Borg-Human Interaction Design

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Abstract

We use the term *borg* to refer to the complex organizations composed of people, machines, and processes which provide services to their clients, most often through computer and mobile interfaces. Unlike interfaces to pure machines, we contend that *borg-human interaction (BHI)* happens in a service-like context of anthropomorphization of the interface, conflict with users, and dramatization of the client journey. We believe this context requires designers to construct what we call the *human facet of the borg*, a structure encompassing the borg's personality, social behaviour, and embodied actions; and the strategies to co-create dramatic narratives with the user. To design the human facet of a borg, we propose a six-step design methodology to combine traditional computer-human interface and service design techniques, including enactment of conflicts, the use of puppets as interface prototypes, and comics-like sketches of the interaction process.

KEYWORDS: Service design; multidisciplinary design; design methods; borg-human interaction; anthropomorphization; user conflict; dramatic interaction; service blueprinting.

Introduction

Today's service organizations are complex entanglements of workers, machines, owners, buildings, rewards, systems and sub-systems, policies, associates, goals, and, too often, also other organizations. People have to interact with such organizations to accomplish their goals in life and, more often than not, they use a computer interface (usually over the Internet) in this process. However, most work of interface design is still based on traditional Computer-Human Interaction methodologies, which have been developed with the underlying assumption that users are interacting with pure machine systems, not with organizations. The main difference, we argue, is that interfaces to organizations should be regarded, and designed, as part of a process of service provision.

The main subjects of this paper are the organizations made of people, machines, and processes, which surround all of us in cyberspace and with whom we are interacting constantly in a service provision context. We refer to those organizations as *borgs*, paraphrasing the fictional character *Borg* of the *Star Trek* television and film series. The *Borg* is a villain in the series, which capture

some of the common distrust of people when they engage with large organizations — an often ignored component in human interface and service design. But, more importantly, the key characteristic of borgs is that they are large-scale service organizations which display complex behaviour resulting of the coupling of people and the machines inside them through interactions and processes. Large-scale organizations are essential components of the modern life since the Industrial Revolution and there is a vast literature studying them, including the work on sociotechnical systems such as Trist (1981) and on organizational theory (Pugh 2007).

People have to engage with such organizations to accomplish their goals in life, and in many cases our interaction with them happens through human-human interaction with the people in it (such in hospitals or schools) but more and more borg interfaces are based on computers or mobile devices. Customers interact with their bank through its tellers and managers in a bank branch and also through ATMs and web interfaces. Notice that not all service providers are borgs as such, for example, a personal trainer.

The main goal of this paper is to discuss how different it is to design a computer or mobile interface to a borg, in comparison to a machine, and to propose a borg interface design process based on service design to address the challenges of this particular design context. The main difference, we argue, is that interfaces to organizations need to convey personality, engage in social behaviour, be embodied through consistent actions, and participate in dramatic stories co-created with their users.

Traditionally the CHI community has treated user interaction with pure machines and borgs almost indistinctively, as if it does not matter whether there are organizations, not machines, behind the screen. Although the CHI practices acknowledge differences between stand-alone software and webpage interaction design (for example the work of Nielsen (2000)), those differences seems to be ultimately explained as emergent properties of the Internet medium. We believe that distinguishing interaction with machines and borgs, as proposed in this paper, yields a much better understanding of why interfaces to machines and websites (which are almost always own by borgs!) are different. For instance, websites, unlike traditional stand-alone software, often raise the need of considering privacy of personal data issues. In our view, users are concerned with the personal data they are entering in a website not because they are in the web but because they know that the website is an interface to an organization which can be not only negligent with their data but also malevolent with it.

A refreshing depart from this perspective has been provided by the service design community and work (Holmlid & Evenson 2008; Mager & Gais 2009). However, the service design community sometimes utilizes weak theoretical foundations for its methodologies. For example, Meroni & Sangiorgi (2011) uses the IIHP characterization of services which have been questioned, among others by Sampson & Froehle (2006). Similarly, Morelli (2002) proposes a service design methodology based on Unified Modeling Language (UML) where users are not part of the reference model.

A key distinction of this work from the existing literature and research is its foundation in the service theory developed by Pinhanez (2009) which defines as the key characteristic of service systems the presence of human beings (physical or virtual) inside the process of co-production of value with the customer. Based on this theory, we outline and discuss what we believe are the three main distinguishing characteristics of interacting with borgs in comparison to machines. Borg-human interaction, or BHI, is, in our view, anthropomorphized, conflictous, and dramatic. We list those characteristics as our working hypotheses and although acknowledging that they may require validation and better characterization through scientific studies, we proceed (with

caution) and use them in our search for models and frameworks for understanding specific issues of borg interfaces. We then employ those frameworks to describe a six-step design methodology for borg-human interaction design we have been experimentally applying in student workshops.

Characterizing Borg-Human Interaction

Following the service framework outlined in Pinhanez (2009), the underlying premise of this paper is that the presence of people inside borgs makes the interaction with, and the interfaces to them fundamentally different from traditional interfaces to machines. We hypothesize here that borg-human interaction (BHI) is mainly distinct from traditional machine-human interaction because borg interaction is almost always anthropomorphized, conflictous, and dramatic.

It is not the goal of this paper to provide empirical evidence of the validity of each of the three listed main characteristics of borg-human interaction, but instead to explore how they affect the design process in theory and practice. They are our working hypotheses for this paper and we reserve for future work the validation of them experimentally through mechanisms such as structured interviews, focus groups, user surveys, and experiments such as the ones described by Reeves & Nass (1996).

Characteristic 1: BHI is Anthropomorphized

Our daily observations of people interacting with borgs have shown us users, possibly because they know that borgs have people inside, perceive borgs as having human characteristics, treat them as (partial) human beings, and expect them to exhibit human-like behaviours. In simpler terms, unlike machines, borgs are almost always anthropomorphized up to some level by their users. People often see in large organizations human qualities such as greed, pettiness, arrogance, and evilness. We contend that users perceive such human qualities in most machine-based interactions with borgs, including government websites, ATMs, search engines, webmail systems, social media sites, and airline companies.

Notice that anthropomorphization is an important characteristic of user interaction with borgs, but is not exclusive to them. People attribute human characteristics to objects, places, and machines even without any trace of real connection to human beings or organizations, and change their interaction patterns accordingly, as discussed, for instance, by Reeves and Nass (1996). Also, as pointed out by Dennett (1981), the complexity of most (pure) computer systems, such as machine chess players, is better handled with what he calls the *intentional stance*, in which the user understands the system and predicts its behaviour not by knowing how it works but "… by ascribing to the system the possession of certain information and supposing it to be directed by certain goals, and then by working out the most reasonable or appropriate action on the basis of these ascriptions and suppositions." (Dennett 1981, p. 224). However, while with most machines users have the choice adopting the intentional stance to simplify the effort of predicting the machine's behaviour, we argue that in the case of borgs the actual presence of people inside them establishes the intentional stance, or simply, anthropomorphization, as the right framework for the interaction.

The important consequence of anthropomorphization is that the design and implementation of borg-human interfaces must take into account the need to provide the user with adequate representations and affordances to the perceived humanity of the borg. Today's reality is that in the majority of the cases the overall perception of the humanity of a borg is often left to be

created by the user's imagination as a by-product of the interaction process. To avoid this, we propose that borg-human interfaces should be structured around a coherent personality model which can be designed through specific methodologies described later.

Characteristic 2: BHI is Conflictous

As organizations, borgs have goals and have strategies to achieve them. But more often than not, goals of users and organizations do not match, leading to some level of tension and conflict when they interact with each other. The basic consequence of this observation is that we believe most part of the interaction between users and borgs happens in a context of conflict. For instance, when a user goes into an online store, her goal is often to obtain the best of what she needs for the smallest price; in contrary, retailers "want" their customers to spend as much as possible in high-profit items.

It is interesting how most of the academic literature in interaction design (and also in service design) tends to ignore, if not deny, this conflict, which is, in our view a quite straightforward characteristic borg-human relations. Traditionally, interaction is framed in a context of neutral dialogue, inherited from the "cold" interaction with machines; or as a collaboration process where the interface is supporting the users' goals. For instance, the discussion of Blomkvist and Holmlid (2010) of the role of prototyping in services largely ignores the presence of conflict in service interactions and its possible effects. Fisk, Grove et al. (2010) survey and discuss situations of misbehaving customers but look into more as exceptions than as a result of a pattern of conflict as assumed here.

A good illustration of how user-borg conflict affects interface design are the interfaces for loyalty programs such as, for example, interfaces for acquiring air tickets with miles. From a strict usability point of view, the tickets available for purchase by miles programs should be listed together with the ones that can be purchased by money, giving the user a clear picture of the decision he or she faces. The reason they are not in most airline websites is simply because the airline company goals are in conflict with the users' goals. In contrary, users' perception is often that the interface to acquire tickets with miles is difficult to find and difficult to use, if not intentionally slow, to force them to buy airline tickets with money instead of miles.

Notice that although user interactions with machine-only systems are often frustrating, this tension is mostly created by the physical constraints of different types of materials, components, and sub-systems, and many times compounded with bad interface design. Though users may anthropomorphize this frustration, they do not believe that there is really bad intent (originated in values and goals) from the machines themselves.

We argue here that in BHI most of the times the conflict is a by-product of the conflicting values and goals of users and borgs. The important question for designers is how this conflicted can be identified, managed and, if possible, mitigated. For that, we propose to explore how human-human conflicts are dealt with, that is, through social norms and constructs and emotions, and apply those ideas to BHI design.

Characteristic 3: BHI is Dramatic

One way in which people make sense of their interactions with others is to represent their interactions as dramatic narratives. By imagining ourselves heroes or victims, and rendering other people as gods or villains, we can more easily make intentions, values, and goals clear. And by

using narrative structures such as causation, succession, and counterpoint, the representation of the complex temporal patterns of our social life becomes more manageable.

Our third working hypothesis is that borg-human interaction is dramatized in a narrative by the user. The idea of narratives as representations or cognitive foundations for interaction is not new to CHI theory as, for example, in the work of Laurel (1991) or even in service design (Grove, Fisk et al. 2009). The key difference in the case of BHI is that the narrative almost always becomes dramatic: borgs are perceived as people, are in conflict with their users, and therefore can easily take the role of friends, gods, villains, or sidekicks through the service journeys we have with them. A simple example of dramatization of user interaction is often seen in the context of complaints about failures of service. Getting reparation or service recovery is in many cases described as an arduous journey where the user is constantly facing the inability of proper contact with methods of resolution, ignorant and indifferent people, and the overall greed of the vile borg.

The appearance of a dramatic structure in BHI often only surfaces in more complex interactions. Nevertheless, we believe it dramatically changes the user's perception of the actions and responses of a borg. Therefore designers should be concerned with, and possibly design, the stories their users are creating when interacting with a borg.

The Human Facet of a Borg

If borgs are perceived as humans and interact with users with human characteristics, an important set of questions arise for BHI designers. To what extent the human side of a borg has to be constructed to be perceived as an "artificial" human being, that is, how much do we need to personify the interface? Which human characteristics are more often perceived and needed by the users in borgs? When and how do users treat — and would like to treat — borgs as human beings? How to design interfaces which highlight particularly desirable human traits? How the interface can drive the drama behind the interaction process constructed by the user and better participate in it?

To address those issues, we introduce the concept of the *human facet of a borg*, which is the set of elements and processes that create and control the perception of and the interaction with the borg's human and social characteristics. The human facet of a borg combines elements of its graphical interface, affordances, and the internal processes which together are responsible for the users' perception of the humanity of the borg. In many ways, the need to design the human facet is, as we contend in this paper, the main distinction between traditional CHI and BHI design and, possibly, a key need in service design.

BHI Design Methodology

After having presented and discussed the main characteristics of interaction with borgs, we present here a six-step design methodology we are developing to address those specific issues in borg-human interaction. We firmly believe that most traditional design methods used in computer-human interaction are also applicable to BHI, since there are many interface challenges which are basically related to the communication media (the computer and the mobile screen, the hyperlink structure, etc.). We implicitly assume here that the overall BHI design process also follows basic tenants and steps of a user-centred design such as, for example, the construction of user personas as described by Pruitt & Adlin (2006).

However, the methods discussed in this section try to exemplify in concrete terms the need of additional work to systematically expose and target the intrinsic difficulties of creating interfaces to borgs. Inspired by the ideas from social sciences, theatre, puppetry, and comics, and some of the techniques used in those fields, we describe here six activities we believe are useful in BHI design: back-office ethnography, borg personality workshop, conflict battle, comics workshop, puppet prototyping, and, of course, service blueprinting.

Back-office Ethnography

As a system composed of machines, people, and processes, a borg needs to be well understood for the design process to be effective. We employ the term *back-office ethnography* to refer to the process of thoroughly investigating the inner organization and structure of the borg. We are very liberally using the term ethnography here, since the actual process may include a variety of techniques, including but not exclusive to ethnography. It is inspired by some of the techniques used in contextual design described, for instance, in (Beyer & Holtzblatt 1997) but with an additional emphasis on understanding goals and rewards.

Back-office ethnography starts with collecting all kinds of material available about the borg: organizational charts, company values, sales and production information, growth plans, etc. Based on the information collected, a *borg map* is created which summarizes the basic nature of the borg. The next important step is to build what we call the *goals and rewards map*. Through interviews and organizational documents, we try to establish which the goals and rewards are for the different people and areas of the borg. Care should be taken to map actual, not stated goals: more often than not, the goal of many organizations is not to please the customer but to maximize revenue or profit. Similarly, rewards should be focus on actual metrics and incentives which guide the behaviour of people in the organization.

The last step is to gather information about the business processes on which the interface have to rest on. The main goal is to unearth the requirements and limitations of the process to create what we call *"the system" X-ray*. The term "the system" is used here as in the often heard sentence "The system does not allow it." often used to justify limitations of service provision. One of the best ways to produce a true "the system" X-ray is to try to use anonymously the services provided by the borg and to examine customer complaints.

Borg Personality Workshop

Having collected information about the borg structure, goals, and processes, a designer is in the position to explore better the first characteristic of borg-human interaction, anthropomorphization, for which we have been developing a methodology called the *borg personality workshop*. In the borg personality workshop, designers, potential users, and stakeholders try to establish the main characteristics of the borg personality from the users' viewpoint. They explore individually and in group the personality traits of the borg by using typical personality frameworks. For example, a fake Myers-Briggs test (Myers, 1998) may be applied to the borg, examining the preferences of the borg as the users and stakeholders perceive it. This leads to the determination of an MBTI type (Myers, 1998), whose characteristics are then discussed by the group.

Often, participants in the workshop are likely to differ about the borg MBTI type which leads to the construction of multiple personalities. This is part of the process of the borg personality workshop since there may be conflicting opinions about the desired or actual personality of the

borg. It may be necessary to carry multiple borg personalities throughout most of the rest of the design process to better explore the conflicts and stories each of them generate and the different kinds of issues each personality creates. In particular, different functions of the borg interface tend to elicit distinct personalities. For instance, the sales part of a website can be extroverted while the complaints interface has to be more perceiving.

Conflict Battle

In parallel with the borg personality workshop, it is often useful to run traditional CHI methodologies to determine *user personas* as described, for instance, by Pruitt & Adlin (2006). With the different personalities of the borg and multiple user personas, the stage is then set for the *conflict battle* in which participants take turns playing the role of the borg and user personas in the different scenarios of the BHI. The first goal of the conflict battle is to clearly document as many as possible conflict cases, including the situation they appear, the causes of the conflict, and how they relate to the borg inner structure. It is important to associate the conflict scenarios to the elements uncovered by the back-office ethnography process, that is, the borg map, the goals and rewards map, and "the system" X-ray.

The second goal of the conflict battle is to create *conflict maps* which depict the social behaviours and emotions involved in the conflict scenarios. While some of the participants are acting out the scenarios as short theatrical sketches, others take notes of the social behaviours (such as aggression, altruism, empathy) and the emotions being exhibited by users and borg using one of the emotion characterization schemes. It is often helpful to freeze action (to be continued later) to allow time to the observers to point out, discuss, evaluate, and annotate the key characteristics of the conflict and how users and borg are dealing with it. Having the observers behind a sound-proof, see-through glass may be useful to avoid the impact of their comments on the participants enacting the conflict situation.

The third goal of the workshop is to find better ways to manage conflict and create what we call *conflict mitigation charts*. After going to the process of acting one particular scenario, participants and observers look into possible ways of solving, mitigating the conflict, or better handling it. If necessary, alternative versions of the scenarios are played out, examining whether different borg personalities could cope better with a conflict case.

Comics Workshop

Having found the main sources of conflicts, the emotions and social behaviours associated with them, and some possible conflict mitigating options, the next important step is to collect and organize them as the stories and narratives the user personas and borg produce together. One technique that can be employed here is what we call the *comics workshop*. It is an enriched version of the traditional storyboard technique used in interface design where participants explicit the inner thoughts of the user and the people inside the borg, the story roles they play, and the overall story structure. For each interaction scenario, especially those rich in conflict, designers and participants produce a *comics story* showing the visual elements of the interaction, the emotional reactions of the user, and balloons with the thinking and strategy of the user, depicting, when necessary, his perception of what the borg is doing and trying to accomplish. The comics story also includes, when appropriate, the people inside the borg and what they are doing, thinking, and getting as rewards. The comics stories produced in the workshop are then analysed in terms of character consistency, clarity, enjoyment, and conflict resolution.

Puppet Prototyping

The goal of *puppet prototyping* is to transform the comics stories into concrete interface actions which can express needed social behaviours and emotions between users and borg. While in the conflict battle we allow the full range of human actions to be played through person-to-person interaction (enacting user personas and borg), in the puppet prototyping we tunnel the interaction through representations of interfaces using a variety of methodologies.

Many of the traditional methodologies used in interface design, such as paper prototyping, can be used here with the care of making sure to evaluate their performance in the light of conflicts and emotions as represented in the comics story. In association with those techniques, we also use, especially in the initial stages of the puppet prototyping, other methods inspired by theatre such as *constricted dialoguing*. In this technique, participants re-enact the comics stories with constraints such as only using short sentences, gestures, or drawings. The goal is to find mechanisms to convey the social behaviours and emotions of the comics stories and the mitigating solutions described in the conflict mitigation charts.

Another technique is what we call the *giant puppet workshop*, particularly suited for complex borg organizations with conflicting internal goals and rewards. Participants are asked to create a giant puppet, manipulated by multiple puppeteers, which has to interact, mechanically-like, with the user personas. Materials such as cardboard, colour paper, wire, glue, and recyclable elements are provided. Puppet handlers have as much as possible goals and rewards similar to actual roles and jobs in the organization, according to the goals and rewards map and the overall behaviour is constrained by the issues in "the system" X-ray.

All the insights and discoveries of the puppet prototyping process are registered as alternative versions of comics stories. We repeat iteratively the processes described here until the comics stories have no more direct human-to-human but only computer-mediated interface elements. Notice that the elements depicting emotions and thoughts of the user and of the borg are kept in the refined comic stories as a documentation of the actual goals and mechanisms of the interface being designed.

Service Blueprinting

To work out the practical details of the interaction stories of the user, we employ service blueprinting (Shostack, 1984). Using the comics story as a reference, a service blueprint of the borg interaction with the user in each scenario can be produced to detail the actions and decisions of each element of the borg. The service blueprints should then be analysed in different ways. Looking vertically in the blueprint, information and synchronization needs of each element is scrutinized to make sure that all actions happen as needed. A horizontal analysis allows a good understanding of delays and waits which may affect the user experience and the borg performance and perception. Also, by considering the multiple strips from different service blueprints of a certain role or system in the borg, the complexity of its particular operation is highlighted. Here it is important to check what is expected from a role in comparison with its goals and rewards as listed in the goals and rewards map, and what an element of the borg should do in comparison with "the system" X-ray. Often, this analysis leads to the detection of problems which may require iterative redesign.

Resistance is futile

The key proposition of this paper is that more often than not the interface design process is done in the context of interaction not with a pure machine system but as a service interaction with a complex organization of people, machines, and processes we call borgs. We argue here that designing borg-human interaction is challenged by three key differentiating characteristics of borgs to pure machines and computers: anthropomorphization, user conflict, and dramatization. We then propose a six-step design methodology, which addresses some key characteristics of borg-human interaction.

But do designers need really to go through all this trouble to create a good website for an organization? The "assimilation" of a borg paradigm for interface design and the adoption of BHI design methodologies is, of course, a designer's choice. In our view, the implication of creating interfaces to borgs as if they were just machines is leaving solely to the users the task of creating the human representation of the borg which, we believe, is likely to happen anyway.

The six-step methodology described has been explored and further developed in several design workshops with design students. In those workshops, groups of students have been presented with a typical borg interface problem and guided through the six-step design methodology up to the point of a fully implementable computer interface. One of the most successful aspects of the methodology is the intensity of the conflicts surfaced during the conflict battle step. The re-enactment component easily triggers the worst behaviours both from users and borg, providing very rich material for exploration in the next steps. We have also found the dialoguing constricting techniques used in the puppet prototyping step very useful to find rich and non-trivial alternative designs for the interface. Overall, the student workshops have shown that the methodology proposed here is able to surface and explore issues rarely observed in traditional computer interface design processes.

In this paper we intentionally left out considerations and techniques for dealing with some scenarios of interacting with borgs which involve direct human-to-human contact with human beings inside the borg. Many borgs have customer care centres, physical or virtual, where the borg interfaces with its users through people. In those interactions, the personality and social behaviour of the borg is also played out and borg stories are constructed. Although not addressed here, designing such human-borg interactions is essential, and some of the techniques proposed here may also apply.

One of the key challenges we have yet not successfully addressed is to understand what could be sketches of the human facet of a borg. We agree with Buxton (2007) that sketching is an essential activity of the design process but traditional methods of sketching such as drawing and paper prototyping are limited, most likely inappropriate, when considering the complexity of creating human characteristics in borg interfaces. We are still far from determining useful ways to sketch the human facet of a borg, in the sense of concrete representations which "[…] do not specify everything and lend themselves to, and encourage, various interpretations that were not consciously integrated into them by their creator." (Buxton, 2007, p. 118). But our experience with the use of comics stories show they are an interesting starting point for what service sketches could be.

The ultimate goal of this paper is to trigger a discussion of the applicability of traditional interface design techniques to the service context of borgs. We do not deny here the importance and validity of the most traditional interacting design theories and practices. However, we believe it is important to recognize that in the current world, computer interfaces have fundamentally

changed their nature from users interacting with computers to interaction with complex organizations of people.

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