Location, Location, Location: A Study of Bluejacking Practices

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Abstract

We present an initial exploration of bluejacking, the practice of using Bluetooth-enabled mobile phones to send unsolicited messages to other Bluetooth-enabled mobile phones within a transmission range of 10 meters. A content analysis was conducted on 427 bluejacks from Bluejackq, an online community of bluejackers, in which the contextual characteristics of bluejacking were examined. Bluejacking was found to be highly location-dependent, primarily transpiring in everyday public places. The message content of the bluejacks was also inspired by the physical location where bluejacking took place. We also discuss implications of bluejacking with regards to its relationship to public space and comment on how these findings are relevant to mobile social computing.

Keywords

Bluejacking, mobile phones, Bluetooth, public space, territoriality

ACM Classification Keywords

H5.3 [Information Interfaces and Presentation]: Group and Organizational Interfaces

Introduction

Mobile phones have been adopted as an everyday technology, and they are ubiquitous in social situations as users carry them around as they move through different physical locations throughout the day. As a
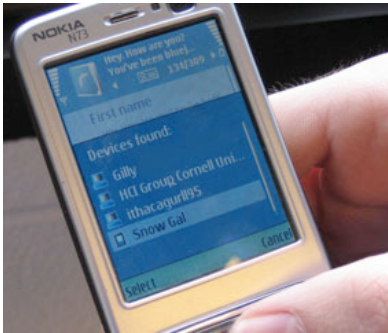
The bluejacker completes a scan to find nearby Bluetooth-enabled devices.
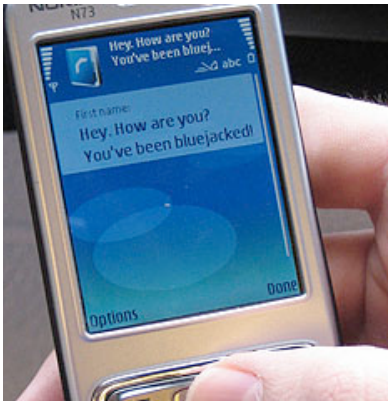
The bluejacker enters a message to be sent to the intended recipient via the mobile phone's contact functionality.

communicative device, the mobile phone has been gradually taken up in ways that move beyond merely providing a channel for mediated conversation. One such appropriation is bluejacking, the practice of sending short, unsolicited messages via vCard functionality to other Bluetooth-enabled phones. To choose the recipients of bluejacks, senders complete a scan using their mobile phones to search for the available Bluetooth-enabled devices in the immediate area. A bluejacker picks one of the available devices, composes a message within a body of the phone's contact interface, sends the message to the recipient, and remains in the vicinity to observe any reactions expressed by the recipient.

The messages tend to be anonymous since the recipient has no idea who has sent the bluejack, and the recipient has no information about the bluejacker, except for the name and model of the bluejacker's mobile phone. Because of Bluetooth's short-range networking capabilities, bluejacking can only occur between actors who are within 10 meters of each other, which makes this activity highly location-dependent. Contrary to what the name suggests, the bluejack recipient's phone is not hijacked; that is, the phone is at no time under the control of the bluejacker.

We conceptualize bluejacking as a violation of possessional territory. Inspired by Goffman [5], we propose that the mobile phone is a possessional territory as a result of the intimacy and continued contact between mobile phone users and their phones. A possessional territory, in our usage, is an object that engenders attachment and defense by those who perceive possession [1] and can be referred to as a "personal effect." Possessional territories function "egocentrically"; that is, they move around with their owners who maintain and exert regulatory control, such as the definition of settings [5]. Since we characterize the mobile phone as a possessional territory, we adapt the category of violation, defined as a temporary incursion where gaining control is not necessarily the goal as a likely and appropriate category of infringement in this context [7].

We also propose that bluejackers are attempting to personalize their experience of public space by engaging in the violation of others' possessional territories through the act of illicit and anonymous messaging. Visitors to public spaces can engage in habitual behaviors at a specific location, such as picking a favorite parking spot that one can return to on each successive visit, to gain a sense of familiarity to locations that are frequently re-visited. These physical environments then hold enough significance to inspire defense among those who inhabit them [1] and defensive behaviors, which can range from defining a personal space within a conversation [6] or while using a tabletop work-surface [10]. Typically, an inhabitant of a public place tends to personalize a location if he or she feels that the social conventions of a space allow one the license to mark a territory [4].

Bluejackers, however, ignore the conflict between the control exerted by the bluejacker and the lack of defensive measures that can be taken by the recipient when his or her possessional territory is violated. To gain a further understanding of why bluejackers would engage in a practice that disrupts the social conventions of public space, we ask the following research questions:

- What are the characteristics of the public spaces in which bluejacking occurs?

- What are the alternative social conventions that might arise from the practice of bluejacking?

- What implications does this appropriation have for the design of mobile social systems?

In the following sections, we present the initial results of a content analysis of an online community of bluejackers that addresses these questions.

Methods

We conducted a content analysis of posts from an online Bluejacker community called Bluejackq [3]. We chose Bluejackq because it is the largest such community at present with 1700 registered members, mostly drawn from Western Europe. In order to investigate the motivations and practices of active bluejackers, we focused on the message topic entitled "Post Your Short Story Here." In this forum, bluejackers relate to the community their stories of their bluejacking exploits; in other words, the "short story of your day to day bluejacking life [3]."

The present study is based on a sample of 243 posts collected from 3/22/04 to 2/26/05, with 427 bluejacks tallied within those posts. Each described bluejack was treated as the unit of analysis. Of the posts collected, all were in English, although sometimes of varying fluency, and we excluded posts that were not related to an account of a bluejacking experience. Following procedures outlined by Bauer [2], two raters used 10 randomly selected posts to develop categories for systematic analysis. We coded for location, message

content, whether the bluejacker was alone or with one or more companions, and recipient gender. To check for inter-rater reliability in the categories of location and message content type, the two raters coded a sub-sample of 20 bluejacks.[1]

Results

Location, Location, Location
We first wanted to determine the types of places where bluejacks took place. The data indicate that bluejacking is an activity that primarily occurs in public spaces, outside of the home. Bluejacks frequently occurred in public transportation locales (23.4%), stores and shopping malls (32.1%) and restaurants (9.8%), bars (11.2%) and cafes (7.3%) but almost never at home (0.7%). This suggests that bluejackers are targeting strangers, presumably taking advantage of anonymity, opportunities for interaction and available Bluetooth-enabled devices afforded by densely populated public spaces.

The lower frequency of bluejacks at school (2.8%) or work (0.9%) as compared to the higher frequency categories of public transportation and shops may imply that bluejackers consider situational appropriateness. It may be okay to bluejack someone while they are running errands or shopping but it seems unacceptable to bluejack while someone may be completing a task of higher importance at school or work. In addition, the lower percentage of bluejacks that took place at movie theaters (4.4%), parks (1.9%), and sporting events (0.9%) suggests that

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[1] Bluejack location, Cohen's kappa = 0.78, p<0.01, Message content type, Cohen's kappa = 0.78, p<0.01

I got on the train like I do every night at about 22:00 to go home from work, and as we start travelling off I get bored again and considering last time I bluejacked on a train I got a lift home... so got my phone again... and shoved in "Nice train isnt it (Smile.)

Fig. 1. Example of location-related message, which was the most frequent type.

I then went for the notes via bluetooth and sent out to 2 t610's "free hamburger with this message" one of them went up and asked for their free burger and got it!

Fig. 2. Example of a fake free offer message.

I finally sent 'Have a nice evening' Heard the tone again. When I went to visit the mens room, I spotted a guy with a 6310i looking at his phone. He glanced at me as I passed but I poker-faced it. He was none too small.

Fig. 3. Example of a social interaction-type message.

bluejackers are less likely to engage in this practice when occupied by other activities, such as watching a movie or taking in a game. It is also important to note that location was almost always mentioned in posts (95.6%). In retelling the story of the bluejack, the description of the location was vital in setting the scene, underscoring the importance of place in the practice of bluejacking.

Again, the concept of location figured prominently in the content of bluejack messages. Of all of the message types that were identified, the largest portion (39.3%) were location related, meaning that the location in which the bluejack occurred was referenced in some way (Figure 1). In pubs, shops and restaurants, there were a small percentage (3.7%) of bluejacks that used fake "free offer" type content that was customized to the services offered at each location (Figure 2). For both these types of messages, not only did the bluejacker use the common context of the shared place for inspiration in terms of the content used in the bluejack, this type of reference to the location acts as a deliberate signal to the recipient that the sender is in close physical proximity.

Social practices of bluejacking
Other forms of message content included social interaction (19.4%) types of statements (Figure 3). This suggests that while bluejackers engage in this illicit messaging, they use social pleasantries to follow the conventions of acceptable small talk occasionally made by strangers in public places. Bluejackers often wanted to "spread the word" about bluejacking; 16.6% of the messages referred to the practice of bluejacking (Figure 4). They characterized this bluejacking-referential message type as a way to familiarize recipients about

bluejacking in the hopes that those who received a bluejack would visit the Bluejackq website and eventually be inclined to try bluejacking in the future.

The evangelical tone adopted by bluejackers suggests that they perceive this practice positively. We were interested in whether bluejackers engaged in harmful behavior through malicious message content, despite their framing of bluejacking as merely for fun. While bluejackers do not deny that there are prank-like aspects to their activities, there does seem to be a regulatory spirit among the posters on Bluejackq. As part of the "Guides and Facts" section of the site, the board moderators have posted a code of ethics, which include provisions that discourage the sending of executable files, libelous or pornographic pictures, and excessive messages. This explicit set of rules may explain the relative lack (2.7%) of malicious message content sent, which we defined as those banned by the Bluejackq code of ethics. It may, however, also be the case that those who do send malicious messages do not report them on Bluejackq for fear of censure by the community of posters.

We conceptualized bluejacking as the bluejacker's attempt to leave his or her mark on the recipient's mobile phone through violation of possessional territory, which leads us to wonder if the bluejackers would want to leave an identifiable imprint, similar to the tag of a graffiti artist. Only a small percentage of bluejackers (4.7%) sent multimedia files, such as a signature cameraphone image or a theme song, suggesting that for most bluejackers, simply sending a largely anonymous text-only bluejack was sufficient to mark the recipient's mobile phone. This lack of richer multimedia messages, when combined with the

Sent 'You have been Bluejacked' and off went the tone. It was a guy standing 2 places up the bar from me so I was covered while I ordered drinks. I sent 'goto www.bluejackq.com' and he was asking his wife(?) what it was.

Fig. 4. Example of a bluejacking-referential message

relatively large percentage of posts (23.4%) that did not indicate message content type, implies that bluejackers place less value on a carefully crafted message. The act itself and the description of the location in which the bluejack took place are the noteworthy portions of the practice when bluejackers share their stories of bluejacking.

Discussion

Through the results of the content analysis, we initially confirm that bluejacking is a highly location-dependent practice, and the location where the bluejack takes place is at the forefront when the bluejack occurs as well as in the recounting of the act on the message board. During the bluejack, the message content tends to be reflective of the location and inspired by the physical surroundings. When the bluejacker recounts the incident at Bluejackq, the location is almost always described in the posts. This after-the-fact recall implies that bluejackers ascribe enough significance to these everyday places that they must be mentioned in order to adequately describe the context of the bluejack.

Not all locations are suitable for bluejacking. Bluejackers judge the appropriateness of the location by taking note of the social conventions that are associated with each place, where those public spaces in which routine activities take place are more likely to be sites to engage in bluejacking. For example, bluejackers are more likely to appropriate the features of the possessional territory of their mobile phones at bus stops, shops and shopping malls because they perceive the tasks of shopping or waiting around as interruptible and perhaps these tasks bore them. Since bluejackers may consider the activities that occur within this space to be mundane, we speculate that

bluejackers feel that they have the license to actively mark their presence in these public spaces through the violation of possessional territory. In contrast, pubs, cafes and restaurants more easily afford conventional forms of reciprocal social interaction, and bluejackers are themselves occupied and entertained or feel less comfortable in violating possessional territory when the possible recipients are also ensconced within a group of friends.

Because of the emergence of bluejacking as a particular type of user-generated appropriation that arose from specific spatial contexts, designers of location-based mobile social software should think of the possibilities that exist as users interact with supermarkets or subway stations, places that make up the everyday routines of life. For the transient public places that are a stop on the way to a destination or locations where quick errands are completed, collocated social interactions will necessarily happen in a limited amount of time, and users will probably choose what is close at hand and easily appropriated -- the accessible possessional territory of the mobile phone -- for fleeting communication between the inhabitants of the space. The relative swiftness of the visitors' experiences with these transient everyday spaces should encourage the design of mobile social interfaces that are lightweight enough to be experienced in a short amount of time.

The density, tempo and turnover of visitor traffic in a shopping mall or train station provide bluejackers with the opportunity to quickly engage with the fellow occupants in the space without fear of discovery. Perceived anonymity may allow for mobile social interactions that may be more intrusive in nature and embolden users to initiate contact with Familiar

Strangers [9, 10], in violation of the tacit mutual agreement that one does not interact with those you encounter regularly in public spaces but do not know personally.

In order to create a mutually beneficial experience among the collocated inhabitants of a public space, message senders and receivers should be able to respond to one another in a reciprocal manner while remaining equally aware of the consequences of interactions within the mobile social system. We would like to examine in a future study whether the assertion of dominance plays a role in bluejacking since the recipient has no idea who has sent the bluejack and may only be able to respond by physically leaving the location or disabling the Bluetooth capabilities on the mobile phone.

Finally, we were unable to examine the recipients of bluejacks because they were often not described in the Bluejackq posts. Our next step will be to interview bluejackers and bluejack recipients to gather additional empirical data on how this appropriation influences the various experiences of these public spaces.

Acknowledgements

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