

Facilitating Media Distribution with Monetary Incentives

Author Keywords

Mobile media sharing; ICTD; mobile internet; Bluetooth; citizen journalism; CGNet Swara; social networking; mobile payments; HCI4D; awareness campaigns; sneakernet

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Abstract

Community media forums such as CGNet Swara and Mobile Vaani leverage interactive voice response (IVR) technology to enable feature phone owners in underprivileged regions of the world to call a toll-free phone number and listen to and report local stories. This excludes potential users living in areas without any mobile network. In this paper, we describe the deployment of an app that both facilitates a new means of media dissemination using a novel incentive scheme, and enables content collection, from no-network areas. In partnership with CGNet Swara, we deployed our app in the rural Indian states of Chhattisgarh and Telangana. In one month, 20,955 stories were transferred through Bluetooth to 2,443 unique phones, for which a total of \$930 in mobile airtime credits was disbursed to 307 of the 680 users that installed the app. In an 81-day period, 537 local stories were reported using the app from 117 unique users. We present a quantitative and qualitative analysis of user behavior.

CSS Concepts

• Human-centered computing → Human computer interaction (HCI); Human-centered computing → Empirical studies in HCI; Human-centered computing → Social content sharing

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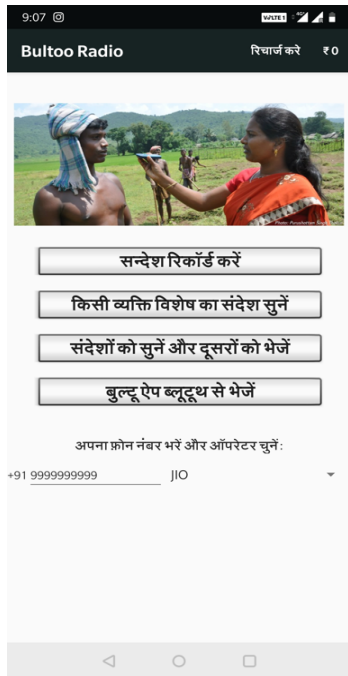


Figure 1: The first option allows users to record stories. The second option allows users to hear a particular user's stories by entering their phone number. The third option lists stories users can share to earn money. The fourth option lets users share the app with others through Bluetooth. The top right indicates the money they have earned

Introduction

Interactive voice response (IVR) forums, which require only a simple phone call in order to participate, have been proposed as a means of reaching out to communities without Internet or Internet-enabled devices [6,7,9]. Despite the success of IVR telephone lines in reaching underprivileged members of society, there remain several critical barriers to scaling up impact. In particular, relying on telephone calls to collect and distribute information has proven costly, excludes users without reliable cellular connectivity, and restricts content to audio content, as opposed to richer formats such as video. At a workshop with CGNet Swara, an NGO operating an IVR forum in India, we found that only 6 out of 9 participants were within cell range most of the time, indicating that some users were not even able to access the organizations IVR platform from their home [10].

In this paper we seek to address these bottlenecks by building an alternative media platform for users having intermittent Internet access. Our key design principle is that we should seek to piggyback and amplify an already-existing practice in these areas: instead of accessing a central server, people are disseminating mobile media content through networks of friends, via peer-to-peer Bluetooth sharing. This makes it possible for high-bandwidth Internet content to propagate to as-of-yet "disconnected" populations, without incurring any financial cost to users. Prior research has found a thriving Bluetooth sharing ecosystem to obtain content, with users surmounting a number of usability and technical challenges to obtain entertainment content [11]. However, up until now, this content dissemination network has been ad-hoc and difficult to coordinate. We hope to strengthen this emergent communications

network with novel mechanisms for content discovery, novel incentives for producing and delivering content, and novel ways of tracking content through a mobile application we created. We tested the design in a pilot conducted in the Indian state of Chhattisgarh in a region where a violent insurgency has been ongoing for 4 decades; and the Southern state of Telangana, where many of the affected tribals have been displaced to interior forests without signal. We believe our design has the potential to collect and disseminate content from as-of-yet "media dark" zones of rural India, which lack almost any access to communications.

Related Work

Our contributions most directly build on a 2014 paper by D'Silva et al, which described the deployment of a mobile application wherein users could record messages and download messages that others have recorded [2]. As users may be in areas without mobile signal, recordings are queued and sent whenever a stable connection is made. Once downloaded, stories could be shared offline through Bluetooth.

We add to this prior work in primarily two ways: firstly, we analyze the type of content recorded by users and published on the platform. Secondly, we experimented with distributing a mobile top-up incentive of Rs. 5 or roughly \$0.07 to users for every story they shared through Bluetooth. Prior surveys have found that this demographic make less than \$150 per month [10]. We derive the idea of using mobile top-up incentives to enable the spread of public service messaging from a 2019 paper by Swaminathan et al [12]. In that paper, after calling an interactive voice response forum, users listened to a brief audio tutorial on rural property rights, after which they were administered a multiple-

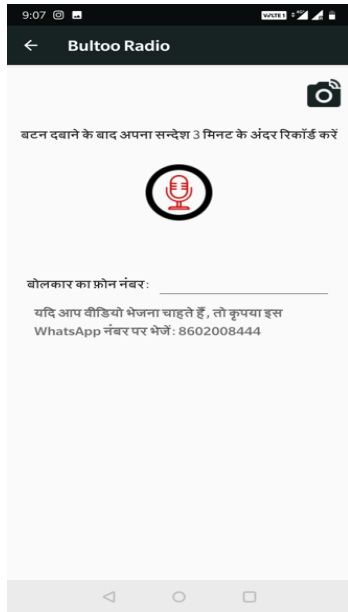


Figure 2: Upon clicking the first option, the user needs to press the microphone to begin recording. Photos can be attached by clicking the camera icon in the top right.

choice quiz to check their understanding. Upon successful completion of the quiz, users earned Rs. 10 or roughly \$0.15 and could earn another bonus for every successful referral. From an initial seed group of just 17 users, the system spread via word of mouth to over 15,000 people. A similar platform without the referral bonus was used by Mothilal et al [3] to raise awareness about voting prior to the 2019 General Elections in India, and to also survey people on whether they had a voter ID card required to cast a vote. In 24 days, 1245 people answered all questions correctly, out of which 175 said they did not have a voter ID.

O'Neill et al. discuss the need to find ways of media sharing to propagate public service messaging [8]. We work toward addressing that need by combining the offline Bluetooth sharing functionality developed by D'Silva et al. with the mobile top-up incentive used in Swaminathan et al. To the best of our knowledge, this combination of providing mobile top-up incentive for sharing public service messages through Bluetooth, thereby enabling content to go viral on an offline network, is the first of its kind and carries important lessons in the development of sneakernet systems around the world.

Design and Deployment

Figure 1 depicts the wireframe of the application that we deployed to users. Figure 2 depicts the first option, which allows users to record a message and add a photo if they so desire. After recording, users can choose between canceling the recording, sending it to moderators, or listening to the message they have just recorded. In case the user did not have internet access while making the recording, the audio files and photo are queued and sent to moderators whenever a stable

connection is made (with the same workflow used by CGNet in the IVR system). As described in D'Silva et al, recordings through a smartphone using mobile Internet instead of a voice call greatly reduces costs [2].

The second option allows users to enter their own or another users number, wherein they get all the stories published by that user. These can also be downloaded and shared via Bluetooth, Whatsapp, Facebook Messenger and other platforms, although no incentive is provided for sharing these stories.

The third option lists the Bultoo Radio programs that can be shared via Bluetooth to earn mobile top-up (figure 3). The name 'Bultoo' derives from the way that villagers in these regions pronounce the English word 'Bluetooth' [1]. These radio programs, usually 15 minutes in length, are a compilation of the best stories recorded by users on the IVR service and through the app. Some of the components include appeals for help by villagers for longstanding community problems (such as handpumps that have stopped working), cultural items pertaining to their community, awareness of government schemes and stories of significant change brought about by the platform. Programs were made in Hindi and Gondi, a tribal language. Unlike previous experiments using mobile top-up incentive [3,12], the incentive was stored in a wallet and could be encashed at the amount users choose, which is importance since recharging at a particular amount gives internet while another amount gives calltime.

The fourth option allows users to share the application itself via Bluetooth. This feature can be an important tool to facilitate the spread of the application within a geographical area. During the deployment period, we

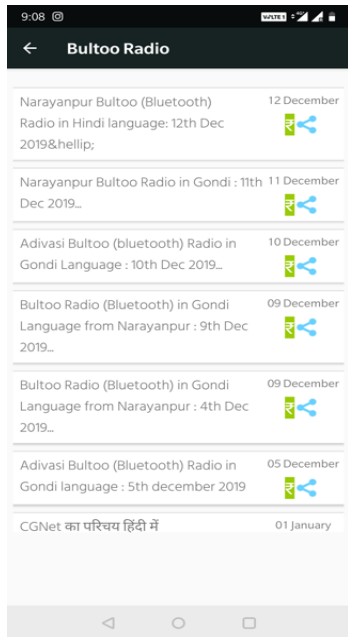


Figure 3: Clicking on the 3rd option in the home screen presents the users with a list of stories that can be shared through Bluetooth to earn mobile credits.

also shared the application through WhatsApp to some superusers to seed initial uptake.

After we finalized the design, our principal ‘seeder’ traveled to 2 regions to deploy the application. The first was the southern states of Andhra Pradesh and Telangana in those areas where villagers displaced by a violent insurgency in the neighboring state of Chhattisgarh had relocated. Many of these locations were located deep in the forests and did not have mobile signal or modern facilities. The second location was Narayanpur in the state of Chhattisgarh, which suffers from four decades of violence. Prior research has found that when infrastructure is damaged during a natural calamity or war, people can use Information and Communication Technologies (ICT) to build new human infrastructure [5]. We aimed to create a network of local users that reports and shares stories from these conflict affected areas. After five days of seeding, we delegated the work of spreading the application to local training teams.

Results

We provided the mobile top-up incentive from October 4th to November 9th. During this period, a total of 20,955 transfers to 2,443 phones were made via Bluetooth. 680 users installed the application, of which 307 active users earned \$930 in mobile top-ups. 34 superusers earned a total of \$465, indicating that with the right incentive, a strong human infrastructure can be built in a relatively short amount of time.

Recharge Value (in USD) vs. Date

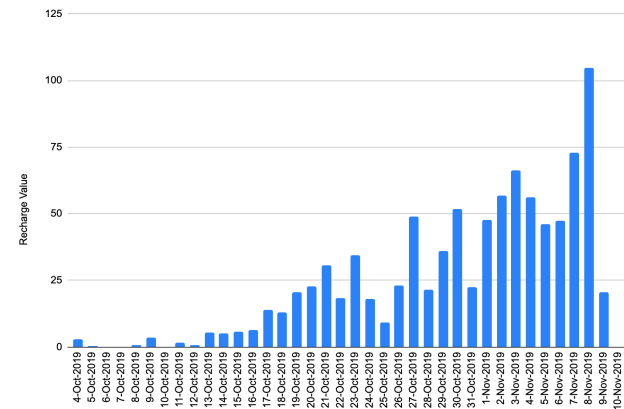


Figure 4: Mobile top-up encashed by users over time.

Consistent with findings in Swaminathan et. al, a sharp drop in usage was recorded after the mobile top-up incentive was discontinued on the eve of November 9th, as seen in figure 5.

From October 4th-December 24th, a total of 528 stories were reported through the app by 117 unique users. Of these, 156 were fact-checked and published on the website, broadcast on social media and also distributed back to the community through the app and the interactive voice response phone number. The reported stories range from cultural folk songs to longstanding community problems such as not having a road to their village. The stories are broken down by type in Figure 6 and 7 and in the tables alongside. A similar analysis for the IVR platform was undertaken in Mudliar et al [7]. Marathe et al. documented how community issues

Category	Number
App installations	680
Bluetooth transfers	20,955
Unique devices receiving files	2,443
Mobile top-up encashed	\$930

Story type	Number
Problems	57 (37%)
Songs	74 (47%)
Local culture	15 (10%)
Impact Stories	2 (1%)
Schemes	8 (5%)

Problem type	Number
Land/Housing	4 (6%)
Road	12 (19%)
Water/Handpump	6 (10%)
Toilet	8 (13%)
Ration Card	5 (8%)
Pension	11 (18%)
Non-payment of Gov wage	9 (15%)
Education	4 (6%)
Miscellaneous	5 (5%)

Total, Apk and File

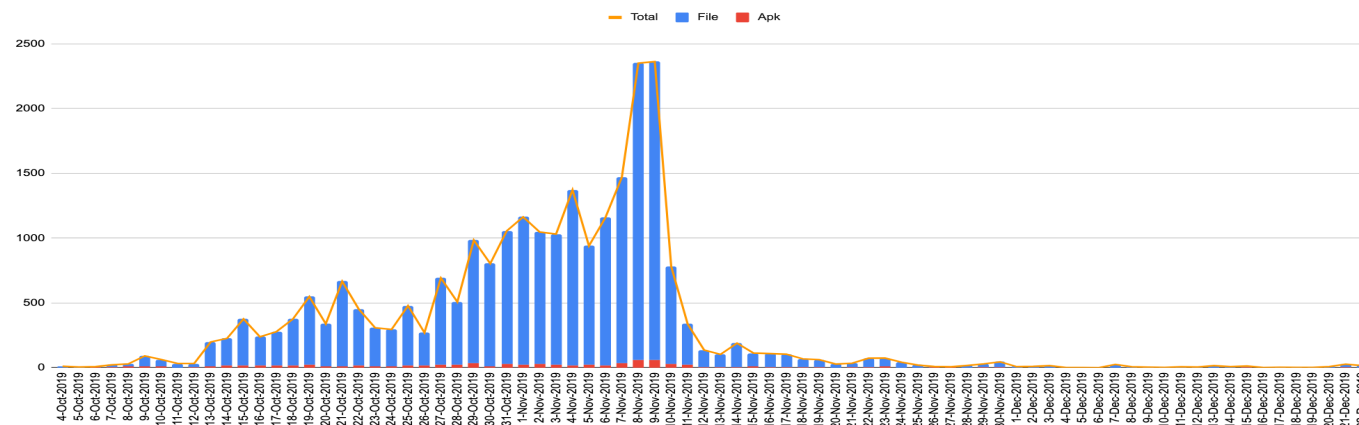


Figure 5: In blue is the number of file transfers through Bluetooth, while red is the number of app installations. A sharp drop is seen after discontinuing mobile top-up incentives

could be solved through an IVR-based media platform. [4]. The preliminary results show that such impact in rural areas can also be achieved through a smartphone application, in a cheaper manner. Here is an example story that we collected through our app and published on CGNet Swara on the 11th of December:

"The problem has been overcome, we got new hand pump facility after recording message on CGNet", reports Santeshwari from Gram-Hatka Charama, Panchayat-Srigohan, Block-Narharpur, District-Kanker (Chhattisgarh). There was a population of about 1100 in his village and there was a lot of issues due to a lack of hand pumps. He had applied many times in the Gram Sabha, but there was no official attention. After reporting the story on CGNet, the government officers sprung to action and a handpump was constructed.

"That's why, people are listening and expressing gratitude to the colleagues and officials for listening to the CGNET voice" says Santeshwari

Although only 2 impact stories were reported using the application, 57 problems were recorded, indicating scope to create much more impact. Ganga Achala is one user who made an appeal for help using the app.

"There is no electricity and water facilities in Anganwadi (a rural healthcare and nutrition system), please help" reports Ganga Achala from Gram-Sitpal, Panchayat-Kukrachhor, District-Narayanpur (Chhattisgarh). There is a water problem during the summer days, so they are appealing to the listeners of CGNET to help solve the problem by talking to concerned officers.

Acknowledgements

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Discussion

In this paper, we present preliminary results from a new media platform that we designed to facilitate distribution of stories through Bluetooth. Our application saw strong usage of 20,955 transfers through Bluetooth to 2,443 unique phones, although sharing came to a standstill once the incentive of Rs. 5 (or \$0.07) per transfer was withdrawn. Future research will focus on not only reducing the amount given as incentive, to study how that affects sharing behavior, but also ideate on how sharing can continue even without a monetary incentive. We are considering varying incentives by location of the user and replacing monetary incentives with non-monetary incentives like recognition and ranking for superusers.

While a total of 680 users installed the app, less than half (307) availed the facility of earning money for Bluetooth sharing. The bulk of the incentive was taken by 34 'superusers', who account for approximately half the amount disbursed. We need to study why the majority of users did not take the benefit of mobile airtime credits for sharing our stories through Bluetooth, and whether the superusers were clustered together, or were located in different regions. Ideally, we would want only one superuser to cover a particular area, so that there is no double sharing of messages to the same people simply to get the incentive benefit. Future pilots could involve pre-selection or approval of users that can avail the airtime credits, to ensure only one person from an area is sharing messages to others.

Unlike IVR, Bluetooth allows the spread of information in areas without any connectivity. However, there are technical barriers in skills and access to technology that do not exist for IVR. For one, only smartphone users

can install the app and earn money for sharing stories via Bluetooth. While feature phone users can receive and share stories through Bluetooth, there is no monetary incentive. This discrimination between smartphone and feature phone users does not exist for IVR platform. For another, using the app requires some level of digital proficiency and functional literacy, as options are presented in written text.

Notwithstanding the above limitations, the app is uniquely positioned to allow users to report stories from areas without mobile signal. Recordings are sent to the newsroom whenever a stable network connection is established. During our 81 day study, 528 stories were sent through the app, of which 156 stories were approved by moderators for dissemination through the app and the IVR platform. The moderators, who are from the community, play an important role in evaluating content and detecting abusive behavior.

Going forward, we plan to address several limitations in our platform. After the mobile top-up incentive was discontinued, there was a sharp drop in sharing as seen in figure 5. Moreover, the incentive was given only for sharing a story, yet there is no way of ascertaining whether a user actually listened to it. Finally, although the main advantage of Bluetooth is that it works on feature phones and in areas without any signal, the incentive was given even to users who shared stories in areas with mobile signal. In the future we hope to address these limitations; and explore the effects of lower (more sustainable) incentive amounts, ideally creating a cost structure per story transfer that is lower than the cost of CGNet Swara's toll-free phone lines.

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