

my2cents

*Digitizing consumer opinions and comments
about retail products*

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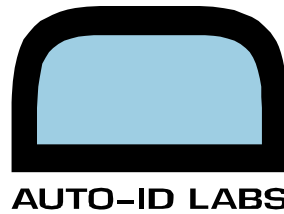
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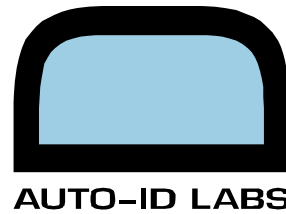
Abstract

Consumers seek for trusted advice during buying decision. Brand owners and retailers invest large sums in marketing and market research, trying hard to find out what customers really want. my2cents is a mobile application for reading and sharing comments and ratings on retail products. Consumers have access to comments about a product via their mobile phone and can share their own product experience with other consumers and within their social networks. They benefit from the experience of other consumers and trusted friends. Brand owners and retailers benefit from tracking consumer opinions and brand recognition at low cost. This paper describes the development of this application and first results from deployment in practice.

1. Introduction

“Which pasta should I take? What do they taste like? Why do they differ in price? What do others think about this product or this brand in general? ...” - staring at a myriad of indistinguishable products oozing out of a supermarket shelf can be quite overwhelming. Looking at the label only does not necessarily say a lot about the product. Do product labelling, the fancy pictures and text snippets provided by the marketing department of the brand provide trust? As other consumers might have already run through this very same decision process and have gained experience, it would be nice to get to know their opinions. Just, how could this tacit knowledge become accessible to everybody? The vision of the Internet of Things envisions a world in which physical objects, information, and internet services blend into each other [1], [2]. Where this vision originates from optimizing supply-chains in retail and handling of goods in logistics [3] only recently also the value for everyday users, consumers and citizens gets recognized [4], [5]. This new focus on consumers in addition to industry scenarios bears the potential of huge number of services [6], [7] which could trigger a new level of adoption of the Internet of Things. Additionally, the phenomenon of microblogging, e.g. on Twitter where people use short text messages limited to 140 characters called Tweets to describe publicly what they are currently drinking, eating, thinking or annoyed about [8], [9], proves the desire (or need?) of users to share and engage in a digital world. According to comScore Twitter could attract 58 millions web visitors in October 2009 who were keen to find out what was happening in the world, what others were tweeting [10].

The engagement of consumers with products becomes evident by the millions of fans of the Facebook pages of popular brands like Coca Cola, Starbuck, adidas and Redbull. Not only does the brand owner share information with their fans, but even more importantly the fans



themselves want to share their experiences and provide feedback on the brand and products, a concept which has been recognized in marketing as digital or electronic word of mouth (eWOM) [11], [12].

Accordingly, we see value in combining the notion of Internet of Things and social media. Linking tweets to products and retail items would make it even easier to share comments and opinions about products. Sharing could happen also more instantly when interacting with the products during purchase, usage, consumption, or disposal.

The majority of retail products is equipped with 1D barcodes today, which Joseph Woodland and Bernard Silver came up with in 1966 and got established as a global standard in 1977 [13]. The incentive of the introduction of the barcode, however, was driven by retail companies and businesses to organize their processes more efficiently, e.g. to increase the check-out processes and inventory checks. Instead, the nonprofessional user, consumer and citizen was never a target. With the new quality of smart phones' cameras, suddenly barcodes become readable for everybody not requiring a dedicated laser-scanner anymore. As 1D-barcodes are ubiquitous on retail products and can be read by any auto-focus camera phone immediately, barcodes are still a compelling technology for linking information to real-world products [14]–[17].

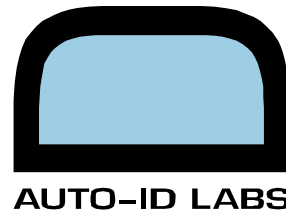
There is a number of mobile phone applications¹ available which use mobile barcode scanning to give best price recommendations from online shops and brick and mortar stores nearby to consumers. These mobile price comparison applications have become quite popular over the last months: For November 2009 ShopSavvy reported up to 100.000 barcode scans per day in average [18].

In this paper we introduce my2cents, a community-based mobile phone application for reading and sharing comments about retail products on the go. my2cents combines the concept of microblogging with mobile product recognition. It generates a product-based information stream and provides consumers with reviews, recommendations and comments related to a product. Users can easily share their own product experience with others and their social network. Our assumption is that the availability of shared product experiences has an impact on consumer behaviour and can lead to better buying decisions. This paper describes the application and system which shall be deployed in order to study real world usage of such an application and its impact on consumer behaviour at a later stage.

2. Related Work

Brody and Gottsman were among the first in 1999 to describe a mobile shopping application with a phone scanning product barcodes. Their applications focussed on mobile price comparison [19]. Novak described a mobile consumer support system based on RFID tagged products in an augmented supermarket [20]. Resatsch et al. evaluated the user

¹ e.g. ShopSavvy, RedLaser, Google Shopper, Barcoo



acceptance of RFID based mobile product information systems [21]. Reischach presented a mobile product recommendation system for consumers that interacts with tagged products through NFC [22]. Reischach et al. have also evaluated product review modalities for mobile phones. They have found that users prefer less and well-aggregated product reviews such as stars or short text blocks on mobile phones rather than long texts or videos [23].

Dellarocas has given a good overview of digital word of mouth systems, their possibilities and challenges, and discussed differences from traditional word of mouth [24]. Dwyer has proposed a page rank mechanism to measure the value of electronic word of mouth and its impact in consumer communities [25]. Jansen et al. have investigated microblogging as a form of electronic word of mouth for sharing consumer opinions [12]. Chen et al. have compared various algorithms for recommending online content using information streams from microblogging [26].

ToTem - Tales of Things is a system which allows people to link their memories and objects in the form of text, audio or video [27]. A similar concept is followed by thinglink, a freely obtainable globally unique object identifier, and a service to link digital content to this identifier [28]. StickyBits is a mobile app to stick digital information to barcodes [29].

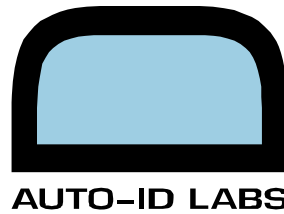
Blippy is a social media sharing site for users to post and follow each other's updates about their purchases of goods and services [30]. One purpose of the site is to facilitate discussion and comparison shopping among people who are connected with each other online. Hollrr is a web application that lets users share favourite brands and products via Twitter and Facebook. People seeking guidance while buying a product can get some valuable information [31].

WhosRich.me is a social utility that tracks friends' shopping habits. Shoppers can show off their new purchases and receive feedback from their friends. An iPhone app allows to share events on the go [32].

Migipedia is the web based product community of Migros, a Swiss retailer. The goal is to feature all the 40.000 retailers' products and to allow users to share comments and ratings. Other consumers and also the retailer can learn about the users' perceptions of specific products [33].

Most existing mobile product information applications focus on price comparison and cost saving opportunities (e.g. ShopSavvy, RedLaser, Barcoo, Google Shopper). Just recently mobile apps for additional product information related to nutrition, health or sustainability have emerged (e.g. GoodGuide, das-ist-drin, foodtracker, codecheck). However, these apps do not allow consumer feedback or leverage existing social networks.

3. Concept



The goal of our presented approach is to leverage mobile consumer-product interaction and social networks to engage consumers to share comments about retail products. Ideally, dialogues about retail products would emerge. Accordingly, users should be able to identify a product, access comments and ratings about this product from other consumers, and to post their own comments and ratings.

First, a mobile application uses the mobile phone's camera to read the product's barcode and capture the product's global trade identification number (GTIN).² In a next step, the application uses this GTIN to query a web service for related information. The web service responds with basic product information (e.g. name, manufacturer and image) and comments and ratings from other users for the identified product.

The basic product information gives positive confirmation to the user that the displayed information has a verified relation to the product; the comments and ratings enable the user to find out what friends or others are saying about the product. This might be interesting for users when using or evaluating the product. It might even help with buying decisions. The application also encourages the user to write and post an individual comment for the previously identified product.

Users should also be able to state their opinion without writing text, i.e. rate the product by pressing a button (i.e. like or dislike). Users can either comment and rate anonymously or use an existing social network account (e.g. Facebook, Twitter, Google) to authenticate. Authentication allows comments and ratings to be linked to usernames and user avatar pictures and thus makes comments more trustworthy. It gives users the additional advantage of filtering and discovering comments from the social network. Authenticated users can also choose to publish their product comments on the social network. This adds content to the user's social network stream or profile and helps distributing comments about the product. It also uses the viral effect of social networks to attract new users to discover and install the my2cents app.

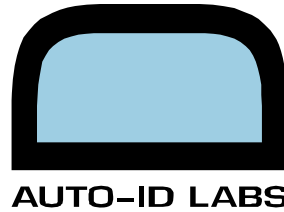
3.1. Application variants

my2cents can be implemented and distributed in two different variants:

3.1.1. White label app

The white label app is customized for corporate customers like brand owners and retailers. Consumers can comment on the products offered by the customer. Basic product information is provided by the customer. Comments and opinions collected by my2cents can be used for advertising, e.g. with digital signage at the point of sale, as testimonials in marketing

² Common GTINs in use are UPC (12 digits) and EAN (13 digits).



campaigns, or analyzed for market research. For the corporate customer my2cents could engage consumers in a dialogue with the company and become a mobile customer relationship management tool.

3.1.2. Generic app

The generic app is independent of individual companies and brands. It is a free app for a wider audience and is distributed by the developers via app stores. The product information is aggregated from several freely accessible information sources. With this app consumers can comment on every retail product with a barcode. Comments and opinions are distributed on a public available website. Product information and consumer comments can be accessed through a public API.

3.2. Benefits for consumers

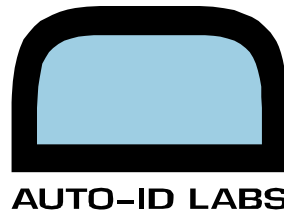
Consumers often face buying decisions and seek advice on products from other people. Many times direct personal advice is not available. my2cents provides unbiased and highly relevant information from other consumers and friends for a specific product of interest wherever people need it. As consumers trust recommendations of other consumers and especially their friends much more than commercial advertising, electronic word of mouth has become an important source of information for consumers [12].

Also, consumers can share their opinions on products with their friends and social network on the go. They can also communicate their opinion or critique back to brand owners, manufacturers and retailers. Thus, my2cents provides a low barrier and easy-to-use feedback and information channel for critical and conscious consumers.

3.3. Benefits for brand owners

The core benefits for brand owners are:

- Costs for market research are reduced: In traditional market research a consumer survey involves relatively high costs. my2cents can provide consumer opinions at much lower costs.
- Tracking of brand recognition and consumer trends, sentiment analysis, and conversational marketing are enabled at low costs.
- Consumer behaviour and feedback can be monitored in real-time and location-based, providing valuable input for strategic decisions in product development and marketing.



- Consumers authenticate themselves using existing social network accounts to personalize their comments and publish them on their streams and profiles. Given the users grant access to their profile information, precise consumer profiling for market research and marketing is possible. Also, comments can be published using these social network links, which helps to spread the word about the product and has a high viral marketing potential.
- The brand is present in mobile and social media with a tangible added value for the business.
- Cross selling mobile advertising and coupons within one brand are possible: During a scanning process at the point of sale advertising for a related product can be displayed on the phone. (e.g. if a consumer scans cereals she gets an advertising message for yoghurt on his phone. This could also be combined with digital coupons, which can be redeemed at the check-out right away) or existing customer loyalty programs.

4. Implementation

my2cents consists of a web service and several mobile client applications. The server backend of my2cents has been implemented using the Ruby on Rails web programming framework. It provides a RESTful API to access product information and to access and post user comments and ratings. The backend also provides a simple web interface which can be used with standard web browsers and also a lot of mobile web browsers.

The my2cents client application has been developed for Android and iPhone mobile phone platforms. The generic version of the app can be installed from the Android market.

4.1. Barcode scanning

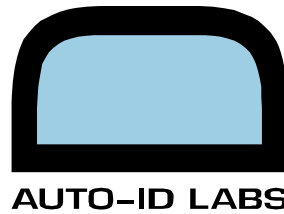
On Android my2cents uses the ZXing barcode scanner library³ for quick product identification. On the iPhone my2cents currently uses the RedLaser barcode scanning library.⁴ For the iPhone version we are planning to replace RedLaser with ScanDK,⁵ a better and faster barcode scanning solution.

4.2. Product identification

³ <http://code.google.com/p/zxing/>

⁴ <http://www.redlaser.com>

⁵ <http://www.mirasense.com>



Basic product information is retrieved from various sources to enable product identification for the user. Our goals are to provide a fast response and to recognize as many retail products with a barcode as possible. As there is no single or authoritative source of product information for retail products, my2cents uses different databases and web services to get product information. The information is aggregated to provide the most accurate product identification.

Currently, the following databases and web services are used as product information sources:

- **Amazon** - The Amazon eCommerce Web Service⁶ provides product related information from the Amazon database, including prices and reviews. Five web services are offered for different geographic Amazon locations: US, Canada, UK, Germany, and Japan.
- **codecheck.info** - The Swiss independent product information service codecheck.info⁷ has been collecting user generated and editorial information about retail products and their ingredients from German speaking countries on its website for many years.
- **UPC Database** - The UPC Database⁸ is a privately operated, web based service collecting user generated product information for UPC and EAN barcodes and providing a SOAP/XML web service for free. UPC Database is located in the US and provides mainly information for US products.
- **OpenEAN** - The Open EAN/GTIN Database⁹ is a non-commercial, web based database for basic product information. Product information is generated by users or provided by manufacturing companies. The service is operated by a small German company and provides a plain-text web service API for registered users. Registration requires a small donation to cover operating costs.
- **affili.net** – affili.net¹⁰ is one of Europe's leading affiliate marketing networks. It offers a wide range of web services for affiliate marketing including a product information web service which can be queried using a product's GTIN. affili.net acts as a broker between advertisers and publishers. To access product information from advertisers, publishers must register and make contracts with each advertiser separately. affili.net has branches in seven European countries.

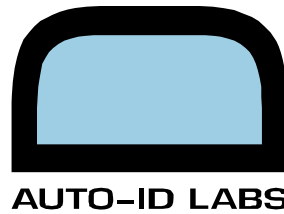
⁶ <http://docs.amazonwebservices.com/AWSEcommerceService/2005-03-w3/>

⁷ <http://codecheck.info>

⁸ <http://www.upcdatabase.com>

⁹ <http://openean.kaufkauf.net>

¹⁰ <http://www.affili.net>



- **Zanox** - Zanox¹¹ is a globally operating online marketing company. The zanox affiliate network offers access to advertisers worldwide and provides a web service which can be queried for product information using a GTIN.

Aggregation of the various product information sources is currently performed with a very simple algorithm: When a client requests information for a GTIN for the first time, i.e. which has not been requested from the my2cents server before, requests to all the information sources above are triggered in parallel originating from the my2cents server. The product information from the first source to answer is delivered to the client. Service requests are conducted in an asynchronous way, so it is possible that other services respond after that, and probably with more accurate or complete information. For all following requests to the my2cents server the information from the most reliable source which returned a positive result is delivered to the clients. The reliability of the services is currently in a fixed order as perceived by the developers. Product information is cached in the server's database backend as the terms and conditions of the queried sources allow.

4.3. User authentication

Users of the mobile clients can authenticate using the Twitter microblogging service. For the website we have also implemented authentication via Facebook. Facebook authentication for the mobile clients and integration of further identity providers like Google accounts is still planned.

4.4. Application flow

The application starts with a main screen where the user can choose between several options: Scan a product's barcode, show recent comments from others, show a history of products which were scanned by the user, or login with Twitter. When a product barcode is scanned (see 2 left) the recognized GTIN is used to query the my2cents web service. The GTIN can also be entered manually if the scanning process does not work as expected (e.g. due to poor lighting conditions).

The web service responds with related product information. Asynchronous requests and caching are used to keep the application responsive for a good user experience. As soon as the request returns results, these are displayed on the following screen - the product details screen (see Figure 1 right).

Depending on the results received the product details screen shows basic product information to identify the product on the top of the screen. Below this existing comments on the product from other users are listed if available. On the bottom of the screen a text input

¹¹ <http://www.zanox.com>

field asks the user to enter a comment. When the user posts a comment, this comment appears immediately on top of the list of comments. If the user has chosen to authenticate, the posted comment includes the user's Twitter screen name and avatar image.

If the user has chosen to publish her comments on Twitter, a short URL to a product-specific page on the my2cents website is added to the comment, and the comment is distributed on the user's Twitter stream. This enables followers to read the posted comment in the context of the Twitter stream. The included reference to the my2cents website allows others to follow the link and discover more comments on the product. The viral effects of the Twitter network are used to advertise both the product and the my2cents application.

4.5. Current status

The first generic version of the my2cents app was launched for Android on 23 April 2010 and is now available on the Android market with the package name mobi.my2cents.¹² Figures 1 and 2 show screenshots of the Android version of my2cents and the usage of my2cents with an Android device.

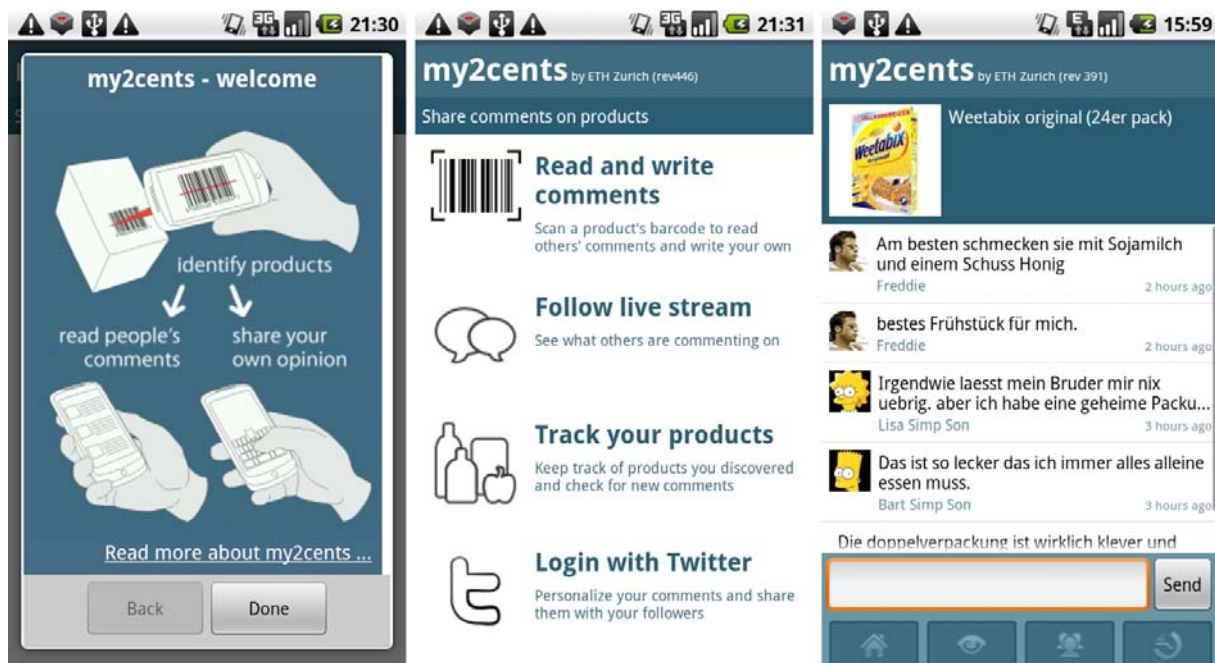


Fig. 1: my2cents screenshots.

¹² <http://market.android.com/search?q=pname:mobi.my2cents>



Fig. 2: Using the my2cents Android app.

A small update with bugfixes was released two weeks after the launch. The next update of the Android client will introduce a rating feature (like/dislike button) and some improvements to speed and reliability. The server backend is continuously improved and more information sources are added to improve product recognition. The iPhone version is currently in a pre-release test phase with friendly users. More information about the current status of my2cents can be found on the application's website.¹³

5. Commercialization

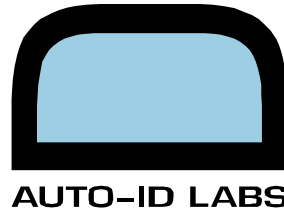
my2cents is a service which should be available free of charge for consumers. We are interested in providing an economically sustainable service and looking for ways to commercialize the service while at the same time staying an independent and trusted source of information. A commercialization of my2cents could be possible in business-to-business (B2B) with two revenue streams: selling customized (white label) software and mobile advertising.

5.1. White label

In a white label solution the mobile app can be customized and branded for corporate customers which are brand owners like retailers or manufacturers. It carries the corporate identity of the customer and is also distributed in the customer's name through app stores or can be downloaded from the customer's website. The customer provides and has complete control over the available and presented product information when the customer's products are scanned. Also, the processing and distribution of consumer comments can be controlled by the customer.

When consumers install the branded app on their phones they can read and give comments on the customer's products. These comments can be personalized and linked to social network profiles. The personalized comments can be accessed by other potential customers

¹³ <http://my2cents.mobi>



in an intuitive, well-aggregated way and thus support them in their buying decisions or influence their perception of the brand's products.

All comments are collected and provided to the customer as consumer feedback data for marketing and market research. Given the user's agreement this data can be used as advertising content for digital signage (i.e. displays in the stores), as testimonials in marketing campaigns, or for trend analysis and brand tracking. The core benefits for the brand owner are reduced costs for market research and new insights for product development and marketing from monitoring consumer feedback.

The relation between a white label app and the generic my2cents app depend on the preferences of a white label customer and need to be discussed individually.

5.2. Mobile advertising

Mobile advertising is rapidly growing, with an estimated market size reaching USD 1B in 2010. my2cents has lot of information about the consumer-product interaction and thus allows highly targeted advertising options. With my2cents the user is scanning products, thus indicating products and product categories she is interested in. Also, given the user allows usage of location or social network profile information like age, gender or education, this can be used to further target advertising to the particular user and context.

6. Evaluation and Discussion

6.1. Application usage and user feedback

The my2cents app has been released on the Android market on 23 April 2010. Since then (as of 11 June 2010) it got a total of 2249 downloads, with 1122 active installs (49%, i.e. installs minus uninstalls) according to the official Android market statistics. Until June 11 Android users have rated the app 31 times with an average rating of 3.81 corresponding to 4 out of 5 stars. In the same time the app has received 16 comments from users: 12 in the English Android market, and 4 in the German Android market.

While all the German comments are very positive and rate the app with the best possible rating of 5 stars, the ratings coming with the English comments are more diverse. 9 of the users' comments stated that the concept is good, several comments are critical, claiming either that there should be more people using the app (3 comments), or that too few products are recognized (3 comments). Three users proposed to add crowd-sourcing of basic product information. This feature request was also voted the most popular in the my2cents user

feedback system which has been installed using the web based feedback service uservoice.com.¹⁴ One of the early my2cents users wrote in a comment: "A very cool concept! Love getting a second opinion on something I wanna buy before I actually do." Another user raised the question if the app "will be rather used by marketers than by consumers rendering the whole service useless."

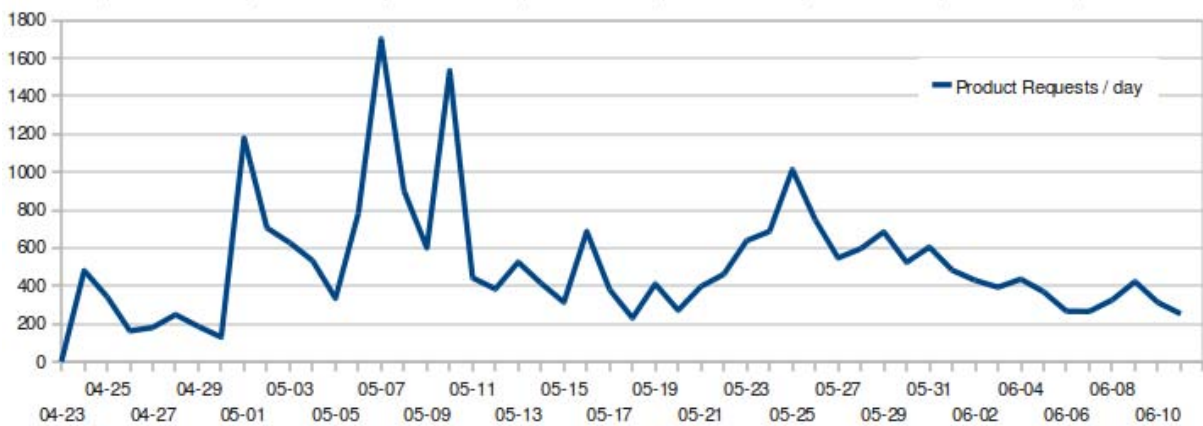


Fig. 3: Number of product requests per day over time.

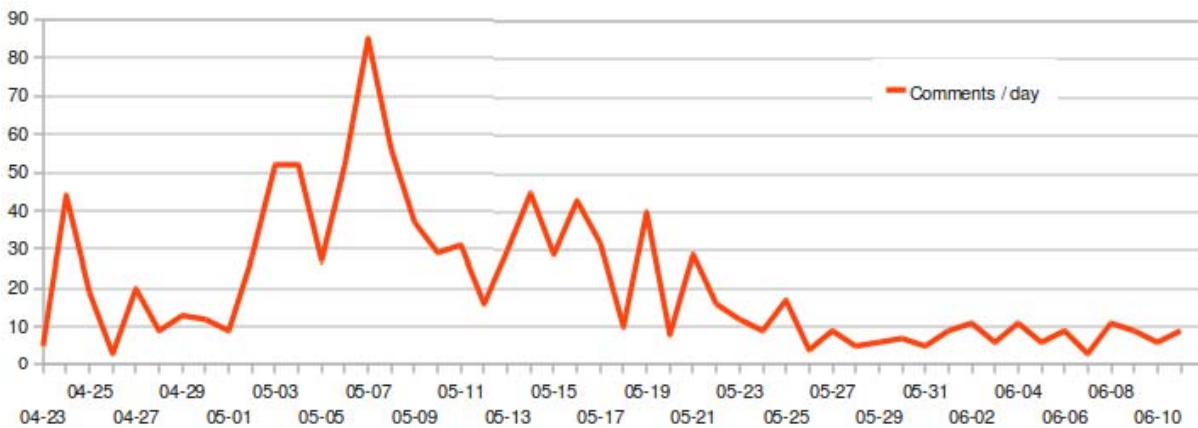
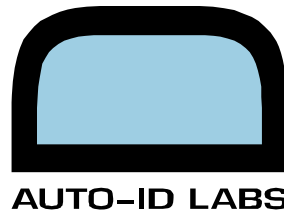


Fig. 4: Number of comments per day over time.

In the 50 days from release of the app on 23 April until 11 June the my2cents server received 25521 product requests for 4796 different products. Users contributed 1045 comments on 925 or 19% of these products. Figures 3 and 4 show the distribution of product requests respectively comments over time starting from 23 April until 11 June. The curve shows some promising growth beginning one week after the launch with a peak on 7 May with 1701 product requests and 85 comments. On 6 May my2cents received a very positive review on a popular Android blog. After that the curve drops again and has now come down to a rate of 250 to 450 product requests and 5 to 10 comments per day.

¹⁴ <http://my2cents.uservoice.com>



283 of the given comments or 27% came from authenticated users. Of the 4796 products nearly 50% (2391) could be identified, i.e. one of the product information services returned a product name for the requested GTIN. 27% of the products which were identified have received comments from users compared to only 11% of those products which could not be recognized.

This indicates how important a reliable and correct identification of the product is for the users to contribute. More interestingly for several GTINs we received different product information from different product information sources. This indicates that the GTIN is not as unique as it is meant to be.

Information sources have shown different levels of accuracy. For example, information from Amazon for products from its core business, e.g. books and electronic media, has proven to be highly accurate. However, our first results indicate that the Amazon database also includes user generated content which seems to be less reliable. Single requests return product information which is very clearly not related to the product scanned. This might be due to unauthorized use of GTINs by individual resellers on the Amazon marketplace.

We applied for the Amazon partnership program in all five Amazon locations. In May 2010 Amazon.de informed us that our partner ID is being deactivated referring to their terms and conditions, which do not allow usage of Amazon data on services designed for mobile devices. Amazon has been known not to allow use of their data for mobile services and also threatened to sue other services which continued to use their data. This issue is subject to a lot of discussion among mobile developers and an official explanation of Amazon why they are providing their data for websites but not for mobile services has not yet been given.

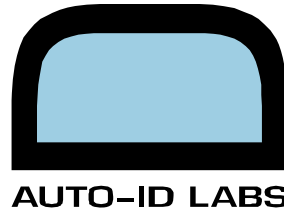
In contrast the results from codecheck.info have proven to deliver very accurate product information for the German speaking market. Comparing user comments and ratings from the different Android markets indicates that the app is perceived to be better by German speaking users.

6.2. Business development

To evaluate the commercialization aspects of my2cents we prepared a business plan explaining the business concept and submitted it to two business plan contests, MIT\$100K¹⁵ in the US and Venture 2010¹⁶ in Europe. In both contests my2cents could reach the semi-final or final rounds. At MIT\$100K my2cents was one of the five best business plans in the mobile track, at Venture 2010 my2cents was among the 20 best business plans.

¹⁵ <http://www.mit100k.org/>

¹⁶ <http://venture.ch/>



During and after the competitions we had the chance to present, discuss and refine the business concept with different stakeholders, including experts from retail, mobile media, and advertising companies; and venture capital investors. The main issues being discussed were:

- How to generate a revenue stream?
- How to generate additional value for businesses?
- How to protect the business model?
- How to reach a unique position against competitors?
- How to gain user base and a critical mass?
- How to establish a trusted and independent but yet sustainable service?

7. Conclusion

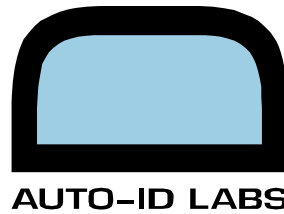
We have introduced a service, my2cents, allowing consumers to read and share comments and ratings on retail products. Consumers have access to comments about a product via their mobile phone and can share their own product experience with other consumers and within their social networks. We have described the implementation of the server backend and mobile clients on Android and iPhone platforms. Additionally, two revenue streams, branded white label version and mobile advertising, have been investigated. A first evaluation based on direct user feedback and discussion with experts has proven the feasibility of engaging consumers into dialogues about products and generate value for consumers and businesses with product-centric information streams.

We have learned that reliable and accurate product identification is an important factor for user contribution. Also, we have seen that the current version of the Android app is not yet attractive enough for growing a large user base. Possible reasons for this might be missing product information, bad user experience, or missing incentives for contribution. However, we believe that the focus on consumer comments in combination with social networks is a viable way to collect data about product perception and to engage consumers in dialogues about products. The generated information can be valuable input for marketing and product development departments of brand owners and retailers.

Our next steps are:

- user studies to evaluate the mobile apps
- continuous improvement of the Android app
- integration of more product information sources
- release of the iPhone app

We are also planning to syndicate content with other services, i.e. to include existing comments on products. Furthermore, we plan to analyze the data, e.g. the sentiments in the collected comments or the most dominant product categories. Finally, we are looking forward to learn more from our users in user studies and to continue the dialogue with retailers,



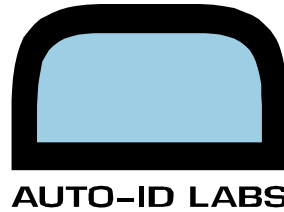
brand-owners, marketers and consumer associations. The implementation of a white label solution in cooperation with a retail company is also an important goal.

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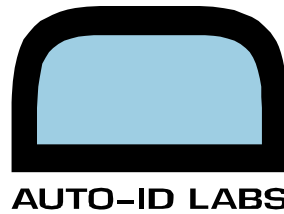
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