Rethinking Information Handling: Designing for Information Offload

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ABSTRACT
This paper introduces information offload as a supplement way of responding to and designing for information. By presenting iFlush, a design concept aiming at providing the user with a possibility to offload information and then instantly dispose of it, the paper presents an approach towards designing for reflection and also serves as a critique towards information overload. Furthermore, the absence of reflection on the role played by HCI community in the constant augmenting of all spaces is addressed.

Keywords
Information overload, information offload, critical design, interaction design, HCI.

INTRODUCTION
We, the authors, each have several phones, phone numbers and instant messaging accounts. We have thousands of e-mails in our mailboxes from multiple e-mail accounts. We subscribe to a large number of newsletters, RSS feeds and newspapers. In other words, we are exposed to huge amounts of information, often much more than we can handle. Each day brings increasing amounts of information and instead of designing new ways of coping with it, we need to start thinking about ways of getting rid of it.

In this paper, we identify three ways of responding to the increasing load of information (*propagating information*, *accepting information*, and *blocking information*) and propose a new direction for coping with the issue, namely *offloading information*. Our proposal to design for getting rid of information can be seen as a response to the rise of pervasive computing, in that we are critical of the tendency to push information technology into ever-more dimensions of life, be they work, play or private/intimate.

Furthermore, the proposal is a call for attention to the HCI community: By constantly expanding into new domains of research, the HCI research community lends an air of legitimacy to (and even helps drive) the flood of information. The mapping of ever-more parts of life by HCI research thus provides the IT industry with a foundation for developing commercial products that add to the over-saturation of information in the life of technology users.

Digital information is by nature easy to collect and store, and therefore also easy to send, share and access from wherever you are. Today hardware rarely sets the limit for the amount of stored information which results in an increasing urge to save and back-up everything; eg. Gmail recently set new standards for email handling by giving users 2GB free storage based on "the idea that you should never have to delete mail" [6]. When cleaning an office desk from physical information, there is simultaneously a mental offloading of things to remember and do. Cleaning the digital desktop initiates similar mental processes, but the digital information is rarely completely gone since it is often moved into other virtual folders. Same rules apply to an inbox-cleaning which for most people means moving emails into sub-folders. The ten thousand dollar question is, when we will begin to delete all this digital information? Will we ever? Is it really more stressful to delete digital information than to have thousands of emails?

INFORMATION EVERYWHERE
From George A. Miller's famous paper on information processing limits of short term memory [11] to modern day models of working memory [1], much effort has been put into exploiting our cognitive and perceptual abilities to cope with information. The ever-increasing amounts of information and the propagation of technologies to spread and access this information has reached a point where many people accept a state of *information overload* as a fact of modern life. Information overload occurs when the quantity of information exceeds the mental processing abilities of an individual, eg. when there are too many sources of information, when information is incoherent or contradictory, when new material is constantly being added or when low signal-to-noise ratios obscures information. The fact that information overload is a wide-spread

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phenomenon is evident in a number of tools created to cope with the overload, such as Personal Knowledge Management, peripheral information (i.e. informative art [15] and ambient information [14]) , content aggregators and news feed readers [9] etc. These tools have emerged as a response to information overload; however, they respond to the symptoms of the problem rather than address the roots of it.

These mechanisms all maintain the information level but teach us how to cope with it. The opposite way would be to minimize information thus lowering the general information level.

DEALING WITH THE CURRENT INFORMATION LEVEL

The ever increasing amount of information can be dealt with in four ways: Propagating, Accepting, Blocking and Offloading information.

Propagating information

The optimistic or propagating user finds the rapidly evolving technology and ever increasing information flow fantastic. To him, a website like slashdot.com is a source of daily rejoice on the technological wonders in the world of tomorrow. Being an early adopter, he always has the newest gadgets and subscribes to the saying "rather arrive early than miss the party".

More importantly, the propagating approach is the motor driving the market. Major stakeholders in the information technology industry have a shared interest in increasing the load and especially the accessibility of information – internet service providers create information infrastructures, hardware manufacturers and software developers create the tools for accessing and manipulating the information and content providers create and reshape information for consumption.

Consumers are told – both verbally and visually (see Figure 1) – that if information is good, more information is better, and if they don't follow they will be left behind.

Figure 1: A magazine advertisement for highspeed internet (TDC Online). The stream of information from the internet is literaly almost blowing the user away, but he is desperately clinging on. The ad serves both as a touting and a warning since he would obviously disappear if he raised his hands from the keyboard.

Accepting information

The most commonly chosen stance regarding the increasing load of information and new technologies that propagate information seems to be one of acceptance. Although the majority of technology users may appropriate technology to suit individual needs [4], studies in technology adoption lifecycles indicate that it is often early adopters that shape the use patterns of information technologies [12]. Thus, many users occasionally utter their dissatisfaction with the deluge of e-mails in their in-boxes and the number of information sources that they have to keep up with; however, these complaints often fade and users accept the state of information overload. An increasing number of techniques, tips and tricks teach people how to deal with the issue. This is all good and well, except for the fact that most of these techniques do not encourage people to question the underlying causes of information overload. Such uncritical acceptance is problematic in that exposure to information overload can have severe mental and physiological consequences, such as increased cardiovascular stress, impaired vision, decreased benevolence towards others and impaired judgment [16].

Blocking information

The most drastic way of handling too much (digital) information is to prevent it from arriving at its destination. The most common example is the spam filtering used on most email accounts, but more physical and specifically targeted examples have been produced. The category can be divided into devices controlled either individually or centrally.

Individual devices

TV-B-gone [2] is a commercially available product which enables the user to turn of any TV in a room. *TV-B-gone* ships with a number of preloaded turn-of signals that by the push of one button are distributed into the air, thus eventually hitting the right code for practically every tv. Similarly, the artwork *BuBL Space* [5] enables the user to free her near public space for information pushing itself onto her presence. The concept lets the user make mobile and customized scrambling zones in which mobile phone signals are scrambled. The sleek looking *BuBL Space* has only one function and if the user simply presses the only button on the artifact, a temporal scrambling with a radius of about one meter is emitted. Not much, but enough to have a private face-to-face conversation without being disturbed by a mobile phone. Interestingly, *BuBL Space* is illegal to use in the EU and the US.

Centrally controlled devices

In some cases letting users receive information is unwanted. The Italian Ministry of Education has recently tested [8] the use of a jammer [13] making schools able to cut off mobile phone signals during exams. Also techniques like VPN and WEP which scrambles wireless signals to a central server and a wireless access point respectively, can be seen as a way of preventing information from flowing freely.

Offloading information

A fourth approach to information handling is to throw information away. By offloading information, the user takes a somewhat critical stance in comparison to the previously described modes. Examples of temporary and disposable information access do exist, for instance the application DrawMe based on MIXIS interaction [7]. DrawMe's base for interaction and access to information is the drawable interface, which you draw when needed and throw away immediately afterwards. The technique supports temporary interfaces and information access, but still information is saved and left behind on the mobile device.

We suggest that system developers consider how to design for easily accessible ways of crossing the mental barrier of actually deleting information. We believe that there is a need for designing for offloading both mental and digital information.

IFLUSH

We have created iFlush, a conceptual critical design of an information offload system that supports instant disposal of both physical and mental information. When we address *critical design*, we agree with Cuartielles [3] in his definition "to add the adjective "critical" to design means that design is used to analyze and explore the possibilities of using design as a tool for making statements".

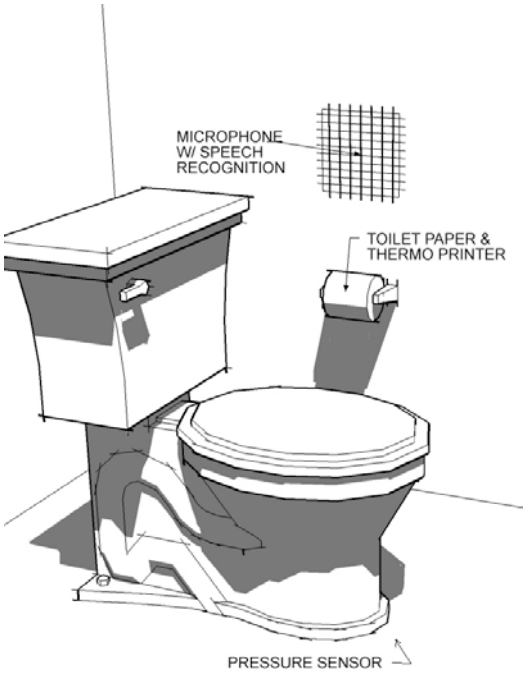

Figure 2: A sketch of the iFlush design concept.

iFlush is a toilet confession system containing a pressure sensor, a microphone, voice recognition software, a thermo printer, a roll of toilet paper and a regular water closet. The concept draws upon the ritual of confession, but is not to be mixed with any religious provocation. By sitting on the toilet seat, the user activates the thermo printer, which responds by printing "Confess yourself" on toilet paper immediately exposed to the user. The user can perform whichever information offload that she finds suitable by speaking into the microphone just next to her head. Voice recognition software processes the oral offloading and the words are printed on the toilet paper, which is exposed to the user. The user now has a possibility to read the offload and reflect on the words. Seconds later, another print appears, saying "Thank you for your visit. Please come back soon". The paper containing the printed information is now ready to be used and flushed down the drain with the physical offload. The gesture of instant flushing provided by iFlush enables the user to physically demonstrate the reliefs of the burden, letting her go on in life with fewer burdens on her shoulders.

iFlush is set in public rest rooms that by both being a mixture of a temporal and anonymous private place in public, and being a place for unleashing physical burdens is perfect for also unleashing private information. Public restrooms do (and iFlush would) serve as a refuge where the surrounding world, including information of various kinds, is shut out. Even the act of accepting a phone call while visiting the rest room is generally not socially accepted. Public restrooms also serve as a place to go for people with secrets: i.e. drug addicts or best friends with secrets to share. Lastly, it is obviously a place where everyone has a few minutes to mentally reflect or be idle [10]. Since iFlush is set in a public setting, the offloading room is soundproof, letting the user keep her private space and talk unheard.

The iFlush concept demonstrates criticism towards the information overload in today's society and aims at making individuals as well as system developers reflect on the current standards of information consumption and information storage. Of course, iFlush could be used as a nifty notebook, and it is not unlikely that a considerable part of the users will keep the information instead of getting rid of it. However, since the system only supplies toilet paper if users deliver information, they will have to come up with some information that they do not wish to keep. By way of alternative, users could bring their own toilet paper.

iFlush is not the first attempt to make a concept for augmenting the last frontier of non-augmented rooms, as also the Toilet Entertainment System (TES) [17] used the public rest room as a place to print information requested by the user. TES, like iFlush, is conceptual design, but where the iFlush concept makes a clear and critical statement regarding the current standards of information overload, TES is contributing to the information flow, giving the user a possibility to access information also while being at the toilet. The creators of TES also regarded their system as critical design; they were, however, ambiguous as to whether the system was intended for actual use or meant as a critical statement.

DISCUSSION

HCI and interaction design as such often aims at making products easier to use, thus the discipline can be said to also want to make life with technology easier for the users.

Considering the information overload we have today, it is amazing that so little effort is made to reflect on how information seems to be sneaking in everywhere. By this we mean that instead of designing for better understanding or handling of information, we should consider designing for reflection instead: For making the user aware of the massive amount of information both fed to and saved by us everyday, but also for giving the user an opportunity to throw information away instead of just making higher bandwidth or bigger storage possibilities.

The responsibility to turn the direction of the information society is of course partly up to ourselves. We need to overcome the mental barrier of deleting in order to take a more critical stance towards information directed at us. Still, system designers should be more aware of also implementing functions to support information offload and reflection. The Windows operating system already gives the user a possibility to delete unused icons on the desktop, and even though this feature is a step in the right direction it is not nearly enough. Instead of focusing on augmenting every inch of the world, maybe HCI should direct some of its resources towards figuring out how people can be helped to get rid of information, thus providing physical and digital spaces for users to reflect and offload informational burdens. Which solutions this research could result in is not clear to us, but we believe it is an interesting challenge to address.

CONCLUSION

In this paper we have discussed some of the problems relating to information overload and identified three ways of dealing with this phenomenon; propagating, accepting and blocking information. As a critical alternative, we have proposed a new way of addressing the issue, namely information offload.

Our fundamental argument is that we need not uncritically accept or drive the continual information overload, since we find it increasingly hard to keep up with. As a consequence, we have created the conceptual design proposal iFlush, in which users in true multi-task fashion are forced to surrender some of their pent-up information to the system, which then invites the users to flush this information. iFlush is a critical response to information overload. It supports reflection on informational sins and provides a space for physical and mental ease of burden. The concept could serve as inspiration for further critical installations.

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