kPod: Selecting Kosher Products Faster

Design Proposal for LIS519

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Introduction

kPod, short for "kosher iPod," is my suggested solution to significantly reduce the amount of time Orthodox Jews spend grocery shopping. The kPod solution includes a small piece of hardware to be plugged into an iPod; accompanying software to access and display information of products on grocery stores' shelves; and the hardware, software and network necessary to store, manage and distribute the sought information. In this paper, I suggest using Value Sensitive Design to investigate the technical aspects of the solution and how the stakeholders' values are represented. I also place the device, the design process and the social context of its usage into the framework of Alfreda E. Chatman's Small World theory, as the target audience forms a classic small world.

Following the rules of *kashrut*, or "eating *kosher*" is a core tenet of the Orthodox Jewish belief system. Members of the Orthodox Jewish community need to check whether food items are suitable for them, i.e. kosher, or not, when shopping in the grocery store. Currently this process is achieved by lifting each packaged item from the shelf and carefully examining whether the packaging has a small sign, called *hechsher* (figure 1) certifying that the item's ingredients and preparation has been supervised by a rabbinic authority and is, therefore deemed kosher. This examination takes a considerable amount of time when performed on a regular basis. kPod can considerably cut the time spent searching for *hechshers*.

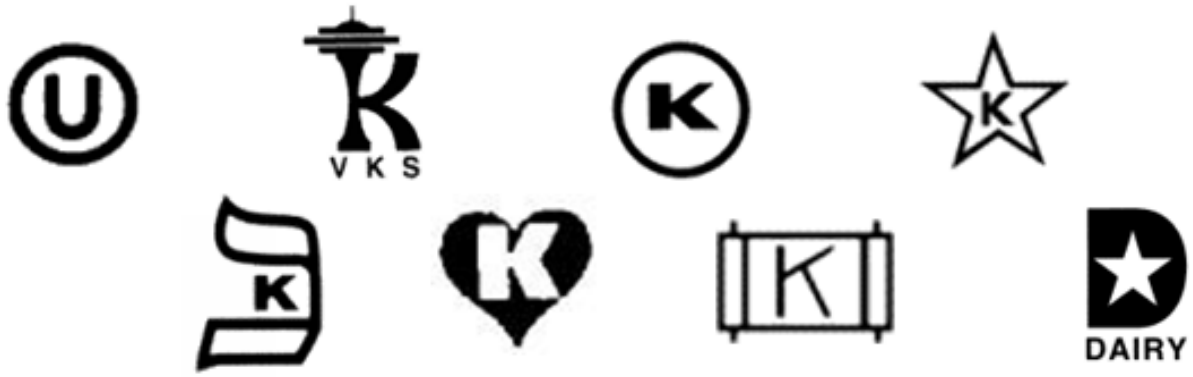

Figure 1: Examples of hechshers

I will first introduce the technology and describe its usage. Then I will examine the technical implications of using Value Sensitive Design for the creation of the product, based on a list of identified values. The conceptual and empirical assessment is beyond the scope of this proposal

The Technology

The proposed system would consist of five elements. First, the solution assumes that each packaged food item in a supermarket will be tagged with an RFID (Radio Frequency Identification) chip. To date this technology has not been deployed on a large scale, but it is a reasonable assumption that it will be as consumer needs intensify and markets rise to meet growing needs.. For example currently the Ginza shopping district in Tokyo is experimenting with a trial version of using RFID tags on purchasable items (O'Connor 2007). As the RFID technology becomes cheaper and its technical challenges regarding scalability will overcome its use will be widespread.

The second assumption is that the data about all available products in a particular shop is stored in a database. This is already the case for all modern and large supermarkets. Currently, these databases contain information used to maintain inventory. To this I would add more

information that is of interest to the customers, including *kashrut* certifications. (*Kashrut* is the noun form of *kosher*, the adjective, referring to the laws, rules, and customs of religious dietary restriction. It can be also used indicating whether an item is kosher--and if yes, according to which rabbinic authority--and its meat, dairy or *parve* (neutral) status. Jewish law prohibits the mixing of the first two, while the third category of food can be combined with either of the first two. This information is important for observant Jews and is must be displayed on the packaging.)

Third, a wireless network would make the information stored in the database accessible within the store. Setting up a secure limited range wireless network is a simple process; it became a commodity in the last few years. It is no longer prohibitively expensive or a technical burden on the store.

The fourth element of the system is a small piece of add-on hardware to the popular iPod. It incorporates an RFID reader and a wireless card. The former is capable of reading the RFID tags the device is at which it is pointed and the latter interfaces with the in-store wireless network. (See figure 2 for a conceptual example of this device and how it would attach to the iPod.) Note: the images are modified versions of Ingenico's iTrip device (iTrip, 2007)

Figure 2: The kPod hardware on its own and attached to an iPod

The final, fifth element of the system is the software application running on the iPod. It has four basic functions: it tells the RFID reader when and what to read; transfers the identified tag's characteristics to the wireless card; uses the wireless network to pull the product's information from the database; and displays the information.

In the remainder of the proposal I will refer to the combination of the last two pieces, the hardware and the software, as kPod.

Using the kPod

Figure 3 provides an overview of the process of shopping augmented by the use of kPod. It is followed by a description of the shopping experience.

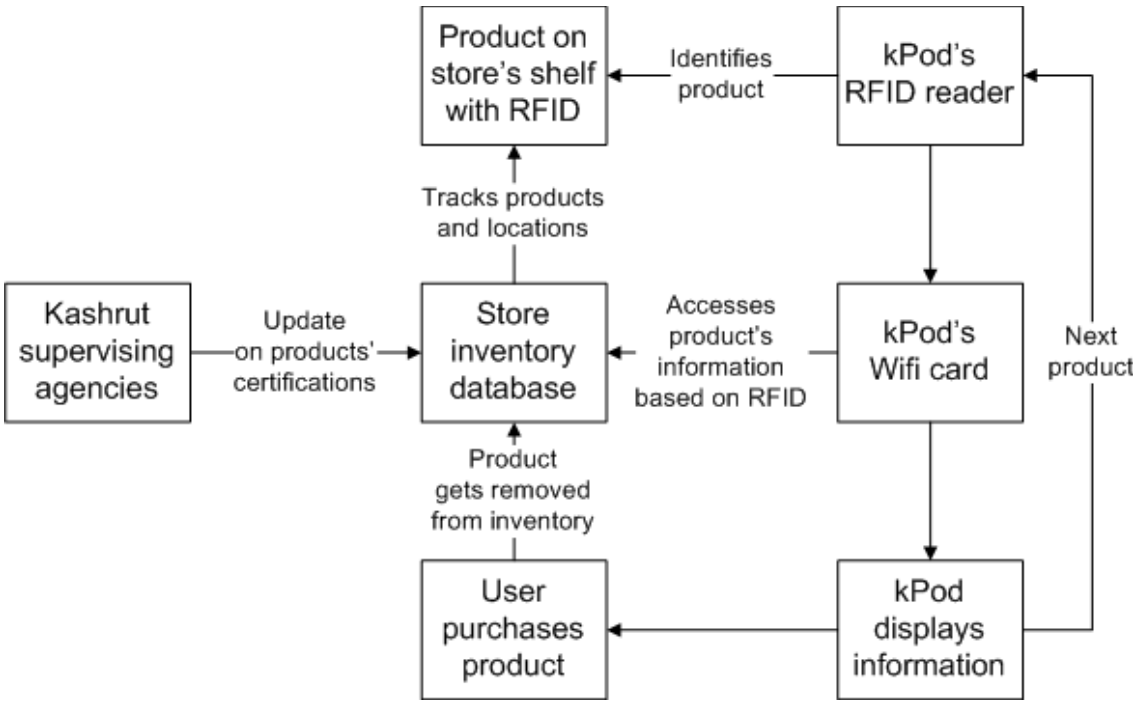

Figure 3: Using the kPod

The customer is walking in the aisles of the store with her iPod/kPod in hand. She points it to a product and the built in RFID reader identifies the product, based on the product's RFID

tag. The technical problem of identifying one specific RFID tag in the presence of thousands or hundreds of thousands of others has been already resolved. One of the main reasons I selected RFID technology over existing barcodes is the lack of line-of-sight requirements. RFID readers do not need to be lined up precisely; unlike the barcode reader needs to be aligned with the barcode, to read the information. Other advantages of RFID technology include higher data capacity and read/write capability.

Next, the kPod's wireless card sends the identifier tag via wireless network to the database. The database contains continuously updated information about the products status including level of inventory and whether the product's *hechsher* is still current or if the certification has lapsed. (Note: This paper does not address the technical and logistical requirements for maintaining this system. Instead it assumes that a system has been worked out with the cooperation of the supermarket, the item suppliers and the *kashrut* supervising agencies. I acknowledge that it not a trivial matter, but the focus of this paper is one the foundations, background and interface. The decisions of implementation would require a strong partnership between the three entities listed above.).

Next, the kPod receives all available information about the product. The iPod's screen displays the most current and appropriate *hechsher* and selected related information, based on the user's pre-programmed preferences.

This is a reiterative process; the cycle can be repeated as many times as necessary.

Stakeholders

A key feature of Value Sensitive Design is its emphasis on stakeholders. "*Direct stakeholders* refer to parties who interact directly with the computer system or its output" (Freier

et al, 2005, p.2), in the kPod's case observant Jews. Therefore the focus of this paper, after a brief treatment of other stakeholders, will be concerned with the values of this group

Depending on the frequency of their interaction with the system, the employees of the company implementing the solution could be considered either direct or indirect stakeholders. The latter "refers to all parties who are otherwise affected by the use of the system." (Freier et al, 2005, p.2) Because they do not form a single, identifiable group it would be challenging to consider their values. Instead I will briefly examine their employer's values and interests.

The advantage of the kPod system for grocery stores is multifold. They can increase customer loyalty by showing special attention to the niche market. As I will discuss in the expandability section, the solution can be extended to various groups of users. The stores can achieve a competitive edge by offering a unique approach to serve their customers. By tracking the information of what the customers have viewed compared to what they have bought they will have a better inventory tracking and can finetune their just-in-time supply chain. Any implementation of this last potential, however, needs to be done in a way that does not harm the direct stakeholders' values and interests.

Values and Implications

Trust

The consumer places her or his trust in the *kashrut* supervising agency and accepts its certification as valid. For a successful implementation of the kPod technology they are being asked to extend this trust to previously unknown parties, such as the software developer, the grocery store, the security of the network or the people keeping the database up-to-date. If the customers do not trust the reliability, integrity and authority of the system the kPod plan cannot thrive. The solution to this issue has two sides. First, a trusted authority, either the local rabbi or

the kashrut supervising agency has to extend its services to examine and vouch that the chain of information dissemination does not compromise the data integrity regarding kashrut status. This information needs to be displayed on the iPod's screen assuring the user that s/he can trust the system. For example, the startup screen of the software can display the signature or other sign of the local rabbi's approval along with the date of when the system was last checked.

Relation to Technology

In some orthodox communities certain types of modern technology is looked upon as a potential distraction from the preferred lifestyle leading to secular, discouraged activities. Therefore, the design and the marketing of the product have to be sensitive not to intrude into these markets and alienate potential customers. I suggest two ways of accomplishing this. Before considering the product for a certain store, it needs to be approved by a local rabbi. If he deems it kosher, others will be more likely to use it. Also, the marketing of the device will emphasize that it can access information that is pertinent to the user population and will explicitly say that other information will not be displayed. This is important because wireless devices that can access the internet are often discouraged for the above mentioned reason. The kPod is not an internet device and should not be marketed as such.

Freedom of Choice

The Orthodox Jewish community is not a monolithic; numerous branches exist with slightly different understanding of the laws of *kashrut*. Accordingly, the various supervising rabbis and *kashrut* agencies have different *hechshers*. Members of a particular community usually follow the advice of their own rabbis' affiliates whether a particular *hechsher* is suitable for them or not. Therefore the software interface for kPod has to be granular enough to be programmed according to the needs of the individuals or particular communities. It must be able

to recognize all *hechshers* and also any subset of them, depending on the rabbinical approval and the user's preference.

Informed Consent

Information the store wishes to gather about the use of kPod devices on its premises has to be handled delicately. Users have to be provided with a choice whether they allow this information to be gathered or not. From the consumers' point of view an "opt-in solution is attractive because participants must take an explicit action" (Friedman, 2005, p. 7) to register consent. However the solution has to be simple as well. Friedman's suggestion of an "on the-fly opt in/opt out [option with a] simple toggle switch." (ibid) could work for the kPod system as well. The interaction design of the software needs to make sure "that the disclosure [regarding informed consent] is communicated in a comprehensible form." (Freier et al, 2005, p. 3)

Privacy

The software needs to protect the privacy of the users by containing the scope of the "how and to whom information about the user is distributed." (ibid) This is a particularly sensitive issue for Jews, because the availability and successful gathering of information about them enabled the Nazis to engineer the devastating genocide of the Holocaust in the 1930's and 1940's. Ever since then, some Jews are more predisposed to decline to consent information gathering about them.

The technical aspects of the solution for privacy needs can encompass the above mentioned method of assuring informed consent, securing every element of the involved technology infrastructure (assuring that data will not get into unintended hands), and "splitting information into separate, unconnected representations." (ibid)

Small World Theory's Influence

The social norms of Orthodox Jews are derived from three closely interrelated sources. Technically, they follow Biblical tradition, or at least their understanding of the commandments laid down in the Hebrew Bible. Practically, those laws went through thousands of years of continuous interpretation, creating a plethora of rich traditions. These elucidations influence their social norms and behavior. However their daily life is probably influenced to at least the same extent by their immediate community and its expectations. All the values mentioned in this paper are values imposed onto members of the community by these three sources, but predominantly the last one.

Because of this tight-knit nature and because the delineation between insiders and outsiders is clear and rarely permeable this community can be described as a closed social universe. That is one of Chatman's definitions for "small worlds." Her formal definition of the term is a place where "everyday happenings occur with some degree of predictability." (Chatman, 2000, p. 3) This also describes my target group, because a large portion of their daily routine is predefined by the aforementioned commandments and adherence to the letter of the law.

Their sense and understanding of trust, informed consent, and relation to technology is mostly set by the opinion leaders of the community (often the rabbis) and influenced by the whole of the community itself. Therefore, the design of a product like kPod needs to integrate the values and social norms of the entire community. Peer pressure exists to eat kosher. Shopping with a kPod in hand can show (off to) friends who may pass by in the store the extra attention one pays to buy kosher products.

"Community, at times requires a sense of presence among its members, and, at times, the ability for members to withdraw." (Friedman, 2005, p. 2) The fact that members of the Orthodox

Jewish community live a life that is somewhat closed to the outside world, but much more open to the insiders does not mean that they would have less need for privacy. They need "to guard themselves against unwanted exposure" (Chatman, 1996, p. 199) like everybody else, maybe even more. Repercussions for non-compliance with the community standards are harsher in the "small world" than outside. This is why protecting their privacy is important along with ensuring their freedom to choose (in private.) The kPod solution needs to balance the needs of the individual, the community, and the organization.

Even small worlds can be divided. For example some Orthodox Jewish communities are divided by two social types: the people who became orthodox as adults, known as *Baal Teshuvah* and those who grew up observant, known as *Frum from Birth.* Some members of the latter group are prejudiced against the former. With the use of the kPod the *Baal Teshuvah* can show their respect for the kashrut laws publicly and reduce the prejudice against them. Therefore the technology can be an instigator of greater equality within the community. This proves that "a given technology is more suitable for certain activities and more readily supports certain values" (Friedman and Kahn, 2000, p. 163).

Interaction Design

Because of the relatively small size of the iPod screen and the limited scope of kPod, its interaction design does not need to be overly complicated. Therefore I feel that I do not need to provide a screen-by-screen or storyboard representation of the software interface. Instead, I will address the six most important usability goals: effectiveness, efficiency, safety, utility, learnability, and memorability. (Preece, Rogers, and Sharp, 2002, p. 14)

The kPod's effectiveness, "how good a system is doing what it supposed to do" (ibid), can be measured whether it can identify the RFID tags, access the database and display the

appropriate information on the screen. In case of error it has to provide a simple and clear error message. Otherwise its functioning should be transparent.

"Efficiency refers to the way a system supports users in carrying out their tasks." (ibid) In this case the question is whether the *hechshers* are displayed properly and whether it speeds up the process of finding the right items for the users. From an interaction design point of view this means that the hechsher should be displayed in large size on the screen and switching from one item to another should be as fast as the user needs it to be.

"Safety involves protecting the user from dangerous conditions and undesirable situations." (ibid) The physical safety of the hardware is a primary requirement, for which the manufacturer is responsible. The kPod should never draw the full attention of the user when it is used in a (potentially dangerous) public space. The social safety aspect means that the device should be easy to turn on and off as the emerging situation requires.

Utility--"the right kind of functionality so that users can do what they need or want to do" (Preece, Rogers, and Sharp, 2002, p. 16)--is addressed by the minimalist design of the interface. By default the software accomplishes only a few basic tasks. These are designed to satisfy the user's shopping related needs. Therefore I suggest limiting multitasking and disabling the other, functions of the iPod, i.e. music playing, while shopping. If any of the features mentioned below in the expandability section is incorporated into the design, the issue of utility will have to be revisited.

The last two aspects, learnability and memorability (i.e. how easy a system is to learn to use and how easy is to remember how to use it) should not be a problem for iPod users, because the software will utilize standard Macintosh interaction principles and symbols. Assuming users

are familiar with them there is practically no learning curve in getting familiar with the kPod interface.

I would like to reiterate two interaction design related features mentioned earlier. The software startup screen should include the rabbis' signature or sign, signifying of his approval of using this system. If the store decided to collect information about the use of the kPods, the users need to be given an on-the-fly option to opt in and out of this practice.

Expandability

The focus of this paper is narrow compared to the possibilities I could explore around this technology. For example, the kPod could display nutritional information; content of irritating ingredients for gluten or milk intolerant people; organic or green status; WeightWatchers point equivalency; caloric value; and information about common ingredients causing allergic reactions. The possibilities are endless; the product has the potential to reach a much wider audience, and *kashrut* is just a first application for this potentially widely useful technology.

The software component can also have additional features. It can program itself, for example, to learn the owner's favorite items and create suggested shopping lists. At the same time, through its connection to the database it could alert the user if the shop does not carry something the owner preferred in the past.

Social and communal components can also be built-in. Users could rate products and these ratings could be shared with other shoppers. Another kind of data could also be shared with the community if the store's policies do not prohibit them: displaying what are the most popular items in terms of number of purchases at a given store.

The hardware can be enhanced too, e.g. to include a checkout function. A company called Ingenico already developed a method that allows paying for purchases with the use of iPods.

(Cash, check, or iPod, 2005) Therefore the kPod could be used not only for getting information about the products, but as a checkout scanner and as a payment method.

I have just scratched the surface of the range of possibilities; there are many to explore in the future.

Inspirations

This product drew inspiration from two sources. The ABC television network's *Nightline* program had a 15-minute segment on IDEO, a design company. In it, the company was asked to demonstrate its unique methodology by coming up with an innovative concept for the common shopping cart. Part of their solution was a handheld device, attached to the cart that can display price information of a product, based on its barcode. (Shopping Cart Concept, 2007) As I have mentioned, using RFID technology the process of accessing product information can be made much faster, because the barcode does not have to be physically located by the user. It is sufficient to point an RFID based device to the general direction of the product and does not have to be precisely targeted to its barcode.

A second source for the idea of this product came from the Davka corporation's "iDaven for iPod" product. (iDaven for iPod, 2007) It displays all the common blessings and prayers for daily Jewish life in Hebrew/Aramaic on the iPod's screen. This makes the words of several volumes available on a small, multifunctional device. The product's availability made me realize that iPods might be just as popular amongst Jews as in the larger population. Another sign for this is that podcasts catering to the orthodox community are widely available, proving that the use of iPod is accepted (and encouraged, within limits) by the target audience. Thanks to these products, I became aware that the iPod can have other uses, more suitable for the studied group, beyond listening to music, watching videos and viewing pictures.

Great minds think alike: on the last day of my research I found out that a similar technology has been in use in Canada for over two years. Springboard's Concierge product is built into the handle bar of the shopping carts and is an "interactive touch-screen computer that uses a wireless in-store network." (Concierge, 2007) It is different from kPod in several aspects, most notably it is advertiser driven, it uses the older barcode technology rather than RFID and the direct stakeholders' values are less considered.

Conclusions

kPod as an idea provided a great opportunity to use Value Sensitive Design methodology for understanding the values of a clearly definable community and their implications for an interactive device. The technology would be relatively simple, easy and inexpensive to implement and it is expandable to several levels and directions. While a dedicated device built-in the handlebar of a shopping cart maybe more universal, the costs to the stores and the potential for not considering the users' values would be both much higher. Hopefully, in the not too distant future it will be commonplace to see people at the supermarket waving their kPods as magic wands that helps them make more informed choices about their purchases.

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