Final report: Count-A-Gram application

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ABSTRACT
UPDATED—June 2, 2017. This paper describes the development of a mobile application, from start to finish, for a duration of approximately 3 months . Designing the application, implementing it, as well as evaluating it are only some of the areas that this paper will cover.

ACM Classification Keywords
C.2.4 COMPUTER-COMMUNICATION NETWORKS: Distributed Systems; D.2.2 SOFTWARE ENGINEERING: Design Tools and Techniques; H.5.2. Software and its engineering; Information Interfaces and Presentation (e.g. HCI): User Interfaces

Author Keywords
Human Computer Interaction; Design; Mobile application; Android; Software design; Software structure; Native application.

MOTIVATION

Nowadays with the fast pace of our lives we are facing an uphill battle to make sure that the food we consume on a daily basis, provides our bodies with the necessary elements to lead a healthy lifestyle. The importance of nutrition has risen immensely over the past couple of years. People started understanding that going to the gym a couple of times or going for the occasional jogging session is not enough to maintain and lead a healthy life. However, the dilemma we face everyday in choosing the right nutrition, that our body needs, is getting more difficult, due to the pace of our lives and the rise of "easy" options like fast food chains and delivery services. People, who are interested in the this topic, how to lead a healthy life, are looking for more Information about nutrition and tools, that are easy to interact with, which can help and motivate them to start and keep up with this lifestyle. The motivation for those people to use a mobile application for nutrition is, cause it is easy to use, also fast to find and do what they need and mostly it's for free.

RELATED WORK

Considering all this, multiple Applications have attempted to tackle this issue. There are amazing products helping to track our calories intake on a daily basis, also to track working out sessions and even they are trying to give different training plans to help users to reach their goal of leading a healthier life. With every new app created, there are even more options and opportunities that help the user to have the lifestyle they want. In the same time the competition on the market is getting bigger and bigger and to choose the right application is getting harder. Because of that reason, with Count-A-Gram, we decided to concentrate on one particular task and to add multiple features to it which would make daily nutrition and calorie intake challenges a thing of the past. We knew that it is really hard to find the right nutrition program for your body and to calculate how many calories exactly you consume everyday and that was the reason of starting this project. With Count-A-Gram the users can see how many calories they have consumed and how much are left for the day. Also they can search for healthy recipes and add the calories already calculated to their daily intake. In addition to the last one the user is able to create their own recipes and add products, which can be used later also from other users. Count-A-Gram also provides statistics so users can see how good are they doing with their nutrition, and individual nutrition tips so they know exactly what is the best way to do it. With all those applications available on the market, it is challenging to create something newer that can convince the users to use it. We have tried a variety of applications like Lifesum, FatSecret, Yazio and others, that have a lot of different features, we've found them on one hand really interesting and useful, but on the other hand a bit complicated and confusing. There were plenty of features some users might use, but also others might not even know about because the use of the application for them is way more simple. In order to create something simple, useful and easy to use we've tried to combine couple of features from previous products but connected to only one main task - counting the calories intake. We also wanted to make Count-A-Gram a bit more fun, so we decided to have a feature that allows users to compete with each other on how good are they doing with their nutrition.

DESIGN

Considering the interviews we made for the second mile stone, when we asked four different users to use our low-fidelity

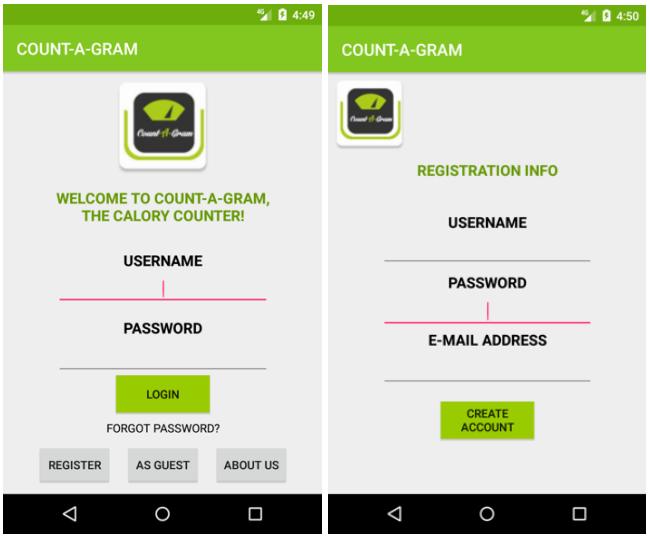

Figure 1. Log in and Register view

prototypes, we have developed our final prototype.

The left figure 1 shows the starting page for a new user or for a user who hasn not logged in yet. A user, who is already registered can enter his username and password to log in. A brand new user has couple of options before logging in. If the user does not want to register right away, he or she can use the application as a guest. In case they want to register, they have the opportunity to use their Facebook or Gmail account or just to register regularly. On the starting page also there is a button, in case the user forgets his password he/she can change it and another button "About us", that gives information about the developers team and the motivation behind creating the product.

On right figure 1. is shown the registration process of new users. The user has to enter an username, password and an e-mail address before clicking on a button that says "Create Account". In order to finish the hole registration precess the user has to go through couple of quiz questions to full fill the hole information needed.

First section of Figure 2 shows the first question the user has to answer - the nutrition goal. Here there are three options to be chosen - "Lose weight", "Gain Weight" and "Stay healthy". There is also an option to skip the question if the user does not want to answer right away.

Second section of Figure 2. shows the next step of the registration process, where the user has to enter some personal details in order to create his/hers account. In case he/she wants to skip the question, there is a hyper link "skip for now" giving this opportunity and later this form can be filled from the profile settings. If the user want to fill the personal data form he/she can choose "Continue" after filling it up and continue to the next step.

Third section of Figure 2d. shows the last step go the registration process and the second phase to the personal details form.

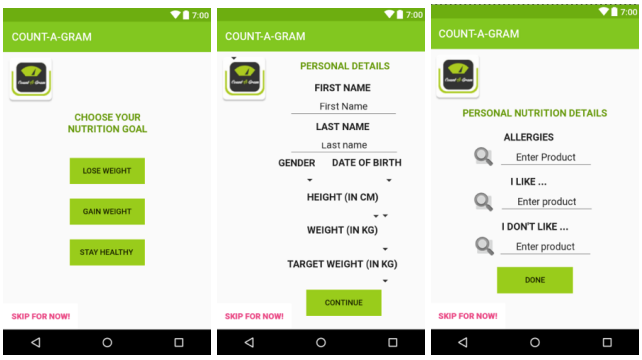

Figure 2. Account registration details

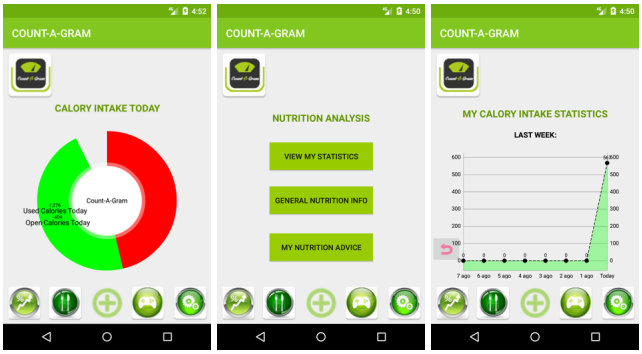

Figure 3. Account registration details

The user can give Information about allergies, what he/she likes or doesn't like to eat. And when everything is filled up the user can end the registration process by taping on a button that says "Done", or just to skip the question.

After finishing with the registration process and clicking on the button "Done", or after log in the user lands on the main page of the application. On figure 3. is shown the hole view of the page. On the main page the users sees a pie chart that shows the amour of consumed calories for the current day and the rest of calories to be consumed.

The reason to chose a pie chart to show the status of the calories intake is, because when we asked our users during the interviews they found it clear and simple. The chart is easy to read and shows the most important information the user wants to know. For our application we chose the navigation bar to be always at the bottom, because it is accessible all the time and users can go through the sections only with one tap.

From the very left on the navigation bar the user can access the statistics, that shows the nutrition analysis. Figure 4 shows the statistics view where the user can chose between three options - "View my statistics", "General nutrition info", "My nutrition advice" - to see information about his/hers nutrition.

Clicking on the first button 'View my statistics" (figure 4a.) the user sees a diagram that shows statistics about the calories intake. With a drop-down menu positioned above the diagram the user can choose a certain time period and check the statis-

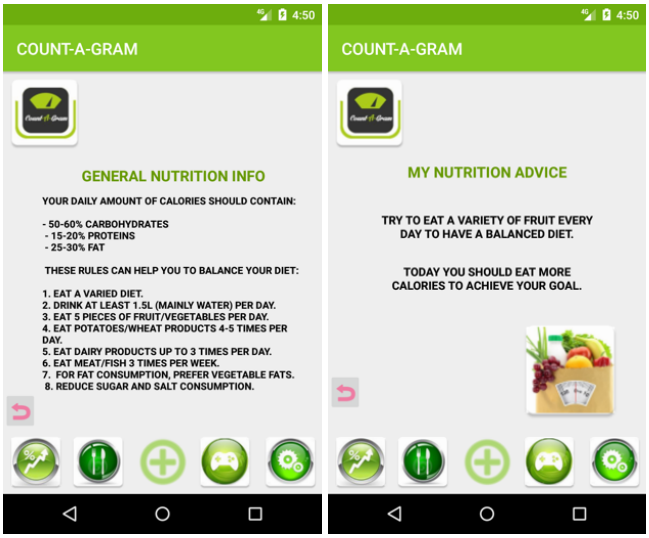

Figure 4. Account registration details

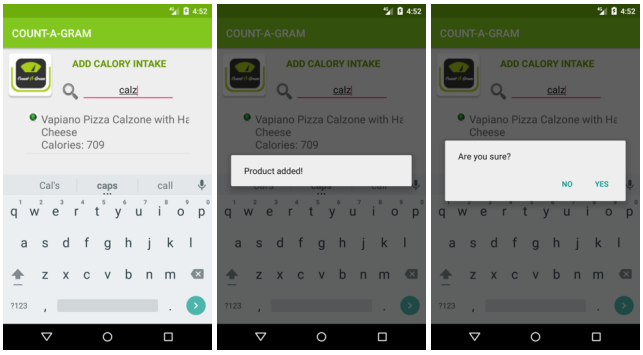

Figure 5. Account registration details

tics for this period. The second button "General nutrition info" shows text with information about the nutrition (figure 4b.). The third button "My nutrition advice" gives the users Tips on how they can get better in they nutrition so they can accomplish their goal, based on past and current calories intakes, nutrition goal and personal (data figure 4c)

Next is the button that leads to the recipes section (figure 5). In this section there is a search option, so the user can search for different recipes. Right away when the user starts writing in the search field he/she sees the search results and can choose a recipe. When tapping on a certain recipe a dialog window pops up and shows the hole information about the recipe - ingredients and directions how to prepare the meal. Another option in the recipe sections would be, if the users do not find the exact recipe or a product they were looking for, to add a new recipe or product.

Figure 6 shows the view for adding a new recipe/product. The user has to write a name for the product, how much calories does it contain, a description in case it is a recipe and to which category does it belong. Tapping the "plus"-button allows the user to add calories he/she has consumed. When tapping on it

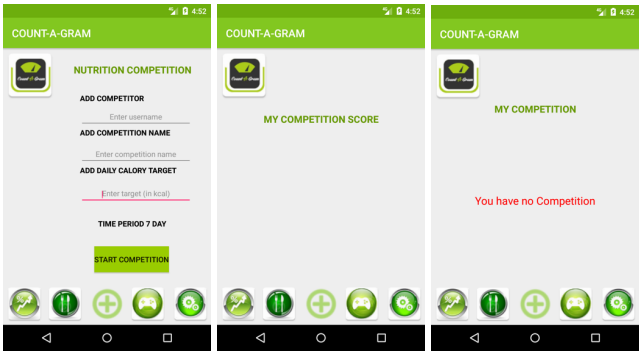

Figure 6. Account registration details

the user has to enter the product or the meal he/she has eaten and to add it to the consumed calories.

After the plus-button, the next station on the navigation bar is the competition section. We wanted to make out app more interactive and fun for our users. That is why we decided to make a competition section where our users can play and compete with each other. Figure 7 shows the hole concept of the competition section. The user can type the name of a friend he/she wants to compete with, the name of the competition and the daily calories target and with a set button he/she can start the competition. The result of the competition after that can be viewed on a graphic, that shows the exact score and status of both competitors. To make the data and results of the calorie calculation a better match for our users we created a settings section, where users can add more information about themselves. For creating the user profile there are two options. As earlier mentioned during the registration process the user can add all this data and then access it or edit it in the settings section or in case the user did not want to deal with any details in the beginning he/she can skip the questionnaire during the registration and add the data later when he/she decided to use the application. Here come also the reason of putting a skip button in the questionnaire. Asking our users, they all had the opinion that those questions in the beginning can be sometimes annoying. That is why we decided to add a skip button in case the user wants only to try out and see the application. Later on when the users want to use it, they can edit their personal information in the settings. In the settings it is also possible to check the nutrition goal, nutrition details or the account info. Our main goal for the design of Count-a-Gram was to make the application extremely easy to use, familiar to our users so they do not feel confused while using it and to minimize the amount of irrelevant information. Because the use of our application is to help the users to track their calorie intake at anytime easy and quick.

IMPLEMENTATION

Because Count-A-Gram is a native application and its target consumers were, from the beginning, users that poses a smartphone with Android as an operating system, the implementation must be written in Java[1] programming language. Therefore, Java API Framework and Android Runtime are the laying at the base of the application. The Software Develop-

ment Kit (SDK) version is Lollipop 5.1. It was tested on many version of the emulator, as well as on many mobile devices like Google Nexus 5[2] and Samsung Galaxy J3. Android Studio[3] 2.3.1 was the integrated development environment used for this project.

For saving the users data, the program runs on top of a mysql database. For connecting the database with the application, MySQL Connecter[4] was required. The application is but limited, allowing only students of the University of Vienna to use it. The connection must be established either directly, using the university's eduroam network, or through a VPN connection.

For a more realistic and for a better interaction with the user, the application also contains an external chart 'library com.github.PhilJay:MPAndroidChart:v3.0.2'[5].

The application itself is well organised, structured on the Model-View-Controller (MVC) pattern, in combination with the Singleton pattern.

The time needed for implementing the BETA version was approximately 4 weeks.

EVALUATION

Resources:

We first prepared 4 usability tests:

1. Create an account. Using the search function, type the name of the product you desire, so you can find it.
2. Insert a product of your choice (with fictive details) into the database.
3. Insert the number of intake calories from the products that you have chosen from the database, by clicking the "+" symbol. Return then to the primary page and inspect the number of calories you have eaten today. Look at the statistics and your personal hint for today's nutrition.
4. Click the game pad, so you will be able to start a competition. After that insert some data (it does not need to be true) of your opponent player and the goal of calories lose/intake you want to achieve. Now, go back and look at the amount of calories your opponent is having.

Based on this 4 usability tests and inspired also from ISONORM 9241/110-S form[6],created by professor doctor Jochen PrÃijmper, a form containing 7 question was made:

1. Suitability for the task: Does the application take care of the specific order you gave, without too much effort?
2. Self-descriptiveness: Is the application giving you enough hints and are those clear enough?
3. Controllability: Can you, as a user, influence the way you control the application?
4. Expectations: Does Count-A-Gram meet your expectations and habits through a uniform and comprehensible design?
5. Easy to remember: Is the application designed in such a way that you could easily anticipate the next requests?
6. Error tolerance: Is the application offering you the possibility, in case of an error, to return to the previous state, without too much effort?
7. Customizability: Does the application meet your needs, without requiring unnecessary effort from your side?

The best approach for evaluation is always somebody outside the comfort zone, because they will really judge and exploit the programs, or logic flaws. That is why we randomly asked a number of 8 students to help with the evaluation process, taking in consideration that they, maybe, future users of these application.

Interview procedure:

First we gave the user the 4 assignments. During the test, we do not influenced them in any way. In case they got stuck at some point, the tester got some small hints.

After finishing the tests we asked them to complete the form described above. Some basic personal details were also collected, with the goal of forming a user analysis basis.

Results:

All the users found the application very easy to use. The vast majority knew where to click, so they get the expected result and they also really liked the optic of the fonts and buttons. Two out of eight users though, did not managed, from the very beginning, to return to homepage. But with some small hints they found the way back pretty quick. They also loved the ease with which they can navigate through pages. That was, as all the users agreed, because of the bottom navigation and the symbols clear meaning. An inconvenient on this matter was, that the navigation's buttons do not change form or colour, while the user is active on that particular layout. This will help them get more orientation. A very inspired feature in the eye of the users, was that the application asks again, if the user really sure is, that he wants to add/delete a specific product to/from the database.

REFLECTION

Every member from our team wanted to participate in this project. We tried to split the tasks in a way so everyone has contribution in it and finishes the tasks well done. For this milestone one member of the team (Cordula Eggerth) was on charge for the improvement of the application, the second member (Lisa Schierer) was responsible for he user tests and the protocols for the usability tests. The last two members of our team (Viktoriya Lazarova and Ioan Daniel Tircob) were on charge of creation the final report for the project. The work during this project taught us couple of lessons. One of them is that Mobile Application Programming completely rocks! Also it is really important to work on something you find interesting so the results at the end are better. Another reflection on the project and really important one is that working in a team can be challenging. For creating a good product and working in a good environment a lot of communication is needed so people know and understand what the other members of the team are doing. Being open and sharing your opinion and ideas is very important for the communication, because this allows people

to consider every idea and be more creative and this is also the best way to learn something knew from each other.

REFERENCES