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# USING CROWD SOURCING TO SOLVE THE FITTING PROBLEM IN ONLINE FASHION SALES

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## ABSTRACT

Consumers struggle to find clothes that are fit. This is a problem that has been accentuated with the increasing online sales. It is the largest contribute to sales returns and make customer return about every third item they buy (Ratcliff, 2014). If consumers select to buy online, they can no longer try them out in a fitting room. Most of fast fashion brands have opened their online shops, and many designers' brands have also started to sell their ready-to-wear lines online. While online shopping is seen as a significant new way to reach more consumers in fashion industry, the size problem becomes more visible and is waiting to be solved. It may decrease the fashion industry's ambition to piggyback on recent advances in e-commerce.

Previous studies on clothing consumption have already touched upon the topic of size and fitting. Consumer surveys in the clothing industry indicate that in general between 35% and 50% of female consumers in the USA were not satisfied with the fitting in their clothing already ahead of the surge in online stores (Desmarteau 2000; Goldsberry et al. 1996). Alexander et al. studied the shopping behaviour of young women in south-eastern USA and found that almost 64% of the respondents frequently changed ready-to-wear clothes to achieve the desired fit (Alexander et al. 2005). Ashdown and Loker pointed out the size problem in current clothing shopping experiences and proposed a conceptual framework called "mass-customized target market sizing", which is a size system "based on and derived from measurement data exclusively from the people who represent an apparel firm's target market" (Ashdown and Loker 2010, p147). In this paper we study how innovative mobile technology, social media and crowd sourcing can contribute to solving the size problem. We summarize the current digital approaches that deal with the fitting issues in online clothing shopping and present a new concept, called "Figuracy", which attempts to find consumers new fitted clothing items through matching their own clothes with anonymous persons' virtual wardrobe. We have built a mobile application to implement the idea and have done two initial feedback studies to see the consumers' attitudes. This concept provides new perspectives and opportunities of tackling the fitting problem in online shopping.

Ready-to-wear and fast fashion brands are selling their clothes all over the world, not just to one local community. This business model of constantly new collections, draws on standardizing size series that come only in a selected number of models. This adds to the

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continuous size problem where the interpretation of a particular size varies in-between brands, and even within different models from a single manufacturer. Firms in the ready-to-wear apparel industry in the world use different sizing systems, like general sizes as XS, S, M, L, or more specific standards as numbered sizes from UK, US, FR systems, which can make consumers confused. These sizing systems are usually based on the ideal body types of consumers from certain geographic regions (Nordic Council of Ministers, 2009), thus, a size standard from one region may not fit all types of body within this region. What's worse, there has been vanity sizing in clothing industry in recent several decades, which actually makes the garments of the normal sizes bigger in physical size (Dooley, 2013). This adds to the difficulty of finding well-fitting apparels.

Recently, a few companies have provided a number of solutions to the fitting problem. The solutions are based on fine-grained automatic body measurements; self-generated extended body or garment measurement and body matching. First, the approach to use technology for more automatic and detailed measurements has attracted many interests. For example, it has been to generate a visual presentation of the body by using three-dimensional scan technology. Then consumers do not need to type information manually. A UK-based company, called Bodymetrics, provides the services that use three-dimensional body scanner and "On-line Virtual Try-On" technology to help find the perfect pair of jeans. Second, there are a number of services that require users to manually type the measurements of their bodies or garments that they own and fit. It can be done by users input information of their body types by answering simple questions, such as weight, height, body type, or measurements of bust, waist and hip. Some systems like Mipso, SmartFit can add more personal preferences, such as colours, cuts and budgets. Then the system runs some algorithms to determine the users' full set of body measurements. It can also be done such as Virtusize, Truefit and Clothes Horse by measuring a garment that the user knows it fits in detail (Perez, 2012). When the personal data is added to the service, it can then match individual's body measurements with specific brands and sizes of garments. The service recommends fitted ready-to-wear clothing from various brands in online stores, like Fashion Metric and Virtusize. The data can be used to see how fitted the clothing item in an online website is on a virtual avatar built upon the input measurements of the users, like in Virtusize and Mipso. Third, it has been suggested to use self-described body descriptions and then match consumers' new purchases as a way to recommend clothes that are fit. For instance, Fitbay attempts to personalize clothes suggestions based on the selection of other users with similar descriptions of size and body shape (Lomas, 2014). Through the help of anonymous persons in the community, one could find fitted clothing items.

We investigate a fourth approach, called "Figuracy", where people get suggestions on the garments that are fit by crowd sourcing their existing clothing items and then matching wardrobes among members in the community. It draws on utilizing the matching of consumer-generated data, i.e. crowd sourcing as Fitbay also does. But it uses a description of existing fitting garments in people's wardrobes in terms of brands, models and size, rather than self-description of bodies. The idea depends on that a community of people are willing to share information of their favourite and fitting clothes from their own wardrobes. The system matches the clothes from one wardrobe with that of other

members in order to recommend new fitting clothes to the user. In specific, if the system finds that a user shares a single clothing item with another person in the community, it will predict that the two of them have similar body types. Then it recommends other items from the second person's wardrobe to the first user. Therefore, the system gains data from the fitting clothes in users' wardrobe and matches the information with the items from someone else' wardrobe. If the approach is successful, consumers would not need to input any personal body-data but only data on existing fitting clothes. The concept depends on the existence of a massive database of clothing items from individual wardrobes, i.e. a critical mass, which is also a big challenge to build.

The Figuracy concept and implementation is at an early state and it has not yet the amount of content to start generating matching suggestions. Still, the concept is intriguing and the size problem is highly relevant. Thus we were interested in acquiring early users' feedback. We have done two user studies of two variations of the concept, with a focus on one type of clothing item- the bra. Bras have high requirements on fitting (Chena et al. 2010) and it is considered specifically difficult to find garment of this type that is fit. Since the number of test persons was limited to around ten people each, the system did not generate any matching suggestions. The first test was done in November in 2013 on the app that was available in iPhone's App-store. This version of the system reads the barcodes, which are usually attached to the price tag, to acquire a unique identifier for brand, model and size. We invited the participants to download the app and scan the barcodes of fitting bras when they try new bras in stores. We conducted phone interviews with six participants. The early feedback identified that users hesitated to add garments based on the barcodes. They did not feel comfortable with adding it in a fitting room in a shop, and they did not have any saved prize tags for the bras at home. Thus, although the barcode is theoretically and technically an easy and effective way of uploading garments, it proved to be inadequate in practice. Based on this feedback, we built a new version, which includes a manual and text-based tag function allowing users to add information about a garment, which do not require barcode reading. The second user feedback study was carried out in December in 2014. We recruited female students on the campuses of Stockholm University and Royal Institute of Technology in Stockholm, Sweden. In the end, nine participants tested the application and input data of their bras at home. After the try-out, we contacted the participants for either a phone interview or a face-to-face interview, each of which lasted between twenty and forty minutes. Each interview was recorded and transcribed. We used a method of qualitative content analysis to study the transcripts. "Qualitative", as opposed to quantitative, indicates that the analysis goes beyond systematic data coding to identify interesting topics and allow us to contextualize the interpretation of the materials, given theoretical preconceptions (Mayring 2004).

Through studying the transcripts, we find the following preliminary results. First, our participants all provided concrete examples of size problems they met in real life. Seven participants considered bras as one of the clothing items that are most difficult in this respect. Three participants stated that size should not be independent from other qualities, such as comfort and style. This implies that future design of similar systems may take into account not only sizes, but also other aspects of clothing. Second, in terms of the input function, all of them followed the instructions and managed to input information of

their fitted bras from their wardrobes. Seven participants considered it easy to use while two of them thought it was a bit confusing when to add information. They got stuck at whether they should scan the barcode or just type, since the two functions were presented in one place. All of them used "type" to add items and thought the information on what they should input was acceptable. Four participants felt it complicated to take photos by themselves, so they downloaded pictures from the Internet. In addition, the participants tended to add the latest and favourite items from their wardrobes into the system. Thus these items could represent their personal tastes and styles, which will be useful to link fitting and styles in the future improvement of the application. This also points to a general problem. From an individual perspective, a single item would in the long run be enough to get matches from other people's wardrobes, if they have added more than one item. If they also only add only a single item, the first person would not get any matches. The users must crowd source their wardrobe, and not for example their latest purchase. The user study shows that this concept might be restricted by users' unwillingness to present data in such a way. Third, as to social interaction, eight participants at least "liked" one item from others' wardrobe. Although none of the participants commented on other's items, they all thought it was important to have some kind of social interactions. Four participants expected more interactions, such as reviews and discussions of certain clothing items, or following fashionable people. Most of the existing fitting systems, except Fitbay, lack the opportunities for social interaction, but Figuracy provides such a platform for users to share their interests and exchange their ideas. Two participants asked for increased opportunities to add the information on their own profile pages even though they were sharing images of their underwear. They asked for means similar to those available when building a blog space so that people in the community would get to know each other better. According to the participants, more social interactions could make them more engaged with the application. Social communities are good for those looking to learn, help and/or support like-minded individuals with common interests. Last but not the least, most of the participants were very interested in the "buy" function, which link the item to online shopping sites. But still three participants revealed their concerns and discussed the problems of it, such as how the system can guarantee the fitting of the item if they conduct a purchase through the system.

In sum, the use of crowd sourcing and social interaction to fixing the size problem in online shopping gained great interests among participants. However, they also expressed their uncertainties towards how the system would work. They needed the system to make sure that it could provide fitting clothing items. They thought the biggest problem was that it was unclear what real help they could get from the application at this stage. Although the application failed to provide new recommendations based on matching, the user study allows us to see the feedback of the potential users so that we could improve the system, such as clearer interaction flows in adding items and more interesting interactions. Future research will continue the improvement of the system, start collaborations with online clothing stores and a third recruitment of users to test. On a general level, the study provides an example on how to investigate critical topics in online fashion through the so-called design research. Such research needs to be interdisciplinary and span technology and social science.

***Keywords:*** online fashion sales, clothing consumption, social science, fast fashion, fashion brand

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