICS

Quality of Services is defined as a set of service requirements that are followed by a network when a stream a data packets is delivered from source to destination [12]. These service requirements are maximum delay, minimum bandwidth, minimum packet delivery ratio and maximum jitter. All these requirements are verified at the time of network establishment and once the connection is established the network has to satisfy that QoS are met during connection duration [13]. Several Routing protocols

has been proposed for the Routing of the Data Packet and enhancement in the proposed protocols are also on pace. Delay is the major QoS metric in the Mobile Ad-Hoc Network, there are different types of delay like End-to-End delay, Packet delay Propagation delay, delay jitter etc. [14].

Delay in MANETs involve different types such as compression and decompression delay, processing delay, propagation delay, media access delay, acknowledgment and retransmission delay, jitter delay, end-to-end delay and routing delay. End-to-end delay is a very significant performance metric in MANETs especially in real-time or multimedia applications. It states that the total time experienced by a single packet travelling in a MANET from source node to destination node. The growth of delay time can be due to congestion and/or collision and also other factors such as the length of the route and interference level along the route path. Throughput is considered to be another important QoS metric in Mobile Ad-Hoc Network.it is defined as the minimum packet delivery rate required by most voice or video applications. Additionally, other constraints affect QoS parameters during the route discovery process.

V. ESTIMATION AND COMPARISON OF DIFFERENT REACTIVE ROUTING PROTOCOLS ON QOS

Protocol Name	Based on	QoS Metrics
Energy and Delay with AODV (EDAODV) [15]	AODV	D, E
Energy and Delay-Constrained on AODV (EDC-AODV) [17]	AODV	D, E
Energy and Delay with DSR (EDDSR) [15]	DSR	D, E
Ad Hoc QoS On-demand Routing (AQOR) [16]	AODV	BW, D
QoS - Ad-hoc On demand Distance Vector (QoS- AODV) [12]	AODV	BW, D
Delay Aware AODV Multi-path (DAAM) [13]	AODV	D, MP
Split Multi-path Routing (SMR) [18]	DSR	D, MP

D = Delay, BW = Bandwidth, E = Energy, MP = Multipath.

Table.1 Summary of reactive routing Protocols based on QoS metrics

Table 1 encapsulates some reactive routing protocols available in the literature. Some of these protocols highlight QoS in terms of Delay and Bandwidth metrics [3], [7] whereas other emphasis on Delay and Energy metrics [6], [8]. The policy of Multipath selection and Delay has been proposed in [4], [9] to improve end-to-end delay and to reduce packet loss.

The efforts to optimize delay have been done at the path discovery stage by accumulating delay calculations to the route table. Delay calculations include among others, time taken during passage of route request and route reply message. The dynamic performance of MANETs in terms of topology change and node mobility results in inaccuracy of the delay estimation at path discovery stage. Delay intended at the route discovery stage is useful as long as MANETS Continues to stable since delay is calculated at discovery time. The very structure of MANETs allows mobile nodes to freely travel in and out of network range. Therefore, the network load is continuously changing and the variable factors of interference and end-to-end delay are also.

VI. CONCLUSION

This Paper explains the basic concept of Mobile Ad-Hoc Network its Working and what are the shortcomings, advantages of Mobile Ad-Hoc Network. It also explains the different requirements which are needed for the efficient communication between the nodes in MANET.

This paper shows what are the challenges and issues in the QoS Routing Mechanism. The summary of this paper is that how to achieve all the parameters which play a major role during the transmission of a data packet from Source node to Destination node. In MANET there are multiple route available from source to destination so the factors responsible for choosing the most efficient route from source node to destination node is reflected in this paper.

VII. REFERENCES

[1]Z. Wang and J. Crowcroft, "Quality-of-service routing for supporting multimedia applications," Selected Areas in Communications, IEEE Journal on, vol. 14, pp. 1228-
1234, 1996.
[2] J. Abdullah, "QoS Routing Solutions for Mobile Ad Hoc Network," Mobile Ad-Hoc Networks: Protocol Design, pp. 417-454, 2011.
[3] E. B.-R. C. E. Perkins, "Quality of Service for Ad hoc On-Demand Distance Vector Routing," INTERNET DRAFT,draft-perkins-manet-aodvqos-00.txt, 14 November 2001.
[4] J. Boshoff and A. Helberg, "Improving QoS for realtime Multimedia traffic in Ad-Hoc networks with delay
Aware multi-path routing," 2008, pp. 1-8.
[5] Z. Ye, S. V. Krishnamurthy, and S. K. Tripathi, "A Routing framework for providing robustness to node Failures in mobile ad hoc networks," Ad Hoc Networks, vol. 2, pp. 87-107, 2004.
[6] R. Asokan and A. Natarajan, "Performance Evaluation of Energy and Delay Aware Quality of Service (QoS) Routing Protocols in Mobile Adhoc Networks," International Journal of Business Data Communications and Networking, vol. 4, pp. 52-63, 2008.

[7] Q. Xue and A. Ganz, "Ad hoc QoS on-demand Routing (AQOR) in mobile ad hoc networks," Journal of parallel and distributed computing, vol. 63, pp. 154- 165, 2003.

8] L. Sánchez-Miquel, N. Vesselinova-Vassileva, F. Barceló, and P. Carbajo-Flores, "Energy and delay constrained routing in mobile ad hoc networks: an initial approach," 2005, pp. 262-263.

[9] S. J. Lee and M. Gerla, "Split multipath routing with maximally disjoint paths in ad hoc networks," 2001, pp. 3201-3205 vol. 10.

[10] Chhagan Lal, Dr. V. Laxmi, Dr. M.S. Gaur, Book Chapter in Building Next Generation Converged Networks: Theory and Practice, "Taxonomy of QOS Aware Routing Protocols for MANETs", CRC Press, pp. 533–560, Publication 2013.

[11] Chen, S., and K. Nahrstedt. "Distributed quality-of-service routing in ad hoc networks." Selected Areas in Communications, IEEE Journal, Aug. 17, 1999, 1488–1505.

[12] Crawley, E., R. Nair, B. Rajagopalan, and H. Sandick. A Framework for QoS-based Routing in the Internet. RFC2386, IETF, 1998.

[13] Reddy, T. B., I. Karthigeyan, B. S. Manoj, and C. S. R. Murthy. "Quality of service provisioning in ad hoc wireless networks: A survey of issues and solutions." Ad Hoc Networks, Jan. 4, 2006, 83–124.

[14] S. M. Zaki, M. Ngadi, S. Razak, "A Review of Delay Aware Routing Protocols in MANETs" ISSR Journals, vol. 1, June2009.

[15] Z. Ismail, R. Hassan, A. Patel, and R. Razal,"A study of routing protocol for topology configuration management in mobile ad hoc network," 2009, pp. 412-417.

Lights Camera 'Niche'

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A B S T R A C T

"It's not what a movie is about; it's how it is about it." -Roger Ebert
As the saying goes, movies aren't everything but how they are talked about is everything. This compilation on movie marketing is the result of reviews from all perspectives. When a movie is marketed well, every aspect of the movie like the location, style, stars, products and services gets marketed. The impact of visual has a lasting influence on people in general. So marketing itself is a skill that has to be creative and effective. Movie marketing needs investment. A fresh wave of path breaking, innovative marketing spurs the popularity of movies. Despite some setbacks, the marketing has not shown any sign of stopping or even slowing down. There are only three things that are popular in India – Movies, Cricket and Politics. Movies in India is a huge market with estimated market size of INR 100 billion. The Indian film industry is expected to grow at 10% CAGR to touch INR 150 billion by 2016. Marketing a movie is an expensive affair and with the growing competition in the industry, movies have to reach the masses in a big way else they are a loss to the investor. The breakthrough in movie marketing strategy has given a tremendous boost to the industry which is discussed in this paper 'Lights Camera Niche'.

INTRODUCTION

Everything that is produced has to be sold at one point. Marketing is the mode that is used by everyone who produces anything. Earlier it was only the products that were being offered for sale, as years passed by services also joined the line. Entertainment in earlier days pertained to means to livelihood. Subsequently entertainment became a business, an industry that fetched good returns. This gave rise to different dimensions. Initially the producers of products and services were approaching people to accept the same and derive satisfaction. Now there has been a total change in the scenario. The customer's perception towards the entertainment industry has transformed, hence has made the producers of goods and services change their marketing strategies.

'Silver Screen' is the prime mode of entertainment. Elements like plot, character though seem important,

other factors like clothes and design, tools, gadgets, products, organizations, made use of in the making of the movie catch the fancy of the movie goers of all ages. This trend has become extremely popular. There are only three things that are popular in India – Movies, Cricket and Politics. Movies in India is a huge market with estimated market size of INR 100 billion. The Indian film industry is expected to grow at 10% CAGR to touch INR 150 billion by 2016. Marketing a movie is an expensive affair. With the growing competition in the industry, movies have to reach the masses in a big way on their opening weekend, often on their opening day, else they are off the theatres, and hence are a loss to the investor.

Lights – The dimensions

The movie making, industry as a whole has been going through a sea change. Ever since the first movie was made, marketing has been a major link in reaching the audience. The network was through drum beat announcements, posters, pamphlets, gramophone records. Eventually radio was being used as a mode to communicate the reviews. With the emergence of television and social networks, communication has become faster, easier but very challenging. Piracy is a major threat to film industry. Hence it is quintessential to market a movie effectively and efficiently. Producers have been dormant in marketing the films to the customers, which often has resulted in the failure of good movies at the box office. With the industry expanding in all horizons, a number of production companies have started taking marketing of their films seriously. Lights are prominent features of movies from the making stage to the projection stage. The dimensions of movie marketing are:

- Trailers

    A large and varied section of people watch a trailer and accept the movie. For example movies like the Dark Knight Rises had thousands of viewers attracted by the trailer that went viral. In another example Sharukh Khan had unveiled the teaser for his sci fic super hero movie Ra One at the 2011 Cricket World cup, 9 months before the release of the film and that proved to be a perfect launch pad.

- Promotion through small screen

    A small screen has a larger coverage, right through the four walls. The team of directors, actors, music composers and technicians all play a vital role in sharing and highlighting the experiences and discuss around the theme. This increases the viewer ship and consequently boosts the movie goers. For example Indian Idol Junior, Kaun Banega Crorepathi reality shows were a platform through which many movies were promoted.

- Print media

  Newspapers and magazines, an ancient mode of media has always been a powerful one in reaching and creating a great impact on the readers. A newspaper is a cheap and convenient mode to reach every nook and corner of the human habitat.

- Online Network

  The internet is proving to be a big prime spot for publicity. Promoters place rich interactive ads on the websites that are highly viewed. They release behind the scenes clips, bloopers that attract both the moviegoers and the non movie goers. Websites that allow downloading ringtones, wall papers and other videos are gimmicks that enthrall the people.

- Social media

  Twitter, Face Book, Orkut, LinkedIn, You tube are some of the many social tools that the promoters use to reach the masses in a flash. Like pages on face book is one fine example of informing customers. Once the viewers step out from the theatre the feedback goes viral and influences ones opinion. Celebrities use twitter to voice their views and have a healthy interaction and this trend is catching up. For example the trailer of the movie Chennai express was launched on twitter and later was unveiled at a press conference.

- Posters and Billboard campaign

  Public places like malls, bus shelters, and railway stations are made use of to reach the common men who do not have access to any of the media modes. These kind of public campaigns are on the rise to reach the masses at lightning speed. Many of the bollywood heroes promote their movies among the general public.

- Radio

  Radio shows are the best way to reach the people on the move, working or resting, in any kind of terrain and remote places. Audio launches of the recent movies have been done through radio shows.

- Word of mouth

  The dividend a business reaps through a satisfied customer is not a match to any marketing strategy. A satisfied customer spontaneously propagates the product or service that he has used for the money he has spent. The impact of such opinions is much more powerful and motivates to follow suit. So marketing should aim at satisfying as many customers as possible. The word of mouth has always been a main factor in determing the success or failure of a movie.

- Games

  Movies like spider man, Superman and other super hero movies which become a hit among the

the kids are adapted in game forms.

- Catch Phrases

    One liners and Catch phrases have started to attract a large number of viewers. They create a sense of attachment and personal rapport with the viewers. There has been an increase in people watching movies just for the one liner and phrases. Some of the best examples are the lines delivered by Amitabh bachan, Ranjnikanth and Sharukh Khan.

- Costumes and Designs

    The viewers are now influenced to a large extent by the costumes, accessories, hairstyles, and other trademark styles used by different actors. For example in movies like cocktail, Deepika Padukone's hairstyle has made a big wave throughout the country. The Rajini style in the movie Shivaji is a classic example of how people get influenced by the stars. These kind of reach among the public boost the ratings of the movie and the collection at the box office.

Developing a Strategic Marketing Plan

A film production house has to develop a carefully constructed marketing campaign to sell the movie. Initially marketing is the process of bringing the film to the public. This is done through television, radio, billboards, advertisements, interviews and social media blasts. Second, marketing forms a base of interest among thousands of people before they see the movie. In this sense, marketing is a way to peek the interest in potential moviegoer. Third, the aim is to have a box office success in the first weekend.

Planning a film marketing campaign

The most important strategic decision a distributor makes is when to start raising awareness, to engage with potential moviegoers, to expand the campaign to reach a bigger audience, and to release a film to optimize its chances at the box-office. Planning a campaign is a two-stage process:

- Raising awareness (by targeting a core audience) and getting fans & industry attention

- Expanding the audience afterwards

Major distributors for worldwide releases, Local distributors for domestic releases and

Producers and international vendors, for high anticipated movies with a different distributor per territory plan for the marketing campaign.

Steps in a Film Marketing Strategic Plan

- Before the shooting – Obviously, this can only be used by an integrated studio, or a producer who is likely to distribute or to sale the movie. The vast majority of movies are not able to launch promotion

that early. For a potential "event-film", it's been a good time to kick off word of mouth during Director announce, Cast announce, Shooting announce and Title unveiling

- During the shooting – expectations can be created through Content (production videos, news…), The videos and photos from the set, planning Set visits (with key journalists, exhibitors or marketing partners), Live-twits from actors, directors, etc…

- After the shooting – Media Strategy – First Trailer & first images, Teaser posters, and sometimes first billboard campaign, Social Media, Industry Promotion.

Camera- Zoom

The most important decision a producer makes is when to raise awareness, enthrall the potential movie goers and expand the campaign to reach a bigger audience and release a film to optimise its chances at the box office. This can be done through either focusing on the aspects mentioned before or the products endorsed in the movie.

Niche – Tapping the Untapped

Some of the challenges of movie marketing are that they turn out to be risky if not channelized properly and the portion of money would be spent unnecessarily on people who would not consider watching the movie. Another pitfall is underestimating the audience, some of the adults would not fall for the marketing gimmicks and avoid falling prey to the hype. A movie business is cyclical and seasonal by nature. With so many high profile movies fighting for the same audience, movie marketers need to figure out how to make their movies stand out from the pack. In the recent days, the general tactic is to "Go Big". Every movie is different and strategies have to be planned to figure out what kind of campaign is effective to reach the target audience. Movies should be marketed to a specific audience segment or various groups based on the demographics. The movie Chennai Express has used this technique to reach a large segment of public across the country. Fortunately movies like English Vinglish go globe-trotting with its own charm. Now it is making a big name in Japan because they relate to the character. A subtitle is the in thing in marketing a movie. According to a study conducted by A.C Nielsen in 2004, the recall rate for cinema is 80% as compared to television. This means that 'Marketing Moves Movies: Movies Move Minds.'

The Case of Chennai Express

Shah Rukh Khan and Rohit Shetty are the champions of marketing, so when they joined hands for 'Chennai Express', it was expected that the film will take the advertising world by storm. The following is a list of ten innovative ways through which the makers have publicized 'Chennai Express'.

- Posters in different languages: As the film was released in many languages – including German, Spanish, Tamil and Telugu, the promoters developed posters for the respective language. It added a sense of belongingness to the posters. The audience will be watching the film in several languages

- Game: The promoters of 'Chennai Express' have launched a game based on the film. It is a move to tap the huge potential of the cyber games user base. The game app is available on both android as well as java based phones. The user will fights roadside goons in order to score points in the game.

- Tie-up with products: Shah Rukh Khan is one of the leading actors when it comes to brand promotion. He has been associated with a long list of products and many of them are featured in the film as well. His earlier film 'Ra.One' also saw Shah Rukh collaborating with popular brands.

- Promotion on TV: Before release Shah Rukh Khan was visible on the small screen in serials and shows with high TRP. He was continuously giving interviews and talking to the participants, which kept peeking the audience about the movie.

- Interactive movie channel: A media house launched its interactive movie channel with 'Chennai Express', a huge feat to achieve for any film. Shah Rukh is known for his undying spirit and grace, which helped the movie channel in becoming a brand.

- A new range of sarees: The star-cast of 'Chennai Express' launched a new line of sarees that have designs similar to Deepika's sarees in the film. If reports are to be believed then the 'Chennai Express' merchandise are in demand in the market.

- Snacks: No matter where are you watching 'Chennai Express', you will get a chance to satiate your taste buds with your desired foods. The cinema halls are serving snacks carrying a local flavor in different metropolitans.

- Lungi dance: This song was composed for the promotional drive of 'Chennai Express' but it has become one of the chief attractions of the film. Yo Yo Honey Singh has come up with a catchy tune and it is fetching benefits for 'Chennai Express' at the box-office.

- The Rajini brand: 'Lungi dance' is a very well planned marketing move. Shah Rukh Khan's film is based in South India where Rajinikanth's name matters a lot. SRK had tried the same trick in 'Ra.One' as well.

- Fashion shows: Shah Rukh was recently spotted at a fashion show walking the ramp, an alien territory for him, but everything is fair in love, war and film promotion.

Conclusion

Due to globalization Indian films now have a global appeal with release happening all around the world. Hence marketers today have a larger audience base to touch upon. To top it all corporate, are now heavily investing in film industry which binds all the fans together throughout the world. Therefore film marketing and promotion is becoming very important and lots of money is spent on it in the present and further a lot more money will be spent on it in the future.

References

- *http://ibnlive.in.com/news/chennai-express-10-innovative-marketing-techniques-used-for-the-film/412778-8-66.html*
- *http://www.business-standard.com/article/management/bits-and-bytes-power-movie-marketing-113071601011_1.html*
- *http://curiosity.discovery.com/question/pitfalls-of-movie-marketing*
- *http://howmoviemarketingworks.com/*
- *http://www.mediaknowall.com/gcse/bbustermovies/movies.php?pageID=market*
- *http://scienceblogs.com/cognitivedaily/2009/10/28/product-placements-in-movies/*
- *http://www.mbaskool.com/business-articles/marketing/7723-evolution-of-film-marketing-in-india.html*
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