



## ICT in Rural Development with Wireless Community Radio Service on Mobile Network

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*Abstract - ICT plays a vital role in the empowerment of economically backward and remote areas. Recently numerous new findings are made in different technical facilities provided to rural people with the help of ICT. The main focus of this paper is wireless facilities for the rural development. Most commonly used wireless facility is Community Radio and Mobile Networks. Basic aim of ICT is to collect information and communicate it to an appropriate destination. To relocate any information different broadcasting ways are used. Community radio uses different broadcasting methods in the form of Manets. Different broadcasting techniques have been studied which help in superior transfer and more steadfast communication.*

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*Keywords - Broadcasting Methods, Mobile Ad Hoc Network, Rural development, Wireless Community Radio.*

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### I. INTRODUCTION

Beyond economic growth, which is a mechanism and not an end for itself, the shift in concern should move towards the social issues which would in the true matter of sense lead to development. A development model will definitely fail if it that ignores the cultural dimension (UNESCO, World Summit for Social Development, Copenhagen, 1995). India got independence on 15 August 1947. India attained success in many fields after independence but still a lot is required in order to reach at the level of being called a developed nation. Statistics show that India's growth rate has increased steadily from 3 % to 9 % but still we are facing major problems like poverty and unemployment. Statistics demonstrate that still a larger part of our population are living in villages (72%) and are backward in every sense of the word. Government is spending a huge amount of money in the name of rural development, but no marked improvements are made till now. Among many reasons, one of the prime reasons for the above problems is the communication gap between government policies and common masses as people mostly remain unaware regarding them. In order to fill this gap, what is essential is a firm guiding principal for statement. Rural community media shall be improved in order to improve rural development, at the most minuscule level. Among the various existing genre of local community, Community Radio will prove successful as it can easily cover a large range of area as well as a wide diversity of audience. In several parts of India experiments with community radio have proved it to be the cheapest and the strongest medium to fulfil the communication gap between the community and the Government. The community radio has in the right sense proved to be a very important tool in enhancing the 'Right to Freedom of Speech and Expression' As, the community radio is still in its embryonic stage and it is quite evident that may be in the near future, we will be able to examine its various new versions which will be more better as well as user friendly. Whatsoever the project is, community radio is one of the best intermediate of communication at the grass-root level [9].

### II. WIRELESS COMMUNITY RADIO

Community Radio is one of the fastest rising mediums of social communication. It is a short range radio station owned, maintained and run by a firm. It functions as a normal FM or an entertainment radio. The Community Radio mainly highlights on enlightening subjects which are quite often publically buoyant. The main use of radio is to give a platform to the unheard voices of communities that go unobserved. There are hundreds of Community Radio's operational in India today [1]. Thousands of community radios are operating today worldwide bringing momentous economic and social development in the service areas. Take for example **Bundelkhand** Radio operating from Taragram, in Bundelkhand. Launched in October 2008 it has up come not only as a source of entertainment for people in close by vicinities, but also a mode of empowerment, a juncture to share experiences and stories. From programs like Khet Khaliyan, Aas Paas, Bal Bandhu, etc. it has succeed in bringing a huge number of optimistic changes around [1].

There are varieties of programs that can be developed and aired on Community Radio addressing various aspects. It provides access to information to villagers and enables educational programs. Also a platform is provided to the community to exploit the talent of this creative media by creating research oriented shows in the field of science and technology, as well as in the field humanities. It helps in the social growth of the area by focusing on social issues. It even creates programs on Health Care and Vocational studies.

### III. MOBILE AD HOC NETWORKS

A MANET has set of self-controlling mobile hosts that communicate with each other at different time without any base cell. Every host node is said to have a carrier sense multiple access with collision avoidance transmitter and receiver. MANET is very common these days because of its different functions like its cost, speed and convenience. It can be setup without any hassle of base unit. Some of the applications of MANET include: military use like battlefield, personal area network among laptops and cell phones, intelligent transportation with vehicle to vehicle communication, Rescue operation in area like flooded etc. Transmitting of message is a multi hop routing process with short transmission range and abrupt mobility. Broadcasting is MOSTLY used for route discovering [7].

The MANET basically is described by energy controlled nodes, bandwidth guarded links and active topology. In real-time applications, such as real-time data, video, and audio, these networks need for Quality of Service in terms of bandwidth, delay, and packet loss is quite significant. Providing QoS in MANET is a difficult function because of self-motivated nature of network topology and rough state theory. That is why it is imperative to have a powerful routing protocol with speedy re-routing function, which provides stable routing for the flows. In general there are basically two different approaches for making wireless mobile units communicate with each other. They are Infrastructure-based and infrastructure-less. [4].

The wireless network for mobiles is commonly known as a mobile ad hoc network (MANET). A MANET has a set of wireless nodes that can energetically form a network to exchange information without using any preexisting fixed network infrastructure.

#### A. MANET Characteristics

The basic difference between fixed networks and MANET: computers in a MANET are not fixed. Due to the mobility of Manet nodes, there are some features that are relevant to MANET. Some of the key features are described below [4]:

- **Dynamic Network Topologies:** In this nodes are free to move randomly, which says that topology is multi-hop and might change without human intervention and randomly at unpredictable times.
- **Bandwidth constrained links:** Here wireless links have notably lower capacity than hardwired counterpart and are less reliable due to the signal propagation.
- **Energy constrained operation:** In this devices in a mobile network may depend on batteries or other exhaustible means. Here, the competent and conservative use of energy may be the most important system design criteria.

### IV. BROADCASTING

Broadcast is the process of sending a message from one node to all other nodes in an Ad Hoc network. It is a elementary operation for communication in ad hoc networks as it allows for the update of network information and route discovery as well as other operations [2]. Broadcast plays an important role in routing, network management and other tasks in mobile ad hoc networks (MANETs).

#### A. Broadcasting methods

- *Simple Flooding Method:*

In this method [3], a source node of a MANET disseminates a message to all its neighbors, each of these neighbors will ensure if they have seen this message earlier, if yes the message will be dropped, and if not the message will resend at once to all their neighbors. The operation goes on until all nodes have the message. Although this method is very consistent for a MANET with low density nodes and high mobility but it is very harmful and unproductive as it causes severe network congestion and quickly exhaust the battery power. Blind flooding confirms the coverage; the broadcast packet is guaranteed to be received by every node in the network, provided there is no packet loss caused by collision in the MAC layer and there is no high-speed movement of nodes during the broadcasting. However, because of the broadcasting nature of wireless communication media, additional transmissions in blind flooding causes the broadcast storm problem [5], in which redundant packets cause contention and collision.

- *Probability based Approach*

1) Probabilistic based Flooding: The Probabilistic scheme [3, 5] is like to Flooding, except that nodes only rebroadcast with a determined probability. In dense networks multiple nodes share analogous transmission coverage. Thus, haphazardly having some nodes not rebroadcast saves node and network resources without harming delivery value. There is very less shared coverage in bare networks; so nodes won't receive all the broadcast packets with the Probabilistic scheme unless the probability parameter is high. When the probability is 100%, this scheme is identical to Flooding.

2) Counter-Based Scheme: [8] show an inverse relationship between the number of times a packet is received at a node and the possibility of that node being able to reach additional area on a rebroadcast. This result is the base of their Counter-Based scheme. The node initiate a counter with a value of one and sets a Random Access Delay (RAD) which is randomly chosen between 0 and T max seconds when a previously unseen packet is received. During the RAD, the counter is incremented by one for each redundant packet acknowledged. If the count is less than the threshold value when the RAD ends, the packet is rebroadcast otherwise it is dropped.

- *Area Based Methods*

Consider a node receives a packet from a sender that is located only a meter away. If the receiving node rebroadcasts, the added area covered by the retransmission is quite low. On the other intense, if a node is located at the boundary of the sender node's transmission distance, then a rebroadcast may reach significant additional area precisely 61% [8]. A node using an Area Based Method can calculate additional coverage area based on all received redundant transmissions. We

noted that the area based methods consider the coverage area of a transmission; they don't consider whether nodes exist within that area.

- **Distance-Based Scheme:** A node using the Distance-Based Scheme compares the distance between itself and each neighbor node that has previously rebroadcasted a given packet. A RAD is introduced and redundant packets are stored upon reception of an earlier hidden packet. And when the RAD expires, all source node locations are examined to see if any node is closer than a threshold distance value. If true, the node is not rebroadcast.
- **Location-Based Scheme:** The Location-Based scheme uses a more definite estimation of expected additional coverage area for rebroadcasting decision. In this method, each node must have the resource to determine its own location, e.g., a Global Positioning System (GPS). A packet it adds its own location to the header of the packet whenever a node is originated or rebroadcasted. Principally when a node receives a packet, it checks the location of the sender and calculates the added coverage area obtainable where it has to resend. Then the added area is less than a threshold value, the node doesn't rebroadcast, and future receptions of the same packet would be ignored. Otherwise, the node assigns a RAD before delivery. If the node receives an extra packet for the duration of the RAD, it recalculates the added coverage area and compares that value to the limit required for the start. The area calculation and threshold comparison occur with all superfluous broadcasts received in anticipation of the packet reaches either it is scheduled send time or it is dropped.

- *Neighbor Knowledge Method*

**Self Pruning:** Self Pruning is an effectual method in reducing broadcast severance. Every node in this method is required to have information of its neighbor and this information can be achieved by periodic "Hello" messages information. The receiving unit would foremost compare its neighbour lists to that of sender's list, the receiving node now would rebroadcast, or the receiving unit will drop the received data.

## V. CONCLUSION

This paper presents an overview of the wireless community radio and MANET. Also we have done the detailed review of broadcasting methods of MANET & its applications. It concluded that ICT brings empowering approach for the transmission of data in MANET applied in community radio with different broadcasting techniques. Active broadcasting doesn't capitulate good performance for other scenario. Different relative studies show that most of the methods need more rebroadcasts with respect to the number of the retransmitting nodes, facing trouble in a high density mobile MANET. MANET is an essential building block of any community radio, therefore broadcasting method should be competent enough to ensure a reliable network. Different relative studies show that most of the methods need more rebroadcasts with respect to the number of the retransmitting nodes, which faces problem in a high density mobile MANET.

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