

DISPLAYING DYNAMIC CARBON FOOTPRINTS OF PRODUCTS ON MOBILE PHONES

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Abstract

Several brand owners are calculating the carbon footprint of sample products and intend to make the information available to their consumers as a label on the product. A physical label on the items or on the retail shelf will not be flexible enough to show the carbon footprint because of the dynamic nature of carbon emissions and the potential difference in footprint between instances of the same product. In this demonstration, we show an alternative to a static physical label, namely an NFC-enabled mobile phone that displays the carbon footprint of tagged products. In addition to demonstrating the dynamic nature of carbon footprints, our prototype shows how consumers can be empowered with knowledge about the products they buy.

1. Introduction

Companies such as Coca-Cola, Cadbury Schweppes, and Kimberly-Clark identified the value of communicating the carbon footprint¹ of their products to end consumers who increasingly consider environmental aspects in their purchasing decisions [3]. Prominent efforts to calculate the carbon footprint of particular products are the pilots conducted by Carbon Trust with brands such as Walkers and Trinity Mirror [2]. Furthermore, CarbonCounted² provides an online application for brand owners, also for the purpose of calculating a product's footprint along the supply chain.

The above-mentioned approaches do not take the dynamic nature of the carbon footprint into consideration. Namely, when different suppliers have different footprints, or when there are temporal or spatial variances between different instances of a product, the use of average numbers results in inaccurate results. For example, fruits bought in different seasons of the year will require different periods of chilled storage, resulting in carbon footprints that vary over the year. Also, different instances of products may be shipped over longer distances or subject to production processes of

¹ "The carbon footprint is a measure of the exclusive total amount of carbon dioxide emissions that is directly and indirectly accumulated over the life stages of a product." [4]

² www.carboncounted.com

varying efficiency, also resulting in different carbon footprints. Taking the dynamic nature of carbon footprints into consideration implies that the difference among items should be made available to the consumer at the point of sale. Using traditional paper labels on products to display their carbon footprint will hinder the automatic retrieval and display of the dynamic information to the consumer. In the next section, we will explain our demo and show how it can support the consumer when checking the carbon footprints of products different instances of the same product.

2. Carbon Footprints on Mobile Phones

A user is expected to carry out the demo using our NFC-enabled mobile phone to retrieve the carbon footprint of particular products. Also instrumental is the user's feedback to the idea, his interaction with the technology, and its potential effect on his purchasing decisions as a consumer. This demonstration has in particular the following purposes:

1. Allowing a consumer to easily and intuitively retrieve the carbon footprint of a product.
2. Showing that different instances of similar products can have varying footprints.
3. Observing the users' feedback to the technology and collecting data that would help in measuring the technology's effect on the future habits of consumers and brand owners.

Demo Scenario

The demo scenario comprises three stages, each aims at fulfilling one of the purposes listed above.

Stage 1: A consumer equipped with an NFC-enabled mobile phone is presented with several tagged objects, e.g. refreshments, chocolate bars, meat, etc. The user touches the products with the mobile phone and the carbon footprint of the touched product is displayed as shown in figure 1.

Stage 2: The consumer is then presented with multiple instances of the same product but with differing carbon footprints. Using the same procedure as above, the user can verify that the distinct items, having different unique identifiers, have unequal footprints. The reason for the different carbon footprints can be attributed to manufacturing processes with varying energy efficiencies, longer refrigeration periods, and shipments across long distances, etc. Part of the user experience will be to reason about the presented products and try to deduce the reason behind the footprint discrepancy among several product instances. Sometimes the differences will be evident on the products themselves. For example consider two variants of a product, one manufactured in the same city as the demo location and one in another continent. The user might be able to deduce that the longer shipping distance of the latter is the cause of its higher carbon footprint. Another example is a frozen meal which was manufactured significantly earlier than another, causing it to be refrigerated for a longer period, thus having a higher carbon footprint. The user might be able to reach this conclusion by examining the manufacturing date of each meal. If the user doesn't deduce the reasons behind the different carbon footprints alone, he would be guided through this information with the help of supporting slides and carbon dashboards

Stage 3: We aim at collecting the users' feedback to the technology and namely their willingness to check the carbon footprint of a product before buying it. Willing users will be asked to answer a few questions that will help us in further research to estimate the technology's effect on consumer behavior and the brand owner's strategies.



Fig. 1. The carbon footprint of a beverage displayed on the mobile phone

3. Outlook

This demonstration shows how the dynamic carbon footprint of products can be easily displayed on consumers' mobile phones. This leads to several opportunities as well as challenges for further research in different fields. First, the data required to calculate a dynamic carbon footprint which is item-specific should be stored in adequate information systems and aggregated across different enterprises. A possible solution for this is to use EPC Information Services [1], but their suitability for this purpose should be verified. In addition to the Information Management aspect, future work should aim at displaying the relevant information to the consumer in the most effective way. There are several possible modes of presentation, such as using absolute numbers as we currently show, but also using color indicators, animations, etc. The footprint information can also be aggregated by target group, e.g. by individual, by household, over time, etc. The roles played by the appropriate mode of presentation and level of aggregation should be examined as part of user studies that analyze the different factors affecting consumers' behavior. Finally, the goals and requirements of the retailers and their suppliers should be studied in detail.

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4. References

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