Gestural Interfaces Touchscreen: Thinking Interactions beyond the Button from Interaction Design for Gmail Android App

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Abstract. The design of interfaces for mobile devices (smartphones, tablets) is still very tied to the WIMP paradigm (abbreviation for "windows, icons, menus and pointers"). Thus, the potential use of gestures (touch screen) is often not used efficiently. Therefore, designing an interface that aims to optimize the user experience from a more natural and human gestural interface becomes a challenge for interaction designers. Moreover, gestural interactions requires a learning curve ahead to commands and interactions of an application. The hypothesis of this research is to argue that applications often used by users can take a more gestural and natural character in their interactions, thus generating a new projetual paradigm (with less use of buttons and menus), established from designing an application for Gmail (Android).

Keywords: gestures, natural user interfaces, user experience, touchscreen.

1 Introduction

In the mid 80s, with the rise of electronic charting components, there was the emergence of the first graphical user interfaces (GUI), GUI metaphors that were related to the user's everyday interaction, making it became friendlier. Today, technological advances enable various new forms of interaction, increasingly complex and user-centric. The WIMP (abbreviation for "windows, icons, menus and pointers") concept still holds most GUIs, even with the emergence of touchscreen interfaces, which, in turn, transformed the way in which users interact with devices, making it a more human interaction, since the touch of own fingers is used instead of the mouse or keyboard. The new forms of interaction dramatically changed the way we think digital interfaces and opened space for discussing new paradigms, such as the use of gestural interfaces. Wigdor & Wixon [8] define that these interfaces do not simply present a mechanically controlled graphical metaphor, but create experiences in which the user has the feeling of being connected to the system in question using natural human means of communication such as gestures or sound language.

Thus, this article will argue, from a design interface for Gmail on Android, how the use of gestural interfaces can be enhanced. This is due to the fact that some of the

touchscreen type interfaces for smartphones make use of predefined gestures by the system, such as swipe, tap, double tap, among others. However, usually these interactions are driven by buttons. The use of buttons is linked to the paradigm (WIMP) . On the other hand , the fact that an interface using pre-defined gestures is not necessarily configured as gestural. For its use to be natural, it is necessary that the user will use the system in a systematic and automatic manner, corroborating the concepts of transparent interface by Preece and Rogers [6]. Thus, in this study we infer the hypothesis that a gestural interface to be considered natural learning requires a user with a frequency of continuous use, so that the interactions can be understood by behavioral level of our brain [5]. As a second stage of the research (in development), user testing will be conducted in order to capture their perceptions of the designed gestures and interactions effectiveness.

2   Gestural Interfaces

The presence of devices that enable interaction through touchscreen interfaces has permitted the development of applications that allow the user interaction beyond traditional WIMP interfaces – where interactions occur mainly through buttons and icons – and now allow gestural interactions, more "natural" to the user. The use of natural interfaces (NUI), or modes of interactions based on natural human communication, on gesture and on the interaction tends to further approximate the human use to the machine, because the interaction occurs in a manner that resembles the mode of interaction that is already inserted into your human behavior. The popularization of devices triggered by gestural interactions has directed the users themselves (not just designers) to project applications whose interface is different from the current paradigm. Regarding gestural interfaces, Saffer [7] classifies them into 2 types:

- Touchscreen Interactions: this first kind of gestural interface requires the user to directly touch the screen of a device or surface. This small change in the way people interact, through fingers on a screen, had them bring new problems to designers and developers, increasing the range of features into their applications.
- Freeform interactions: interfaces that allow free gestures (without being in contact with any surface) assume that the human body is the input device interaction.

Our focus is on gestural interfaces touchscreen type, in order to understand their effectiveness and projective variables front of this new paradigm (gestures). Related to this fact, some applications already intend to use gestural interfaces without the traditional buttons and navigation elements, such as the Clock Rise. Figure 1 shows the interaction based on gestures. In order to activate/deactivate the alarm, running a gesture of dragging left or right to the center of the screen edge is enough, and the feedback of the interface shows the label ON or OFF. To adjust the time, a long tap on the screen is used and after a drag gesture up or down, the time increases/decreases. This application, besides contextualizing the main idea of this research, reinforces the gestural interaction as the sole support for the actions proposed therein.

From this perspective, it is important to note that in its first version, the app had a tutorial (Fig. 1) in order to "teach" users the interaction, however, in the current versions, the app does not start with a tutorial, leaving the user free to discover the possible interactions on the same server.
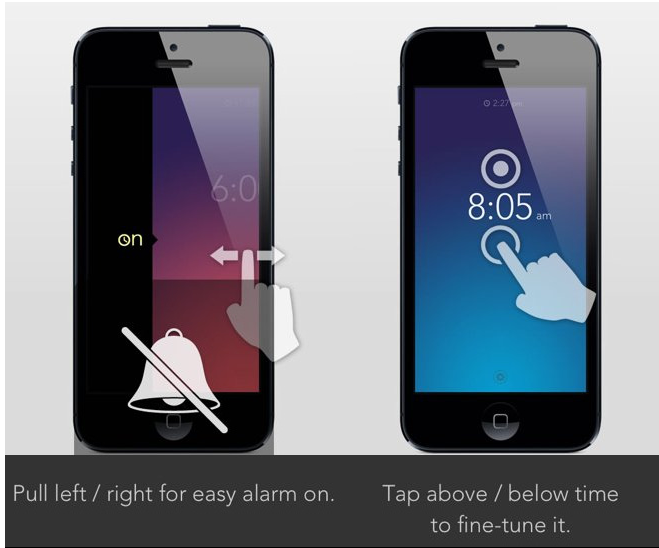

Fig. 1. App interactions Rise para iOS (Source: Rise app)

This features the maturing of the user on the use of gestural interactions, from the sense of search and discovery of what is possible to run on an interface. Another important factor to note is that the alarm clock is an application daily used i.e., their interaction is perceived and understood from the repetitive use until eventually it becomes natural to the user. This premise supports the concept of Levy [4], which about 2 decades ago reinforced the idea that the interface should be intuitive and sensor-motor rather than abstract, rigidly codified and meaningful to the user. It comes to have real direction with the use of gesture interfaces. Therefore, when designing interactions that might use gestures as elements of interaction for a more natural and intuitive experience, it is important to make an analysis about the cognitive load of information in the interface, and the frequency of use of an app, so to facilitate the apprenticeship by the user.

3   Emotional Design – Behavioral Level

The use of gestural interactions based interfaces, being a mode of more natural interaction to man, and that may resemble everyday activities based on body movements, such as driving or writing, can optimize the user experience of applications, insofar as they become part of human behavior after a period of learning. One of the biggest challenges for the use of interfaces that require an apprenticeship

that although natural, is not inherent in man, such as gesture-based, is to break paradigms that have been imposed by other means of interaction, such as a WIMP interface.

Donald Norman [5] tells us about the levels-processing of the human brain and how we respond to the events of our day-to-day. At its most basic and primitive level of human beings process information and anser to them as a form of stimulus and response. This level of processing, defined by him as visceral, is inherent, not only to men but to all living beings.

The level of processing corresponding to the human capacity to learn about certain activity so that you can perform it without the need for more cognitive effort, is played by Norman [5] as "behavioral level", and it is this level of processing that has greater relevance to this research, since it is responsible for carrying out the proposed tasks concisely and automatically after passing through apprenticeship. Norman [5] says that in order to achieve a behavioral design quality, it is necessary to understand exactly how people will use the product. Understanding user needs is the first step towards the design of a product that aims primarily functionality, specially because users usually can not or do not know how to express them.

Although some applications and products already use the technology to propose gestural interactions, the majority of them still use a model based on buttons and icons to meet the needs of users. With this, we realize that creative and innovative interfaces, i.e., providing the user with an interaction that is not yet part of his/her everyday life, has in it the potential to propose new paradigms that can optimize the user experience. Make gestural interfaces as part of day-to-day, entering your new paradigms in user behavioral level, makes it potentially as a way of reframing the use of graphical current interfaces, i.e., as in the 60's the computer was seen only as a machine for calculations and the attempt to humanize it through the graphical interfaces approached the popular usage, the use of naturally human gestures in interactions with human interfaces can completely change how people interact with computers and optimize their experience of use, making the user feel more integrated with the system.

The use of gestural interfaces, which provides an interaction that transcends the use of buttons, in addition to allowing a more human interaction, allows a better use of touchscreen devices such as tablets and smartphones. Not using buttons for interaction causes the screen space to be allocated to what is really important when designing for behavioral level to the functionality content.

As the predominant paradigm in interfaces is currently still based on GUI and interfaces that make use of naturally gestures for human communication, it still has little expression in common use applications, we recommend the use of gestural interactions for applications that have its use frequent, so that models interactions may gradually be interwoven in the cognitive system and the user, in this way they can establish new paradigms of use. Even with the reduction of buttons, it is necessary in the first instance, to explain the user how the interaction should occur, to avoid the difficulty of use of the application and to encourage the user to explore different forms of interactions, highlighting new items.

For a project that seeks to be assimilated by the behavioral level processing user, we pay attention to what Lévy [4] emphasizes about the importance of consistency in patterns of interactions to become a more human and intuitive interface. To facilitate learning, it is important that new paradigms are established, and are used frequently, they can be repeated in different interfaces, to prevent users need to relearn each function for each application used.

4   Design of Gestural Interfaces

Design a gestural interface touchscreen has some specifics in the design of traditional interface relationship. Billinghurst & Buxton [2] define a gesture as a body movement that contains information; therefore it is necessary to understand the context of use of each gesture/command to an interface. It is also important to reflect on the appropriateness of the use of gestures, since their use may not prove to be the most appropriate solution for a given interface. Saffer [7] states that even the most natural, interesting or innovative solutions tend to fail if you do not position themselves towards the needs of the user.

Wigdor & Wixon [8] argue that the design of natural interfaces must establish some previous parameters that help to think of an interaction that has characteristics beyond traditional interfaces, including:

- Forget styles of antique interaction. One must not only translate a traditional GUI on a natural user interface using existing models.
- Start using the most fundamental interactions, refining them over the course of the interface design.
- Provide the minimum number of graphics required for the interaction to happen.
- Reply promptly every action taken by the user.
- Create interactions of easy discovery, creating trust by the user.

In addition to these propositions, it is also important to design the settings of gestures, according to Wigdor & Wixon [8]:

Table 1. Gesture configuration (Source: Author)

Register	Continuation	Ending
Place two fingers on content in a touch-screen	Move your fingers over the surface of the device: the changes in the distance between the two fingers involving the modification of the orientation and placement of content	Remove your fingers in contact with the sur-face of the device

When designing gestural interfaces, the use of static screens prevents the perception of movement thereof. In this sense, Joops [3] states that rather than thinking of wireframes, the designer must think about time, size and animation. These interfaces have several transitions, or animations feedback gestures, switching screens and interface elements. It is necessary to "feel" this kind of interface, so the use of interactive prototypes and/or video is needed, rather than traditional wireframes. Thus, the animation is not only used as an aesthetic element, but as a functional item, since it takes advantage of an element sometimes overlooked in interface designs – time. These differences compared to a traditional interface design are needed so the designer can develop more intuitive interactions and that contribute to the satisfaction and experience of using a system.

5   Case Study: Gmail App for Android

Because it is a type of service that is part of the everyday use of the people, our proposal is to tailor an email service to mobile platforms, in this case, the Gmail app for Android to be predominantly composed of gestural interactions, using a minimum of buttons. For this, a task analysis was done using the original interface based on Gmail for Android, which is already known by users, with the aim of mapping the main interactions of the original application and thus facilitate the user's cognitive process in new interactions proposed by this research.

On the Application home screen (fig. 2) it is possible to realize the lack of buttons for basic actions, if compared with the original interface of the app for Android, such as buttons for "send new mail" and "search", so also with notice the furthest "received messages" from each other in order to give more fluidity in the items movimentation.
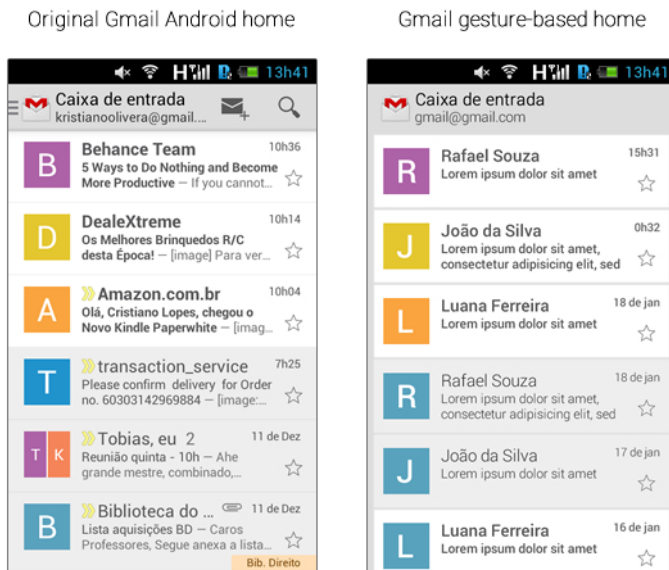

Fig. 2. Suggestion for Gmail beggining screen (Source: Author)

These shares were replaced by simple gestures, which are already exploited in other applications and many users are already accustomed to using. To write a new email (fig. 3), rather than pressing a button, where there is no relevance in the order that gives his/her gesture, the user slides the finger from bottom to top, inside and outside fabric, revealing the field to create a new email.
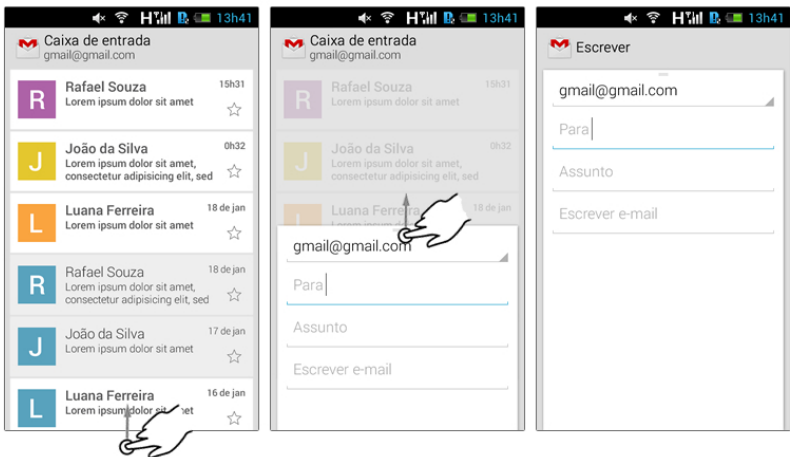

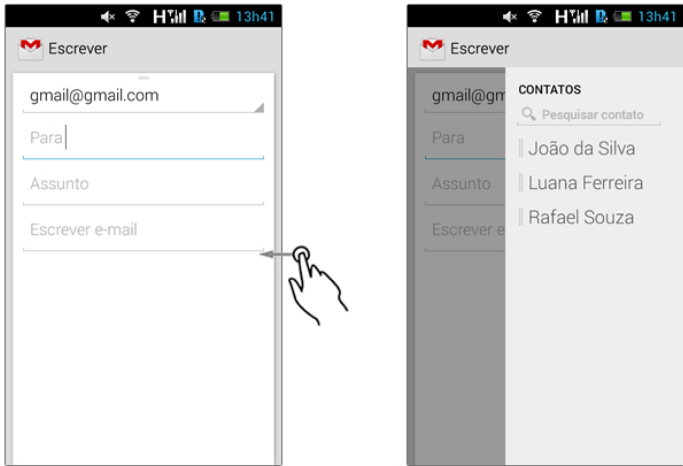**Fig. 3.** New email (Gmail) (Source: Author)

Fig. 4. Search contacts (Gmail) (Source: Author)

On the screen to write a new email, the user has the option to enter the e-mail address or directly Access any from the contact list, which can be accessed by sliding from right to left, from outside to inside in the screen (fig. 4).

Interactions such as opening an email from the inbox, for being the most common interaction in an application e-mail, prevails through the "tap" on the selected e-mail, but the transition from the closed email screen to the open e-mail makes it more natural for the user to understand the space, and more intuitive the act of closing the email again through a "pinch" (fig. 5).

Fig. 5. Close e-mail (pinch) (Source: Author)

Another gesture that is already in common use among users of Gmail for Android is to delete emails in inbox just moving them off the screen, for both left and right. In order to avoid the risk of accidentally deleting e-mails, the gesture was kept slipping the email to the left, off the screen, so you can delete it. To delete an email that is currently open, the same movement is realized, but with the use of two fingers, in order to prevent the user has the intention to move to the next e-mail, and accidentally delete it. The act of sliding the email to the right in the inbox is assigned to schedule emails to later set an action such as "mark as read/unread" or add some markers that are user-defined (fig. 6).

As mentioned earlier, this research suggests that the action of scoring an email is dragging it from left to right. After marking the desired emails, you can open the window that adds bookmarks by pushing the finger for an extended upon the selected emails(interaction to move e-mails to bookmarks).
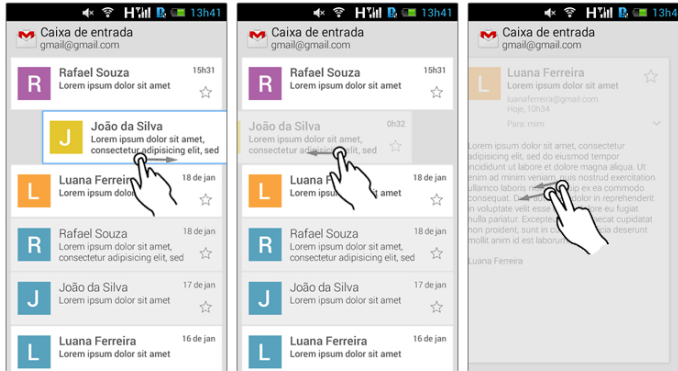
Fig. 6. Delete e-mail (Source: Author)

The aim of the proposed interface in this research is to make the most natural and intuitive interaction for the user, in order that, after a certain period of learning, the user would use it in an automated manner and without cognitive efforts. Aiming at this intuitive interaction, we chose to not use screens tutorials for functions or gestures that were not essential to the basic use of the app, so the user has the possibility to explore the functions according to the affordances provided by the application. The proposed application corroborates the definition Wigdor & Wixon [8] for natural interfaces in that it allows an interaction that goes beyond the use of buttons, where there is no relevance to manage - but allows the user to have the feeling that the interaction is an extension of his/her physical world. Even if one of the challenges when designing gestural interfaces for touchscreen platforms is the need of using surfaces to mediate the interaction , we can see an increasing advancement in how natural interfaces have been present in the modern society day-to-day. This insures a modification in the way interactions occur. Thinking the project taking into account issues of time, size and animation [3] has to be something superficial to be an important tool affordances, indicating the possible user actions that can be performed. The use of animation in the act of opening an e-mail tells the user that it is possible to use the standard gesture of "pinch" to close it again (Figure 5). The decision to use gestures system defaults rather than freer gestures, lies in the fact that the user is already accustomed to them, due to use in other applications.

6   Conclusion

From the moment the computer is no longer seen as a machine for processing calculations and increasingly became part of everyday society, often invisible and ubiquitous, it has also increased the need of development of projects focusing on user experience. Users appropriate new technologies no longer as tools but as extensions of themselves, increasingly feeling the need for being connected to the system.

Nowadays techonology offers interactions that go beyond graphic interactions, allowing a more free and gestural interaction, in a more natural interations for humans. This article aimed to comprehend concepts about the uses of this way of interaction, understand its main characteristics and capacities as well as its projectual differences.

Taking into account the learning curve of the user and the characteristics of the behavioral level, it is inferred that applications that are frequently used are likely to make use of gestural interfaces, since the concept of natural interface for touchscreen devices may prove to be understood from the use and repetition of interactions. Thus, one can realize the potential use of gestural interfaces in optimizing the user experience to the extent that they are used to the naturally human gestures to develop actions that mediate the interaction with the computer, and thus, decreasing the separation that exists between man and machine.

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