Group 6 - MCINO: Sustainability Android Application Paper

Kamil Cierpisz, Daniel Hand, Temitope Akinwale, Nikolaj Jasenko

ABSTRACT

We live in a world where everything is connected through technology. We aim to tackle the human sustainability problem of homelessness using mobile application technology . Technology can be used to bring the world closer together and solve real world problems.

INTRODUCTION

We were given the task of coming up with a project about Sustainability. Sustainability seems like one of those words that everyone understands what it means but is quite difficult to explain. The Oxford dictionary defines Sustainability as the "ability to be maintained at a certain rate or level" and "the avoidance of the depletion of natural resources in order to maintain an ecological balance". Although there are many different types of sustainability, the four main pillars include: human, economic, social and environmental. The department we decided to focus in on is human sustainability in relation to homelessness.

Human sustainability refers to the ability to improve and preserve human life. One thing that our group members have in common is that we feel every individual should do their bit to help the community. Homelessness is a massive issue in many countries, and it is an increasingly prevalent issue here in Ireland. Currently, we are experiencing a period known as the "homeless crisis" in Ireland. The root cause of the homeless crisis in Ireland is the broken housing system. Ireland's housing system does not meet the needs of the society. The lack of affordable rent coupled with increasing house prices have plunged many families into homelessness. According to Focus Ireland, there were 10,338 people homeless in the week of August 19^{th}-25^{th} across Ireland [4]. The number of homeless families has increased by 354% since September 2014. An even more staggering point to be noted is the fact that this does not include "hidden homelessness" which refers to people who are living in squats or "sofa surfing" with friends. All of our group members live here in Dublin and are often in the city centre. It is rather difficult to walk 1km in Dublin without noticing homeless people. This has given us the intrinsic motivation to at least attempt the production of an application that can potentially tackle and reduce homelessness in Ireland.

We propose an application called "home" which offers an infrastructure to emergency services and homelessness initiatives to find and help rough sleepers with the aid of the public. App users can submit the location of any rough sleepers which can be accessed by any emergency or homelessness services. Alternatively, the list of homelessness service details in the area can be used to get the person(s) help. We aim to develop an application that can find help for homeless people while employing the public to care for these fellow humans and report any that cannot find the help themselves. We often pass by people sleeping rough but don't do anything about it or anything to help them. This aim of this app is to make it easy for you to help. Once you spot a homeless person, you navigate to the app and note it. You give details of your location and you can also offer a precise description of the person. This will be forwarded to homelessness assistance agencies who can offer the person help. The contacts page of the app would ideally be extended to display the details of any local soup kitchens, needle exchange areas or any other service available locally.

In addition to this we also provide advice on how to approach homeless people. It may be unsafe to approach a homeless person, can be difficult to know the mental state of a person and as such. We There are different types of people, some are very friendly but some can also be rather aggressive so we provide advice on how to approach homeless people and how to help them out if you wish. It is important to try to avoid approaching them by yourself in case if they become aggressive, having a friend there can be a much smarter option.

CURRENT STATE OF THE ART

There are not so many applications that aid homeless people. The main reason is because "homelessness" insinuates a lack of many things such as shelter, food and access to mobile devices. Thus, the unfortunate people are unlikely to have access to the app. However, there is a tool called Youth Street Connect [7] formed by two mobile apps which connects young homeless woman to local healthcare providers. In the USA a staggering amount of homeless people have contracted different infections [5]. Approximately 2.5 million people between the ages of 16-24 are considered homeless in the USA. To put that into perspective, that is half of the population of Ireland. The basic idea of the app is that there is a youth portal app which will be used by the homeless and there is also a provider portal app which will be used by healthcare providers. Both of the apps are available across a variety of mobile and device platforms. Both apps will be connected a backend database. The youth portal provides information on how these homeless people can get help and prevent the contraction of HIV and other harmful STIs. Additional features allow them to track and rate the health care services they utilized. The provider portal app shows how to integrate STI/HIV/ pregnancy screenings into primary care practices. The portal app is used by the services and the hospital. This app utilizes HTML, CSS and Javascript. This forms the appearance of the user interaction. PHP is used for backend implementation. MySQL database is also used to store user information such as phone number in

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order to receive texts and or emails. Finally, jQuery Mobile is used to allow the developers to design a website that works on several smartphones, tablet and desktop platforms. Our application is going to contain many of these technologies in order to build the backend and the user interface. We will focus heavily on the user interface to ensure that our users can access the application easily and without delay. Our app is very different from the Youth Street portal app because our app will not be used the homeless people themselves. We believe that a lot of homeless people are not in the position to have phones and data so the app will not be very effective being used by them. Our app will be used by the empathetic people who are willing to help.

There is an application known as WeShelter which is quite popular [1]. WeShelter is based in New York City where the homeless population has "skyrocketed in recent years to levels not seen since the Great Depression" [2]. WeShelter tells us that there are currently 58,761 homeless people in New York City Shelters each night. WeShelter is an app that you can opt to give a donation to a specific charity of your choice. The idea behind WeShelter is that so you see a homeless person, you then tap the green button and unlock a donation from the sponsors and the donation will go to homeless services organizations in the city. As an additional feature, you can tap to dial 3-1-1 to get direct help for a homeless individual. This is similar to our idea in which you can note the location the homeless person was spotted in , in order to get help for them as quickly as possible. The final feature is that you can see your impact. WeShelter keep you updated on the good work being done by the organizations you've helped. This will encourage people to continue helping and giving where they can.

Our app is similar to WeShelter but we provide additional features. As mentioned previously, we provide advice on how to approach homeless people and how to really help them. Many people are unaware of how to approach them and it can be a daunting task because of the uncertainty of how they may react. In relation to the location feature, as well as stating where they are we actually allow you to provide a description of the homeless person to allow them to be identified and helped.

There's also an app called Samaritan which is more focused on building relationships [7]. How it works is that homeless people are given a Bluetooth enabled device called beacon which connects to an app. People can then download the app when they're close to someone with a beacon. They then receive a push notification which gives them some information about the persons backstory and may prompt them to donate by pushing a button. It works by sharing your story with one of Samaritans non-profit friends to receive a free beacon. Good Samaritans passing by will learn your story and give to your beacon. You can then spend the money from your beacon at any partnered merchant with a non-profit counsellor. For further development the homeless person can meet monthly with a counsellor to keep the beacon active and plan the month ahead, they can even access greater opportunities.

Our app is quite different from the objective of this app. This app is based on building relationships with the homeless people. Personally, we all agreed that helping them attain clean shelter, food and a counselling is more important and sustainable. Our app focuses on getting them help and improving their standard of living rather than just building relationships with them.

RELEVANT LITERATURE

Academic journals and articles are always a good way of developing an understanding for a specific topic. The idea of human sustainability and homelessness are areas we didn't have much expertise in. Our team spent a lot of team doing extensive research on these topics. In the article on the 2013 IEEE Global Humanitarian Technology Conference a project to help homeless individuals and very low-income families was developed. This was a collaboration by the Santa Clara University and the Community Technology Alliance [3]. "The project focuses on creating a system that allows organizations providing services to the homeless community to get information about their services out to individuals". The goal of this project is to inform people of the services available to them. Strangely, 68% of the homeless people in San Jose area have cellular phones. Meaning that by sending a text message, a high percentage of them will be notified about the available services. Because of this, the academics decided to use text messaging as a medium for sending out information. The project includes two databases, a data base for the homelessness assistant agencies offering their services and a database containing the list of individuals who have registered for the help. Once an agency logs in and creates their announcement, the announcement is added to the database and a text message is then sent to individuals who have expressed an interest in attaining help.

The response they received was positive and local phone providers at the time were considering taking part in the scheme. The goal then became to expand the service from helping homeless people in the area to grow into a project that caters for populations around the globe.

Some of the ideas from this academic journal can be seen in our app. We believe that getting homelessness assistant agencies involved is a vital part of the app being successful. These people are experts in this field of human sustainability, and have numerous services to offer. Our app will make it easier for them to offer their services to the people that need them.

In the academic journal Collective Digital Innovation by Sarah Snoxall, Kathy Oldridge and Will Venters they explore digital and innovative ways to tackle the societal challenge of hidden homelessness [6]. What they propose is a smartphone app to help fight the problem of hidden homelessness. We are told that 80,00 young people in the UK experience homelessness each year and 1.8 million are on the social housing waiting list. The issue is that these numbers underestimate the problem because many people are experiencing "hidden homelessness". These people are sleeping rough, squatting or living in temporary living arrangements so they are invisible to homeless care services.

The academics decided to work with young people through a "series of innovative workshops" in order to generate ideas. The goal was to generate innovative ideas for mobile apps that could help young people at risk of homelessness. They came up with ideas for apps such as "Sofa So Good" which provided a practical and emotional self-help guide. It provided details of how to negotiate a contract with a sofa owner to make the stay more secure and allow you to maintain self-respect by contributing. This can be done through cooking, cleaning and supporting the household.

The results were positive, the young adults involved in the innovative ideas were very productive. Some of the ideas have been accepted by homelessness support agencies and are currently being developed into apps right now. Our team decided to take this kind of approach. We heavily considered "hidden homelessness". Our app will cater for not only those registered as homeless but also for those who are not accounted for. With our location and descriptive feature. Agencies offering their services know exactly where the homeless person is and have a detailed description of the individual. Making it easier to offer their services to them.

Most of the literature reviewed insinuated that technology can be used to help tackle the issue of homelessness. We live in a world where everything is connected and information is acquired almost instantly. With our application we can pass information about homelessness and to the relevant agencies that can help. It is now up to those agencies to use this information given to them correctly to help out

Originality of Idea

In coming up with this idea, we did a lot of research on different cases of homelessness worldwide. This gave us a general idea of how bad the problem of homelessness is around the globe and an insight into how different people are tackling it. After completing this, we then brought it back to Ireland, taking a close look at homelessness here and how we can come up with a technological solution to help. Looking at Dublin, we discovered that there are very few apps trying to tackle the issue of human sustainability. We focused in on the needs of the homeless here in Dublin. What we found is that many people donate to homeless people, but they do not go further in offering them a way out. Donating money is a great gesture but, as humans, we can go the extra mile and notify agencies of the problem to provide help for the homeless. That is our goal. We aim to notify homelessness support agencies about people sleeping rough enabling them to offer their services to these individuals.

As previously mentioned, very few apps tell you how to approach homeless people. Many people have had bad experiences when approaching the homeless and this has led them further away from helping or trying to help them again. Our app will provide a guide instructing you how to approach homeless people in different situations when offering help.

Prototype

When developing it is important to create a prototype to give an indication of how you want your final product to look like. Although it is early stages, having a prototype will give

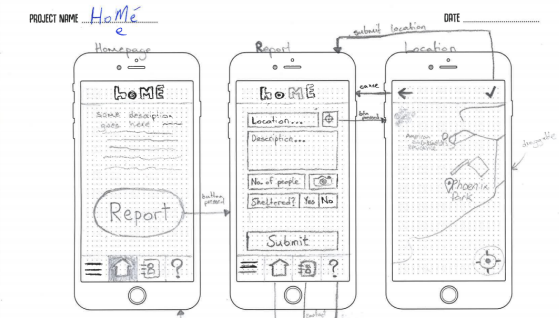

Figure 1. shows the Home, Report and Location screens

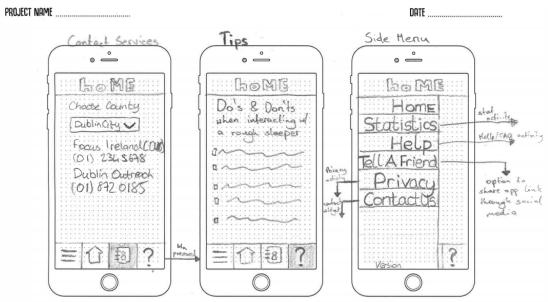

Figure 2. shows the Contacts, Tips and Side menu screens

you a guide to how it should look and help you follow your specifications. As computer scientists we tend to do everything we can on a computer. Our initial judgment was for us to create a prototype online to show what we want our app to look like. We were advised to try and physically draw sketches of what our apps may look like. This is basically a prototype of how our app will look once it is finished. We came up with a nine screen mock-up. These nine screens indicate the different functionalities of our app and how it may look. This exercise was very intuitive and got us thinking logically and aesthetically. I initially wanted to complete this exercise on a computer, but the computer actually has more constraints and restrictions. Now that we have an idea of how we want our user interface to look we just have to iteratively think about how to go about coding it. We have a very good idea how we want our app to look, we will proceed to the coding and development shortly. Figures 1-3 show our prototype design for some of our screens.

As mentioned previously this prototype is a visual representation of the possible different screens that will be present on our app. In total we have nine, but this is subject to change. We will see if there are some more screens that we need or if we need to remove a screen This may be the case if it is more intertwined with another functionality.

There are 5 main characteristics to developing a good app [10]:

- Great User Interface
- Fast loading time and high performance
- Extremely helpful customer support
- Adapts to a users needs

Figure 3. shows the Statistics , FAQ and Privacy screens

- Compatible with a mobile platform

We intend to focus in on these characteristics and make sure all of them are fulfilled to a certain degree to ensure the highest standards of work.

Target Users

When coming up with a product, whether it be a piece of media, clothing or even an app, having a target audience is crucial to the success of the product. Our application is different in the fact that our target users are volunteers. Anyone with empathy that is willing to help is considered our target user. In developing this app, we do not have an age group that we are focused on, anyone who can have a smartphone can help. However, we do encourage that young children avoid contact with strangers and if they would like to help, they should be supervised by an adult. This is specified in our DO's and DON'TS.

Our homelessness support agencies also make up a large part of our target audience. We send all our information to well established homelessness support agencies in the hope that they will act on it and help it wherever possible. A major benefit of our application is the flexibility of it. You do not need to subscribe or take part in any extra questionnaires. Whenever you feel like volunteering you can download the app and just help out. This flexibility means that you are not under any obligation or commitment which allows people to use the app more efficiently.

Project Design and Implementation

Home Screen: As the primary function of the app is reporting, we designed the home fragment centred around a report button. Upon selecting this button, the user is brought to the report fragment

Report Screen: In the report fragment, we ask the user to specify their location, give a description, tell the number of people in need of help, give the user an option to capture an image and ask the user if the people are sheltered. To specify their location, the user's permission is requested. If granted, the longitude and latitude values are used. If the user denies the request, the location can be either set through the getLocation button (opens the Location Screen) or the user can press the setLocation button to redisplay the permission prompt.

Location Screen: To allow the user to set their location manually and further specify the location of the rough sleeper, a location screen displays a map using Google's Map API. The user can then select the location on the map with the longitude and latitude values corresponding to that location used as the location of the report.

Camera Screen: As approaching rough sleepers may be dangerous or the exact location of them unclear, the ability to take a picture was deemed important. Capturing an image using the device camera is straightforward but to use that image for the report we needed to store the image in the reports database in the form of a BLOB (Binary Large Object) file. By using a custom Cursor class to read and write big files (4MB and over) we can store compressed images for the reports.

Contacts Screen: This screen displays all the contactable homeless services. Initially, all services are displayed but upon the user either selecting a county from the drop-down list or setting their location in the Reports screen, the list will display the services in their area.

Tips Screen: The list of tips fell into two categories, the DO's and DON'Ts. To do create this screen we made an array adapter and specified the layout of the entry according to what we felt would look best. We then entered the array adapter into the list view thus creating the layout for each entry in the list view.

More Screen: The more screen was selected instead of the initial planned sidebar. The objective of this screen is to allow navigation to the remaining screens; Statistics, Your Reports, FAQ, Privacy and Contact Us. Statistics Screen: We wanted to press upon the user the current situation of homeless people in Ireland, as such, the statistics screen displays the number of people sleeping rough in each county. To make this more user friendly and interactive, a map of Ireland is displayed in this screen. The user can select a county in the Republic of Ireland and the latest homeless figures (last 3 months) for that county are shown

Your Reports Screen: We decided to create a screen which will display the reports submitted by the user, making the database more effective. Each row of the database is read, with a visual representation of the report displayed in this screen.

FAQ Screen: We have a frequently asked questions screen purely for information purposes. It provides you with the questions asked most often as it can be a similar question to the one you have.

Contact Us Screen: This screen can be considered an overlay. Sometimes you may have a purely new query and the FAQ may not be enough to help with your query. Because of this, we created a Contact Us screen showing all our information clearly to help answer any questions our users may have.

Privacy Screen: This screen contains details of our privacy policy including how we collect your data and use it.

Key lessons

In developing this app every member of our group can see we developed strong communication skills. Although we all study the same course, we have very different schedules and priorities making it difficult to come together and work often. To overcome this, we used platforms such as WhatsApp to create an informal group chat where we can communicate regularly and make sure we resolve any issues with our project as soon as possible. We also used a platform known as Discord to communicate via voice call while working on the project. This made it easier to work efficiently and resolve issues as communicating over text can lead to misinterpretation.

We also believe we strengthened our time management and prioritising skills. With many people doing several important modules while trying to apply for graduate roles, assigning time to work on this project was a difficult task. We followed a strict timetable in which we had to complete sections during certain weeks. Although this wasn't always followed, it gave us a guide to where we should be and how we are progressing.

Conclusion

Linus Pauling once said, "if you want to have good ideas you must have many ideas". This is something that we followed throughout our project and it made life much easier for us [11]. In every section of this project we came up with different ideas on how it could be done and finally focused in on what we believe was the best idea. We also ensured a democratic voting system when deciding on an idea ensured that the majority were always happy with the direction we were taking the project in, automatically reducing the chance of conflict in the group. Our overall strategy was to play to our strengths while still giving room for every team member to try new things. Rather than assigning tasks randomly we decided where our interests lie within the project and allowed each team member to work on different aspects of the problem.

In terms of human sustainability and homelessness it remains a huge problem in Ireland and in many other countries. As humans we need to become more empathetic and try our best to help wherever possible. With the growth of the efficient technologies that we have nowadays, we can use it to try and reduce socio-economic problems. The number of smartphone consumers is rising exponentially. The next step is now to move in the direction of using applications to help solve real world problems. Applications like home may be a major step in reducing the problem of homelessness in Ireland and abroad.

REFERENCES

[1] HappyFunCorp. 2018. WeShelter's mission is to use mobile technology to allow everyone to contribute to ending homelessness. http://weshelter.org/. (2018).

[2] Kevin Kelleher. 2019. Gilded Age 2.0: U.S. Income Inequality Increases to Pre-Great Depression Levels. https://fortune.com/2019/02/13/us-income-inequality-bad-great-depression/. (2019).

[3] Natalie Linnell, Silvia Figueira, Neil Chintala, Lauren Falzarano, and Vincente Ciancio. 2014. Hack for the homeless: A humanitarian technology hackathon. In *IEEE Global Humanitarian Technology Conference (GHTC 2014)*. IEEE, 577–584.

[4] Goverment of Ireland. 2019. Department of Housing, Planning and Local Government. https://www.housing.gov.ie/housing/homelessness/other/homelessness-data. (2019).

[5] Laurence Roy, Anne G Crocker, Tonia L Nicholls, Eric A Latimer, and Andrea Reyes Ayllon. 2014. Criminal behavior and victimization among homeless individuals with severe mental illness: a systematic review. *Psychiatric services* 65, 6 (2014), 739–750.

[6] Sarah Snoxall, Kathy Oldridge, and Will Venters. 2014. Collective Digital Innovation: Integrating The Expertise Of Multiple Specialist Stakeholders Including Young Homeless People In The Creation Of Mobile Apps For Social Change.. In *UKAIS*. 38.

[7] YTH. 2016. YTH StreetConnect is a mobile app that assists homeless and unstably housed young people to locate, access and rate vital services and resource. https://yth.org/projects/streetconnect/. (2016).

APPENDIX

Figure 4. Home Screen

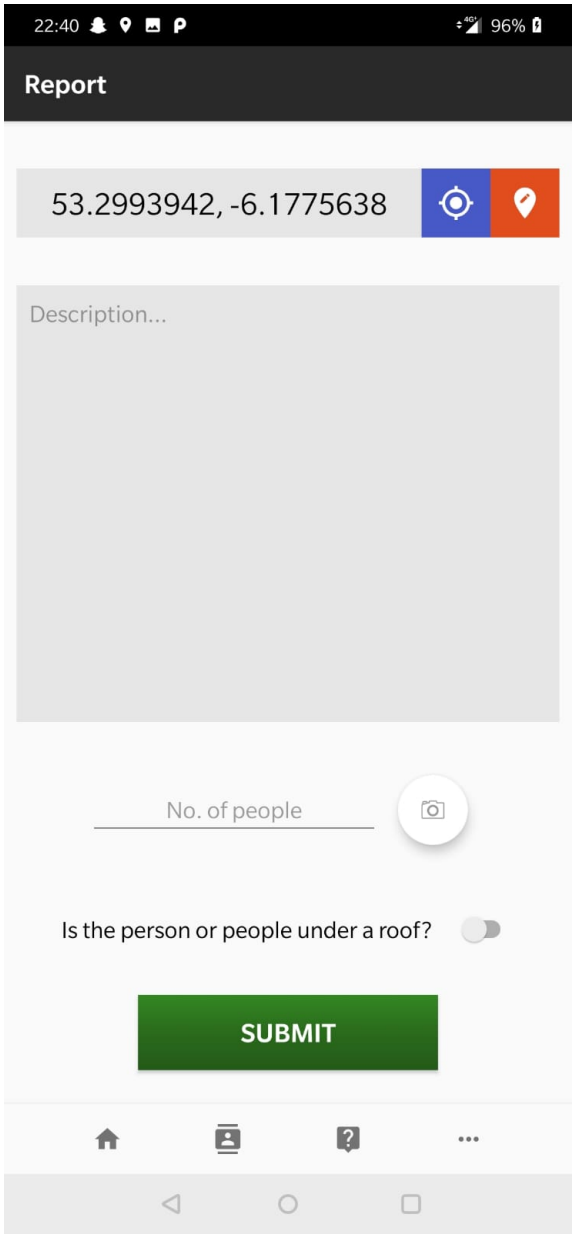

Figure 5. Report Screen

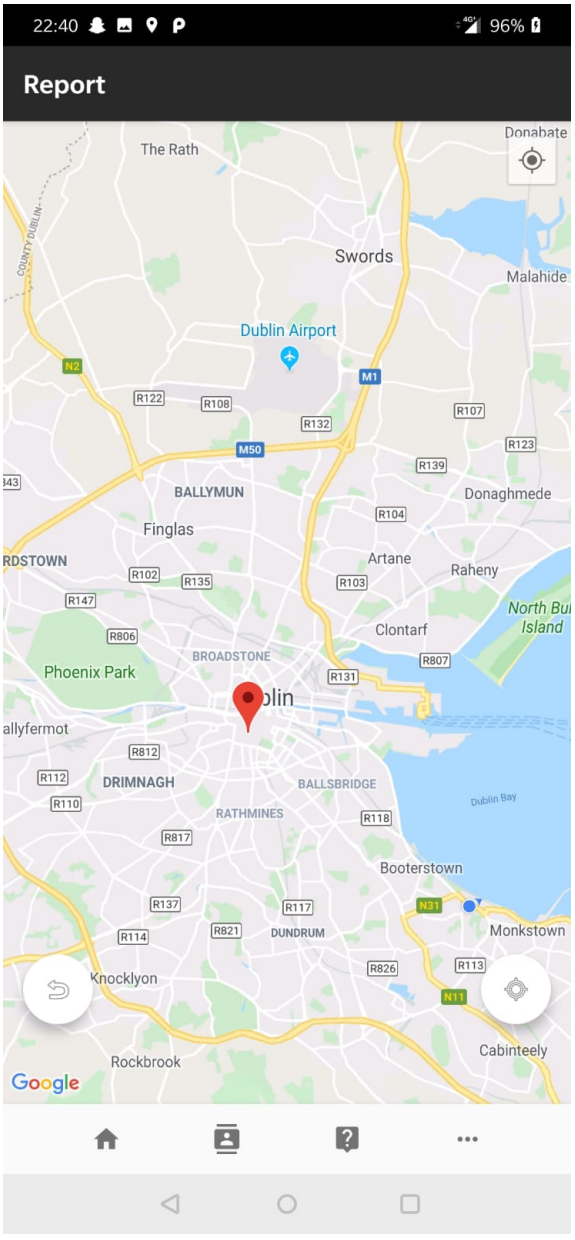

Figure 6. Location Screen

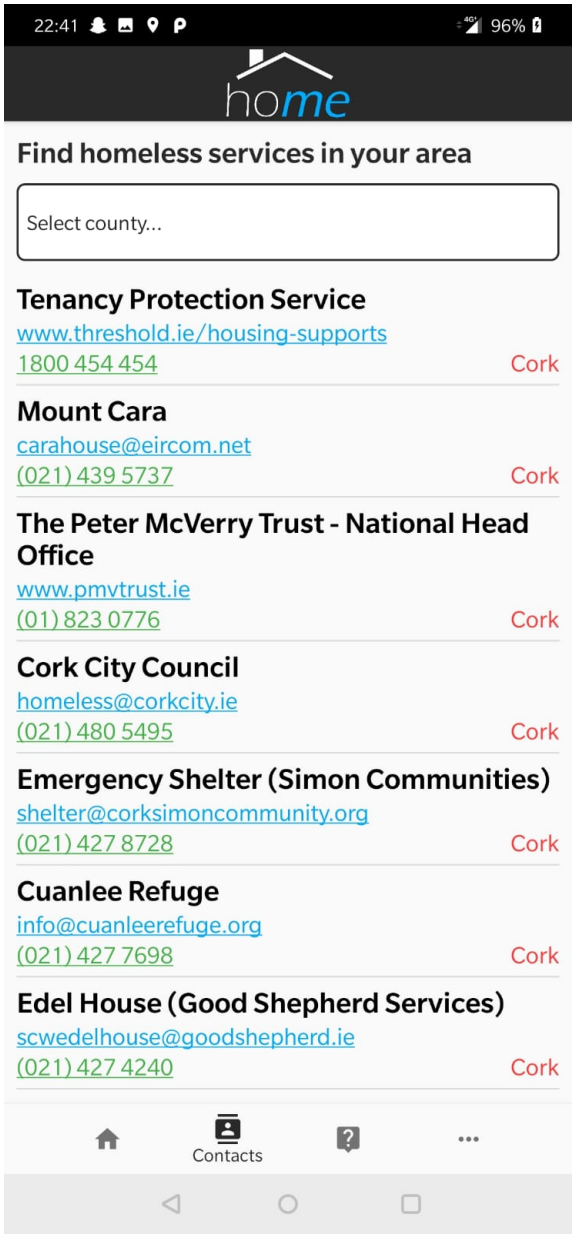

Figure 7. Contact Services Screen

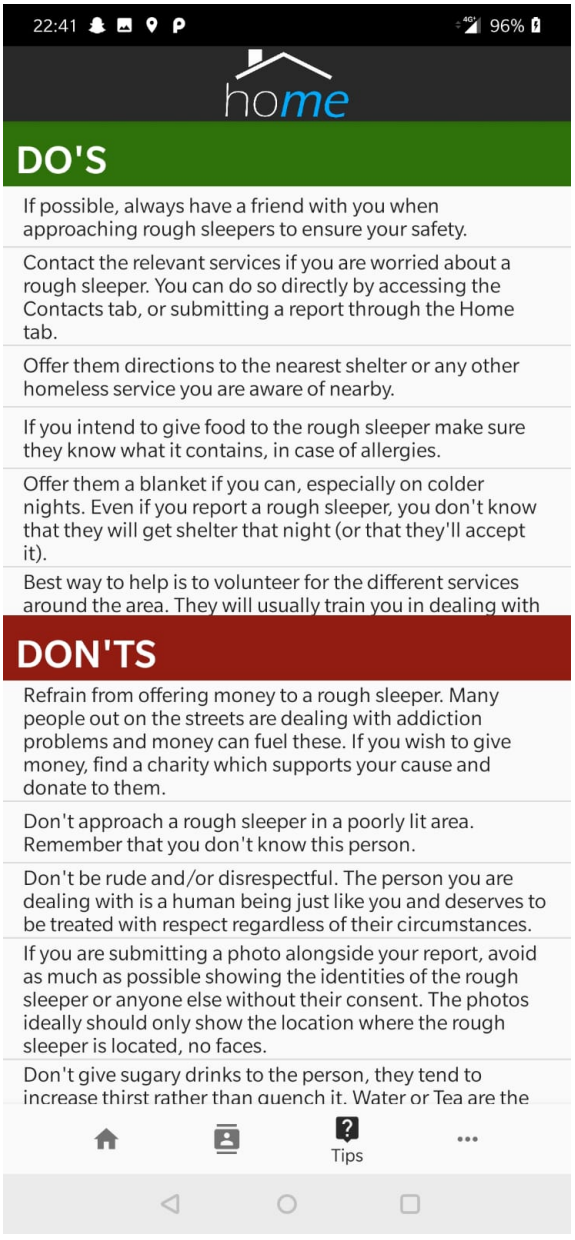

Figure 8. DO'S AND DONT'S Screen

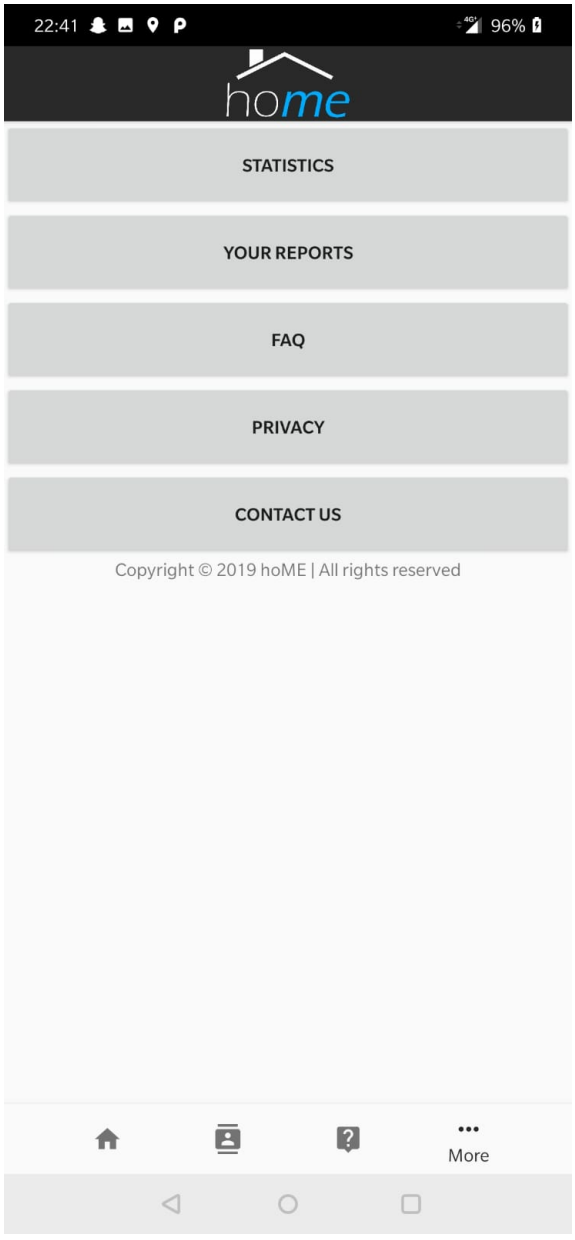

Figure 9. More Screen

Figure 10. Statistics Screen

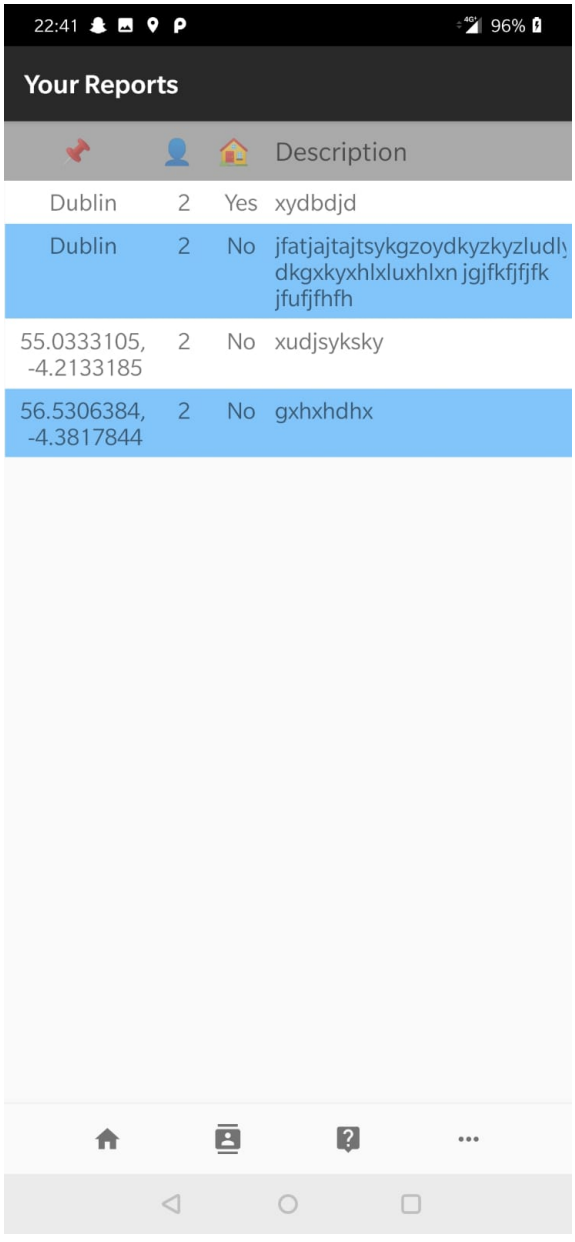

Figure 11. Your Reports Screen

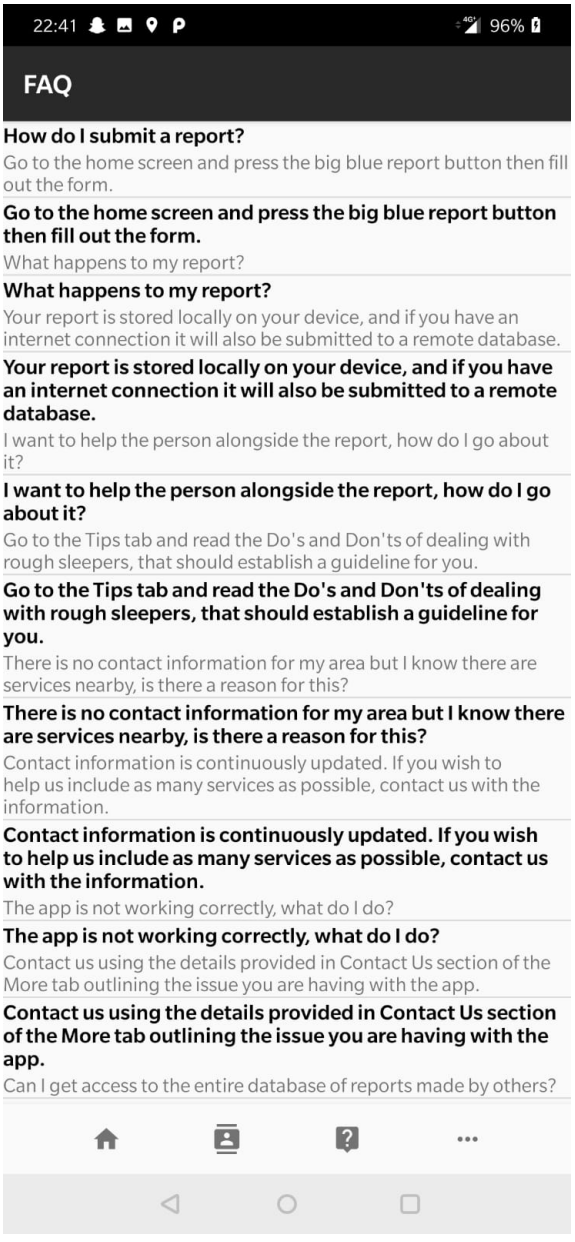

Figure 12. FAQs Screen

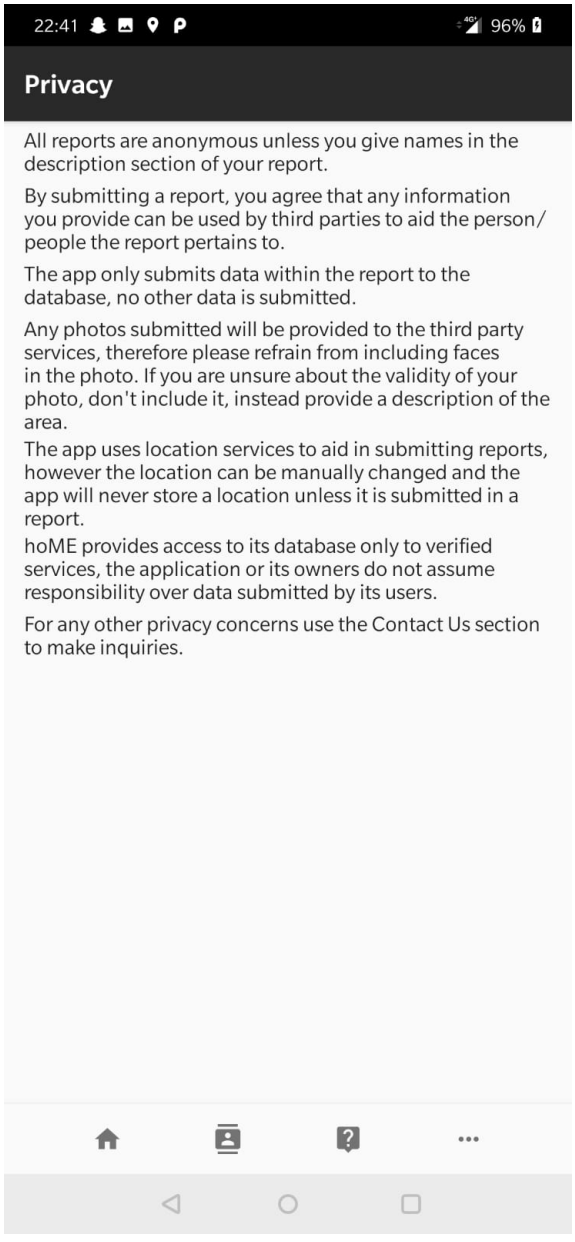

Figure 13. Privacy Screen

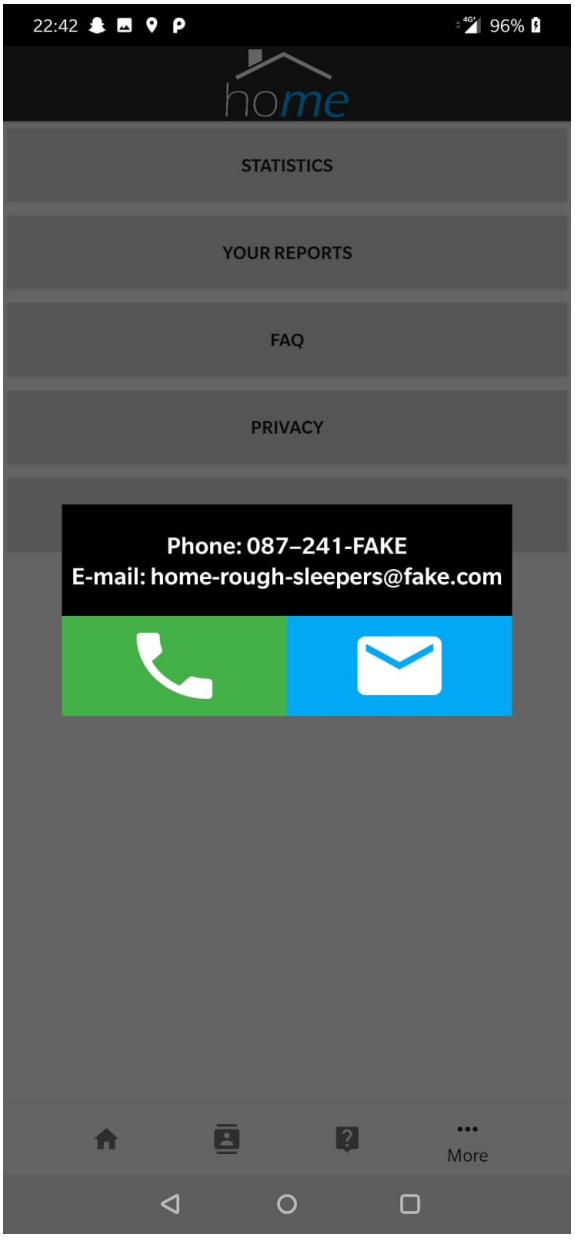

Figure 14. Contact Us Screen