

# Applying a context-sensitivity approach to increase fast food advertising usefulness

Rodrigo Falcão<sup>1</sup>, Vaninha Vieira<sup>1</sup>

<sup>1</sup>Instituto de Matemática – Universidade Federal da Bahia (UFBA)  
Avenida Adhemar de Barros S/N Campus de Ondina – Salvador – BA – Brazil

{rodrigompf, vaninha}@dcc.ufba.br

**Abstract.** *Companies spend too much money on advertising in order to improve their sales. However, the ratio between investment and effective sales is low. Increasing the usefulness of provided ads and discount coupons is an ongoing challenge in advertising. This paper introduces our ongoing research about how (or if) context awareness can improve the usefulness of fast food discount coupons in an ubiquitous advertisement environment. We intent to conceptualize context for the domain, elaborate a model context that takes into account not just the relevance of each contextual element, but the strenght of the relations between contextual elements (that we call “contextual synergy”), and perform an experiment to measure the possible gain.*

## 1. Introduction

A fundamental challenge in the scenario of ubiquitous computing [Weiser 1991] is to develop “calm technologies” (that inform and calm), where computers act on both focus and peripheral of human attention, making information transit easily between these two areas [Weiser and Brown 1997]. Context-sensibility is a core aspect of ubiquitous computing [Strang and Linnhoff-Popien 2004] [Baldauf et al. 2007] and context-sensitive systems are applications that use context to adapt its behavior in different situations or circumstances, promoting more relevant services to users or providing information for better tasks performing. [Vieira et al. 2011a].

Researchers [Müller et al. 2011] have employed efforts to promote alignment between ubiquitous computing (UC) and advertising, given the fact that the results produced by the first area reveal themselves useful to meet the challenges of the second. Ubiquitous advertising is the given name for the use of ubiquitous computing technologies for advertising purposes [Müller et al. 2011] and it is faced as “the killer application for the 21st century” [Krumm 2011].

In this work, we focused a specific class of advertisements – offers, in form of discount coupons – and how the use of context can make them more useful to customers. The main idea is to take advantage of user, advertiser and environment context to deliver a high redemption-prone coupon to the customer.

## 2. The Problem

John Wanamaker, a department store owner and pioneer in marketing [Tucker 2011], said at the ending of 19th century he knew that half of the invested money on advertising was wasted, but his problem was he didn’t know which half [Keyes 2007].

One hundred years after, it is not that different. According to a study presented in 2006, it

is estimated that less than a half (41 %) of all resources applied in advertising effectively promotes sale of products and services [Marsland 2006]. It is necessary to spend continuous efforts in order to discover ways to increase the sales [Lasinger and Bauer 2013], knowing how useful ads can be. In other words, to know ads usefulness, i.e. its capability to produce a sale.

Among the main problems that advertising faces are *targeted advertising* and *evaluating ads effectiveness*. In 2009, there was a record of coupons distributed in United States: 367 billions. However, in the same year, the redemption rate of these coupons was only 1% [Spiekermann et al. 2011].

Although discount coupons are not so popular in Brazil as occurs in US, there is indicators of behavior changing. In the last years, there was a boom of Brazilians coupons websites, and according to Google Trends, searches for “discount coupons” (in portuguese) nearly tripled between 2011 and 2013 [Google 2014] .

Thus, the problem we are dealing is how to improve the usefulness of discount coupons. As we said first, our application domain is fast food restaurants. We’ve reviewed research on context-sensitive mobile coupons and they are scarce.

### 3. Proposed Solution

In order to improve the usefulness of discount coupons, we designed CSCoupons (Context-Sensitive Coupons), an ubiquitous and context-sensitive offers delivery platform for mobile devices. We seek to investigate in which ways ubiquitous computing techniques can address the ad’s usefulness problem. As a motivating scenario, for the current version of our proposal, we consider the domain of discount coupons delivered in fast food restaurants area in shopping malls. CSCoupons is a mobile application that presents daily discount coupons to users, according to variations observed in his/her context.

For modeling a context-sensitive system, it is important to identify what is considered “focus of attention” [Brézillon and Brézillon 2007] [Vieira et al. 2011b], which involves recognizing the actor performing a task that can be enriched through using context. In CSCoupons, the actor is the consumer (ad’s target) whose task is to find a fast food restaurants to lunch in shopping malls. We identified four entities: Consumer, Restaurant, Coupon and Environment. For each entity we indicate the considered contextual elements raised during the problem analysis (e.g. time, location, user preferences etc.). Contextual elements can be static (does not change over time), dynamic (changes over time), explicit (informed by the user) and implicit (obtained without user intervention).

We are going to run a survey with advertisement professionals in order to confirm (and improve) the list of contextual elements we’ve raised before. Moreover, we want to rank contextual elements by relevance and recognize meaningful relations between them. After we analyse data, if necessary, we will realize some interviews with these domain specialists.

From knowing these contextual elements and their relevance, we will conceptualize context for fast food coupons in two ways: first, as a hierarchical structure (as done by [Bauer and Spiekermann 2011] for generic pervasive advertising), and second, as a graph where contextual elements are going to be vertices and the strength between them are going to be edges.

#### 4. Evaluation

We will build two apps, actually prototypes, for delivering fast food discount coupons: one will be context-sensitive featured (*CSCoupons*), and the other won't (named *SimpleCoupons*). These apps will load a certain number of coupons for fast food restaurants located at the main shopping malls in Salvador, Bahia. Both apps will store the same coupons. This number of coupons intends to cover most of real menu options for a variety of kinds of food available in fast food restaurants placed at shopping malls in the city.

So an experiment will be performed to compare the usefulness of discount coupons delivered through these apps. A number of participants will be selected to use each app during a 30 days period. As *CSCoupons* app is context-sensitive, it implements the context model and will notify the user only if it finds a discount coupon matching user needs. The *SimpleCoupons* was developed to support the experimental studies and does not consider context changes. It shows at start up a discount coupon offer (identified randomly). Both applications produce only one coupon per day, so after accepting or refusing an offer, no more coupons will be available until the end of the day (when the coupon expires). At the end of the experiment period, log files will be collected from volunteers' devices. The log records date and time of coupons offering, and the consumer's decision (accept or refuse). The offer's usefulness for a volunteer  $i$  ( $U_i$ ) is given by the ratio between the amount of coupons accepted ( $A_i$ ) and the total generated offerings for that volunteer ( $O_i$ ). The offers's usefulness for each application ( $O_{U_i}$ ) is given by the sum of offers' usefulness for each participant  $i$  in the experiment with the application, divided by the total number  $n$  of volunteers using the application.

We had runned an preliminary version of this experiment [Falcão and Vieira 2013] and our partial findings are reaching our expetactions.

#### 5. Conclusion

This work presents an opportunity to increase the usefulness rate of advertisements through features of ubiquitous computing. For this, we are focusing a specific type of ad (discount coupons), for a specific domain (fast food restaurants). We've already raised a number of contextual elements for the task performed by the user ("to find a place to eat") and we are going to perform a survey with experts to confirm, improve and rank this (and others) contextual elements – and identify meaningful relations between them.

Two apps will be build: *CSCoupons*, a context-sensitive featured smartphone app to deliver fast food advertising, and *SimpleCoupons*, a similar prototype however without use of any context information. An experiment will be conducted in order to evaluate the usefulness of offers delivered by *CSCoupons* against *SimpleCoupons*. We do believe the *CSCoupons* experience leads to a calmest, pleasant and, therefore, useful user experience. For instance, not annoying consumers with things that do not matter to him/her, perceiving him/her in a non intrusive way and engaging him/her in opportunities only at the best time, location and for best reason.

#### References

- Baldauf, M., Dustdar, S., and Rosenberg, F. (2007). A survey on context-aware systems. *International Journal of Ad Hoc and Ubiquitous Computing*, 2(4):263–277.

- Bauer, C. and Spiekermann, S. (2011). Conceptualizing context for pervasive advertising. In *Pervasive Advertising*, pages 159–183. Springer.
- Brézillon, J. and Brézillon, P. (2007). Context modeling: Context as a dressing of a focus. In *Modeling and Using Context*, pages 136–149. Springer.
- Falcão, R. and Vieira, V. (2013). Cscoupons: applying context-sensitivity to increase fast food advertising usefulness. In *Proceedings of the 19th Brazilian symposium on Multimedia and the web*, pages 67–72. ACM.
- Google (2014). Google trends: pesquisa na web do google interesse: cupom desconto. todo o mundo, 2004 – presente. <http://www.google.com/trends/explore#q=cupom%20desconto>.
- Keyes, R. (2007). *The quote verifier: who said what, where, and when*. Macmillan.
- Krumm, J. (2011). Ubiquitous advertising: The killer application for the 21st century. *Pervasive Computing, IEEE*, 10(1):66–73.
- Lasinger, P. and Bauer, C. (2013). Situationalization, the new road to adaptive digital-out-of-home advertising. In *Proceedings of IADIS International Conference e-Society*, pages 162–169.
- Marsland, L. (2006). How much advertising really works? <http://www.bizcommunity.com/Article/196/119/9593.html>.
- Müller, J., Alt, F., and Michelis, D. (2011). *Pervasive Advertising*. Springer.
- Spiekermann, S., Rothensee, M., and Klafft, M. (2011). Street marketing: how proximity and context drive coupon redemption. *Journal of Consumer Marketing*, 28(4):280–289.
- Strang, T. and Linnhoff-Popien, C. (2004). A context modeling survey. In *Workshop Proceedings*.
- Tucker, J. (2011). What’s a good job for? <http://mises.org/daily/5171/Whats-a-Job-Good-For>.
- Vieira, V., Caldas, L. R., and Salgado, A. C. (2011a). Towards an ubiquitous and context sensitive public transportation system. In *Ubi-Media Computing (U-Media), 2011 4th International Conference on*, pages 174–179. IEEE.
- Vieira, V., Tedesco, P., and Salgado, A. C. (2011b). Designing context-sensitive systems: An integrated approach. *Expert Systems with Applications*, 38(2):1119–1138.
- Weiser, M. (1991). The computer for the 21st century. *Scientific american*, 265(3):94–104.
- Weiser, M. and Brown, J. S. (1997). The coming age of calm technology. In *Beyond calculation*, pages 75–85. Springer.