# The Formamat: Investigating the Dispensability of Pervasive Data.

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**Abstract**. *The Formamat is an interactive installation, art piece and pervasive technology that researches the question what value we attach to digital data that we have stored on our mobile storage devices. With the Formamat - a vending machine that returns candy in exchange for the deletion of their digital data - we invite people to experience the joy of deletion in a public space and encourage them to think about the value and (in-)dispensability of their files while also researching the subject in a broader sense by storing and analyzing their deletion-behavior.*

**Key words:** deletion, pervasive data, information abundance, digital data, mobile data, throw-away society, values, dispensability, indispensability, norms, customs, USB, candy, chocolate, vending machine, storage.

## 1. Introduction

This paper showcases the Formamat, a vending machine that rewards users with chocolate for the deletion of their digital files. The Formamat is an example of an interactive artistic expression commenting on pervasive data and a steppingstone for researching the subject of deletion behavior. Within this paper the concept behind the Formamat is explained, followed by a brief technical overview. In the last part of the paper we introduce the first observations and data collected during the exhibition of MSc Media Technology "Crisis - a non-economic approach" at V2_Institute for the Unstable Media in Rotterdam, January 2010. The discussion part explains possible future uses of projects such as the Formamat in the context of pervasive technology.

## 2. Background Information

In everyday life we throw away many things. Usually either because they are old, broken, not being used, or because we feel the need to clean up the space; the term "throw-away society" has been used to refer to the current practice when more and more things are being thrown away often even when they are still functional[1].

However, in the digital world, people are often reluctant to delete files. But even despite the lack of statistical data, a simple scenario might be very familiar: during vacation a few hundred photos are taken, many of them blurry, redundant or unwanted. Instead of keeping only the wanted fraction, people often don't take the effort to delete the remaining pictures. The reasons behind this are various - sometimes people believe that the files will become useful one day but sometimes it is just a result of laziness.

[1] See for example, E. de Coverly, P. McDonagh, L. O'Malley "Hidden Mountain: the Social Avoidance of Waste", *Journal of Macromarketing*, 2008, vol:28, iss:3, pg:289

Meanwhile the storage devices get cheaper and bigger[2] thus decreasing the incentive to delete[3].

Pervasive data sources and devices contribute significantly to creation of new data, replication of existing and increased amounts of stored information, resulting in increased acuteness of questions on pervasive data management and integration solutions. Estimates suggest that in 2012 there will be 5 times more bytes added to the "digital universe" compared to 2008, with user content of created, replicated or captured personal information reaching 1741 exabytes[4].

With phones, handhelds, digital cameras, mp3-players, usb sticks, netbooks and laptops we are also on a personal level all time surrounded by increasing amounts of data. Do we really need all this information or is there an issue with deletion? The Formamat is our answer to the current situation, reminding about the importance of deletion as a natural part of data management by increasing the pervasive aspect of deletion in an enjoyable manner.

## 2. Concept and Deployment

The concept of Formamat is based on treating digital data like a physical object - if you trade it or transform it into something else one "gives up" the original. The Formamat uses a symbolic transformation of digital data to physical objects: it is returning chocolate sweets for the deletion of data. This way the difference in attitude toward digital data and the attitude toward physical objects is revealed and the question of data (in-) dispensability and value to the owner can be raised. Because of the pervasive nature of the mobile data an approach with a likewise pervasive but impersonal system placed in public space – easy accessible for everyone – has been chosen: A vending machine placed in public spaces, like offices, stations, universities, or exhibitions which adds a fun and play aspect to the process of deletion.

The proposed chocolate value for a file is based on a formula incorporating four different aspects: the file size, the file type, last modification date and the total amount of files the user has on his device. The value is dynamically calculated by comparing the four factors of the particular file to the averages of the files deleted so far by previous users. The further away the user is from the average, the more candy he or she will get. (Other concepts, like returning more candy for bigger files than average and less for smaller files have also been tested). The reward is always between one and four chocolates. The dynamically changing thresholds for the value calculation add a level of collective intelligence to the machine.

From the conceptual viewpoint chocolate candy represents a "true" deletion process, as once the chocolate is eaten it is really gone, compared to the standard digital deletion process where file in most cases is retrievable. Using chocolate as a reward/exchange material not only solves the problem of attracting attention to the machine, but also often creates tension between peoples' wish to get chocolate and unwillingness to give up their data. With this tension being expressed, the researcher can gain insight in the deletion reasoning of users.

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[2] D. H. C. Du, "Recent Advancements and Future Challenges of Storage Systems", *Proceedings of the IEEE*, 2008, vol:96, iss:11, pg:1875

[3] J. Jacoby, C. K. Berning, and T. Dietvorst "What about Disposition?", *Journal of Marketing*, 1977, vol:41, iss:2, pg:22

[4] IDC, "As the Economy Contracts, the Digital Universe Expands", Multimedia White Paper, May 2009, available at http://www.emc.com/collateral/demos/microsites/idc-digital-universe/iview.htm

## 3. Implementation and Design

The Formamat uses a form of an already known device - a vending machine in a public space, with a function that is usually associated only with computers - deletion of data carried around on mobile storage devices.

The main body of the machine is made from a wooden closet. The chocolates are stored in a circular tube along the inner body of the machine – leading to a dispenser mechanism that is realized with a wood construction and servo motor connected to an Arduino board. The whole mechanism is controlled by self made PHP-based software running on a MacBook within the vending machine. Users interact with the machine through a touchscreen. Above the screen is a window filled with candy and at the lower part of the machine stands a tray for collecting the candy.

To deliver the experience of "enjoy deletion!" more clearly, witty dialogue texts guide the interaction, explain the calculations and thank the user for deleting files. These dialogues change from file to file according to the different characteristics of it and by doing so add to the personal experience of the user.

For research purposes meta information about the files is stored, therefore we are able to gather information on the file sizes, types, modification dates and total amounts of files within storage devices.

The current version of the Formamat accepts regular USB sticks and common memory card types. Besides that, other devices like phones and mp3-players have successfully been connected using the USB inlet.

## 4. Use and Preliminary Results

The Formamat was placed in the MSc Media Technology exhibition "Crisis - a non-economic approach" at V2_Institute for Unstable Media in Rotterdam, January 2010 for 8 afternoons. During the exhibition the user's reactions were observed and meta information of the deleted files was collected.

The majority of people visiting the exhibition had some sort of mobile storage device with them and thus was able to use the Formamat. We encountered not a single situation where a person had a storage device, but concluded that he or she has no files to delete or would admit to be unwilling to use the machine. On the contrary, people who came with no storage devices expressed their regrets for not bringing one, giving the impression that they would have had a lot to delete.

The general reaction to the Formamat was very positive and the design and deployment of the Formamat was intriguing enough for people to approach it and not feel afraid to use it. The experience delivered by the Formamat gave space for active discussions between the users and the creators and gave many useful insights. The majority of people agreed that most of the times they do have a lot of information that could be deleted, but is not deleted due to various reasons. Just to mention a few: they feel no need to do it, it is time consuming and it involves decision making on what is useful and what is not.

The users of the Formamat showed active involvement in the process of comparing the suggested value in candy to the importance of the file. As the Formamat invites people to delete their data in a public space, users tended to explain their decisions speaking out loud, often involving their friends or people they came together with. These comments were very common and give an insight into the decision making of the users: "*No, I will not delete this file because I need it*", "*I need this file for work and can not delete it*", "*Only two candy for this file? It is my thesis!*", "*I don't remember what it is, let's delete it!*", "*I have this one backed up, so I can delete it*", "*Oh, I haven't watched this movie yet, but it gives 3 candy! What shall I do?*", "*Yes, I don't listen to this anymore, I can delete*

*this!*", "*I downloaded this and I can download it again*", "*Let's see how much candy I can get for this file!*". Another interesting situation happened, where the user accepted the proposed value and based his own value on it, saying, "*This gives 3 candies in return, if it's worth so much I better don't delete it!*".

It turned out to be a general trend for the users to search for the files giving the highest returns in terms of candy.

Due to the exhibition context the statistical results are influenced by many people using the same USB stick for trying-out purposes and not deleting their own data. Therefore the results do not truly represent the personal deletion decisions. We expect to gather scientifically more reliable data in the future; however, the risk of people misusing the machine will remain.

During the exhibition 258 files were deleted with the Formamat. The average amount of files on the storage devices was 391 (ranging from 1 till 25185 files), the average size of the files deleted was 20,3 MB (ranging from 20 bytes to 1.3 GB), almost half of the files deleted were pictures, and on average the files deleted were last modified approximately 34 weeks ago (with the file age ranging from the day of the exhibition visit to 5 years old). The active use of the Formamat shows that a significant portion of our "all times present" data that is being carried around in mobile storage devices is indeed dispensable.

## 5. Discussion

The results from the first exhibition show that The Formamat provokes thoughts about the value of data and leads to discussions. It was a common experience for the people to actively compare the proposed chocolate value of their file to the personal attachment associated with it. The majority of users engaged in further deletion after receiving the first chocolate reward and it was easy to observe that the deletion process was enjoyed.

The Formamat transforms the borders of digital and analog, known devices and new functions, irritating activity and joy, showing that a combination of new, pervasive strategies and old well established concepts can result into an interesting tool for raising discussion about questions with increasing acuteness in the future, highlighting aspects of our relationship with managing digital data in the age of pervasive technologies and as a stepping stone for further research.

As an artistic expression, the Formamat suggests, that pervasive technology being concentrated on data distribution and creation, seems to forget a natural part of data management – deletion –, which can be performed in a fun way.

Considering the simplicity of the project, it can be easily adjusted for various future uses according to different needs and perspectives (for example, added sensitivity to the regular users, accessing emails, constant connection with multiple devices, etc.).

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