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Big data analysis and machine learning in solving social problems

Concept of Friends Around Me (FAM) app as a solution

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Master's thesis
Autumn 2019
Technology
Information and communication technology
Full-Stack Software Development

Author(s) Saeidi, Shahroz	Type of publication Master's thesis	Date September 2019
		Language of publication: English
	Number of pages 53	Permission for web publication: Yes

Title of publication **Big data analysis and machine learning in solving social problems** Concept of Friends Around Me (FAM) app as a solution

Degree programme: Master's degree programme in Information Technology, Full Stack Software Development

Supervisor(s) Jouni Huotari and Pasi Manninen

Assigned by

Abstract The development of technology has affected the human life in many different ways. The majority of the effects are good; however, some of the effects are not for the best. One of the many problems of technology is the effect on society and socializing, and this thesis concentrates on one of the problems, loneliness which caused by technology. Loneliness is one of the major problems of this time and era, and it ends up leading to various other problems such as depression and suicide. The thesis tried to solve this problem created by technology with technology itself and create an idea and application that could somehow solve this problem. Friends Around Me (FAM) application could arrange and show physically close friends to each other when each friend had time to socialize. Especially in the user's available time, FAM will find another free friend and will suggest these two to each other to share the same activity at the same time and place. FAM is divided into two different parts that show friends to each other if they are in the same area and both are free. This is not just a location sharing application; it only shows those friends who are in the same area. The second part is based on big data and artificial intelligence that collect different types of data from the user and arrange free time to both friends. In this part, the application collects different types of data from a smartphone's apps and sends it to the server to analyze and arrange with other users and friends to find a common free time with the same activity for those friends. This document introduces an idea and concept that has been tested.

Keywords/tags Loneliness, depression, Big Data, Artificial Intelligence, Friends Around Me, Social life

Miscellaneous

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Tekijä(t) Saeidi, Shahroz	Julkaisun laji Opinnäytetyö, JAMK	Päivämäärä 2019 Syyskuu
		Julkaisun kieli: Englanti
	Sivumäärä 53	Verkkojulkaisulupa myönnetty: Kyllä

Työn nimi **Big data analysis and machine learning in solving social problems** Ympärilläni oleva kaverit

Tutkinto-ohjelma: Master's degree programme in Information Technology, Full Stack Software Development

Työnohjaaja(t) Jouni Huotari ja Pasi Manninen

Toimeksiantaja(t)

Tiivistelmä

Teknologian kehitys on vaikuttanut ihmisen elämää monin eri tavoin. Suurin osa vaikutuksista on hyviä, mutta osa vaikutuksista ei. Yksi monista teknologian ongelmista on yhteiskuntaan vaikuttaminen ja seurustelu, ja opinnäytetyö keskittyykin yksinäisyyteen. Yksinäisyys on yksi suurimmista ongelmista tänä päivänä, ja se johtaa useisiin muihin ongelmiin, kuten masennukseen ja itsemurhiin.

Opinnäytetyössä pyrittiin löytämään keino ratkaista ongelma, jonka teknologia on luonut, käyttämällä teknologian apua luomalla ideaa sovellukselle. Sovellus "Friends Around Me" (FAM) järjestää ystäviä tapaamaan, jos he ovat samassa paikassa samaan aikaan, kun molemmat ovat vapaina. FAM pystyy löytämään toisen vapaan ystävän, jotta he voivat tavata ja viettää vapaa-aikansa yhdessä.

FAM on jaettu kahteen osaan. Ensimmäinen osa näyttää ystävän sijainnin, jos hän on sekä vapaana että samassa paikassa. Tässä sovelluksessa ei ole ajatusta nähdä ystävän sijaintia aina, sillä sijainnin voi nähdä vain, jos ystävä on samalla alueella kuin itse on.

Toinen osa perustuu tekoälyyn. Se kerää käyttäjältä erilaisia tietoja ja voi järjestää ajan, jolloin molemmat ystävät ovat ilmaisia. Tässä osassa sovellus kerää älypuhelimen toiminnasta erilaisia tietoja ja lähettää sen palvelimelle analysoimalla ja järjestämällä muiden käyttäjien ja ystävien kanssa vapaan ajan, joka on yleisin ja aktiivisempi molemmille käyttäjille.

Avainsanat

Acronyms

AI	Artificial intelligence
AWS	Amazon Web Services
F2F	Face to Face
FAM	Friends Around Me
IT	Information Technology
JAMK	JAMK University of Applied Sciences
SWOT	Strength, Weakness, Opportunity, Threat
UA	User Ability
UCD	User Centered Design
UX	User eXperience

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1 Introduction

1.1 History

The twenty-first century started with fast growth in technology and industry. The growth in computer sciences and related branches is on the level that could be called as a revolution. Despite past times, nowadays, new and rapid developed technologies could affect human life in a notable way. Sometimes it is impossible to recognize all new globally developed technologies. For instance, a current year's new smartphone could be obsolete in the next year or forthcoming years.

The technology has grown fast in the last 50 years at a very high speed, so it becomes impossible to current generations to follow and adapt themselves to it. The living style of first and second past generations compared with the current one was old, so it is difficult to fill the gap between these two life types since this gap generates many problems that are further described in chapter 3.3 section.

According to J Med Internet Res. (2019), the appearance of technology in the life of older generation created a variety of mental problems; hence, those imposed them to be cautious about the future of humanity. Some people, mostly from the old generation are pessimists about the existence of technology in human life. This kind of thinking causes the avoidance in the acceptance of new technologies. This avoidance is visible in social TV programs as conflicts between new and old generations.

1.2 Demand for related app

Based on the advantages of technology in human life, people are interested to use it, so it is very difficult to fight against technology. In fact, it is wise to deal with it instead of fighting. Besides solving many problems of human being, technology itself generates some different problems to humans as well. It is possible to use the technology to solve the new problems created by the technology in the first place.

One of those problems is the mental problem that human beings face now. As the information the scientists have gained from history, humans due to the social requirement for their existence have lived in tribes for many years, so as a social beings people demand the connection between each other. According to Bergland (2016), psychology declared that humans need to meet each other and speak face to face. Although most of the times the audience is unable to solve the subjected problem; however, still talking with someone lightens the load of the aforementioned mental problems.

Nowadays, due to fast-growing technology people are busy with normal life issues so their free time are limited. In this case, it is difficult to allocate the free time for friends and relatives. Since it is difficult to call all friends and relatives to ask about their availability to meet in a certain place and at some free time, one smartphone application to manage such requirement is essential. An application named Friends Around Me (FAM) is the subject of this thesis and it helps to find friends in a certain environment. FAM is designed to share the location of users in a specific time for those who are in the same area and like to be visible to others. It should be considered that FAM is not the only location sharing application that already exists.

1.3   Client and Assignor

FAM application is used in different types of smartphones and tablets. There is no need for an extra device to use this application. Everything is based on app that connects with other types of applications in phones or tablets.

The usage of FAM in any smart phone or tablet makes it accessible for everyone that owns a smartphone or tablet. The main target group of users for mentioned App is middle-aged people between 25 to 65 years old who need more activity and wish to spend more time with their friends.

This app aims to target all people, especially persons with loneliness and depression in their lives. After some weeks, big data and related technology will learn about the users and can send new opportunities and advertisement relatively.

In general, FAM aims to reach people before they need to use it. For example, even if a person does not need it or has not heard about it before, via other friends this

person could be invited to install the application and be an actual client of the app. The lack of such application and need for a possibility to make the friend's meeting easier, was the motivation point for this work. This thesis work has been set a project road map from start to finish. It has a complete understanding of process which has been proposed by author himself.

2 Research method

2.1 Research approach

The topic of thesis comes from real life in which people suffer from loneliness and thus, they are required to connect other people. For this reason, in this thesis work the qualitative research method - as one method - is used and questions are asked about this app from the respondents of this study.

This work concentrates on two research methods: first, collecting the information and getting knowledge for this work in details. It is necessary to learn about big data and AI to know how to use those technologies for this app. In this part of the research, it is essential to get more knowledge about the case and find the best and easiest way to use those technologies. Second, the researcher uses the questionnaire method to ask people about their opinion and interests about this kind of app.

2.2 Research plan and Justify research methods

2.2.1 Theoretical basis of research

Human being is struggling with loneliness problem, creating an app is just one of the ways to decrease the problem so it will be researched to find out what options or requirements are in order to solve the loneliness problem by creating an app. In the case of investigating this problem planning and designing an appropriate app to connect friends to each other would be objective for this research. The concept of the research topic is totally new, so regarding the requirement for such possibility in real life, this research has been done and the appropriate plan for such app is presented.

Sub Questions:

1. What kind of app is it going to be and what is the targeted people for this project?
2. How satisfied are people going to be with this app, and what factors are going to affect it?
3. What kind of expectations this project is going to cover?

2.2.2 Aims of the research

The aim of research is to understand about the need for this kind of project which connects people to each other. First, we need to be sure that people are interesting about some ways to see others face to face and they will be happy to use such ways to find others in free times. This research will concentrate on questions which shows majority of people want to see others or they are looking for some ways to solve loneliness problem. At the end of the research, we should be aware about the requirements of people to solve the loneliness problem and also to be sure that they are interested to solve mentioned problem by communicating with others e.g. visiting relatives face to face.

After the research about statistics in loneliness and depressions caused by it, decreasing the loneliness in real life by using the virtual app became the main aim of this project. In this project, the subjected app is going to help to motivate people to attend to some events to be able to see their friends or relatives. This app also aims to connect the friends who are occasionally in the same place, so helps them to be informed about the location of each other and meet in person in the case of desire. All processes of this application will be designed and tested as a project without implementation. To create application practically, we will need a group of engineers and programmers to implement and execute the application.

2.2.3 Working plan

The research is started by presenting the app and concepts of it for group of students and after being sure that they understood the main idea of the project, made by questionnaires about the app including, if such app is designed, are they interested to use it or not. It followed by a survey asked from JAMK University of Applied

Sciences' (JAMK) students as a part of User Centered Design (UCD) course. The questionnaire was arranged step by step in different parts.

After analyzing the answers from mentioned questionnaires considering their answers, the research about it and related technologies are studied. The study also consisted of finding out if there is either similar app/apps available or not. The technologies needed to be used in this project have also been studied.

2.2.4   Schedule and funding plan

The project started at the beginning of October 2018 and continued with questionnaires and User Centered Design work until the end of November 2018.

The research and study about the required technologies were studied during December 2018 and January 2019. The technologies and writing took place in February until May 2019. This project is planned to conclude at the latest in June 2019.

The funding and the practical part of the project are not the subject of the project at this stage; however, they will be considered in the future in the case of finding appropriate funding.

Different statistics from different countries shows that one of the main problems of people's health is loneliness and all other problems coming after that. It is interesting that the level of loneliness and suicide in developed countries is much higher than in undeveloped countries. This information purely shows how technology has affected people's mental and social life in a negative way. With the title of loneliness, hundreds of articles and websites could be found showing it as a big challenge for humanity. For example, Figure 1 under the title of "Loneliness: a growing national challenge", shows the risk of social isolation by gender and Figure 2 displays the percentage of the feeling of loneliness in different age groups.
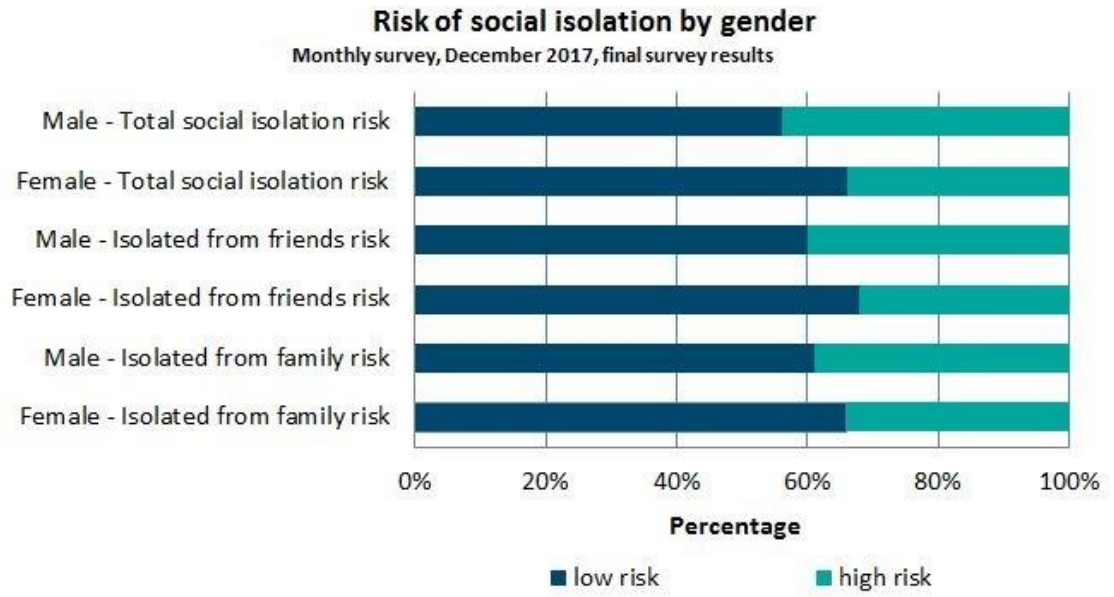
Figure 1. Risk of social isolation by gender (Relationships Australia, 2017)
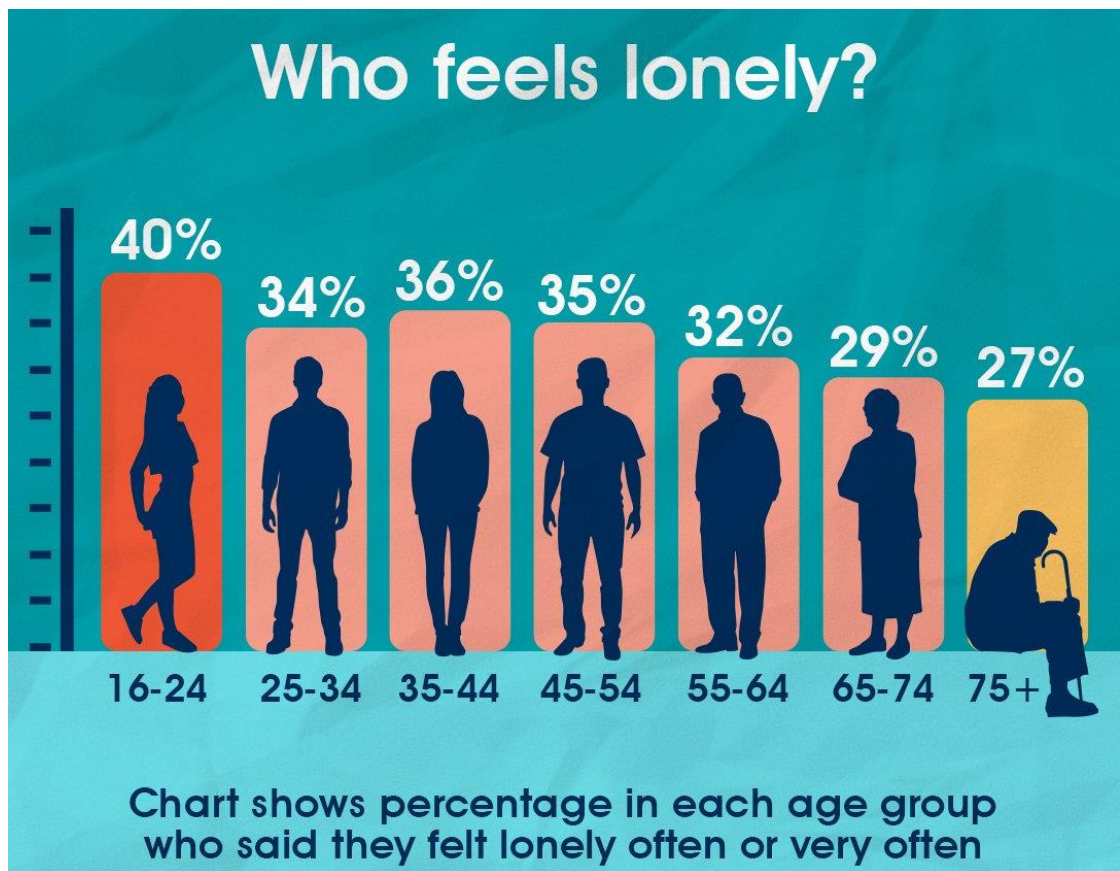

Figure 2. Who feels lonely? (BBC Loneliness Experiment, 2018)

Based on those needs, people are asked how they want to get help for this kind of problems and at the same time, their opinion about some application which could help in this issue is inquired.

3 Effects of technology in daily life

3.1 Effects

The fast growth in technology affects human life in a considerable way. Human life has faced revolutions in industry and other fields before; however, none of them had the same speed which technology has now. Scientists believe that in the last 50 years the speed of development is as fast as the speed of all other development in human life.

Changes in technology and lifestyle affect the life of people. Historical changes and development took place slowly, and one generation was able to witness only few inventions. Those generations had enough time to adopt new things and learn how to live with them. Because of that, the generation gap was not big, and young members followed old people with few new added changes. Especially after the industrial revolution, people started to move to big cities to work in factories with strangers. This revolution was a big challenge for people because the new living style was imposed on the mentioned people. People started to create new rules for the new social life in crowded big cities and started to learn how to live in small houses instead of big areas they had lived before, which was in villages. They started to adapt themselves to new social rules and limit their habited freedom.

Industrial revolution was a huge step for humanity but not as big as technology revolution which took place after the development of computer sciences. The technology was the product of developed countries, so when it was delivered to developing and poor countries, the speed was unfollowable, and it was very difficult to understand the changes and adopt them. Especially many new developed technologies appeared during the recent decade, e.g. the first mobile phone has changed to smartphone with fourth generation features.

3.2   Advantages

Technology contains many advantages, so it has affected almost all fields in human life. It is almost impossible to limit the use of technology into some fields since it already exists almost everywhere. From pharmaceutics to economy, rural to urban society, underground to space, forest to mountain and in many other fields, technology appears as an active and attractive performer. By means of technology, human beings made the whole world into a small village and could see and connect to the other parts of the earth in seconds. In the health sector, for example, tools are connected to computers and they can go inside human body from a small hole and carry out a surgery with high accuracy. Additionally, micro machines can enter the human body and take pictures from inside to make it possible for experts to see what happens inside a human body. A human can fly from one point of the earth to another part in few hours, which in old time took several years.

Additionally, it is possible to understand what happened in history with x-ray related technology. New technology can estimate even the age of materials and evaluate when and how they were made. With bioinformatics technology and DNA tests, also archeology science, it is possible to get to the root of human origin and their living areas on earth.

3.3   Disadvantages

Beside several advantages, technology as many other industries also has its disadvantages. Historically, the need for help in many occasions imposed human being to live in a community. It was impossible to solve tremendous problems such as war, farm work, building houses alone. Technology offered many possibilities for people to solve problems especially spend their time and communicate with people who are physically far from them. This possibility resulted in thinking of reasons why a person must accept someone who is physically close; however, whose mindset is different, so people started to decrease relationships with each other. In the past, spending time especially in winter was a big issue so people were required to visit and spend time with each other. Nowadays technologies such as televisions, computers and phones fulfill the people's spare time in an easy and fast way and people do not need to go to a physical meeting anymore. Even in one house, family

members are busy with their own computers or phones; hence, mentally they are not in the same place although physically they exist in the same place.

The lack of physical meeting requirement that was generated by technology has reduced the human passion to accept others. Most of these problems occurred because of technology in human lives, and it is one of the big disadvantages of technology that people today face.

3.4 Social life and loneliness as problem

One of the major problems created by technology is its effect on a person's social life. As mentioned before, spending time with others is essential for human being, since, historically, for long time human lived in a society with a busy social life.

The long time living with a community empowered human being, so it was easy to solve problems; hence, human beings learned to solve problems with getting help from others. Living in a community caused the group emotions by sharing the happiness and sadness with each other.

By means of technology, human life has eased, and the previous needs to others, at least socially, decreased; therefore, people, especially the young generation became more solitary. They imagined that they do not need friends and relatives to protect or help them in special cases and a modern system supported by technology, will be available in demanding time. People moved to megacities to find job to have more benefits, so all mentioned and non-mentioned issues ruined social communities and people started to feel mentally themselves alone.

Nowadays most people are unhappy, so they always complain about it; yet, almost nobody has a real solution for this problem. People want to visit friends and relatives like before; however, a very busy life in cities with huge work tasks does not let people allocate time to visit friends.

3.5 Offer a solution

Beside many suggestions offered by most of branches of science, technology, which is one of the active and dominant factors causing this problem, can appear as a problem solver as well. By means of the presented solution, an app will assist people to meet friends and relatives when they are free and already in some place which

other friend or friends occasionally visit. In the case of desire app help and motivate them to attend to some events, which other friends are also going to attend.

4 Questionnaire about application

4.1 Questionnaire style and place

Based on the questionnaire in the User Centered Design course in JAMK, this application was introduced to students and teachers, and it was proceeded by asking different kinds of questions. In this questionnaire, the class teacher (Marc Pallot) helped the researcher step by step to go the academic way and get accurate results with the questionnaire.

Jaxber application was chosen as a suitable app for this aim to be used for this survey. The questions were sent via Jaxber to the participants of the survey, and the results were received for an analysis in Excel spreadsheet format.

The questions were divided in to three different groups as Demographic questionnaire, Usability Evaluation questionnaire, and User experience questionnaire. The list of questions for each group and results for this app are as follows:

4.2 Demographic questionnaire

In this part, the user's personal information, e.g. gender, how often each group of ages and genders using mobile devices and how far they are familiar with ~~the~~ technology, is considered. Also, user's mobiles app experiences and using time and places are under the consideration of this project. Based on these aims the below questions have been created:

DQ1 - What is your age range?

DQ2 - What is your gender?

DQ3 - Do you have a mobile device (Tablet or Smart-phone)

DQ4 - What is your level of experience for using mobile apps

DQ5 - Would you like to meet with people in the proximity in order to discuss together and/or share few minutes together in having a coffee or a drink at a bar?

DQ6 - Where would you use a proximity app?

Figure 3 shows the participants of the survey with mentioned questions. It shows gender, age, using tablets and other questions which shown on the chart. As shown in the chart, most of participants in this questionnaire like to meet other people in the proximity area and all the participants using smartphones or tablets when they are outside.
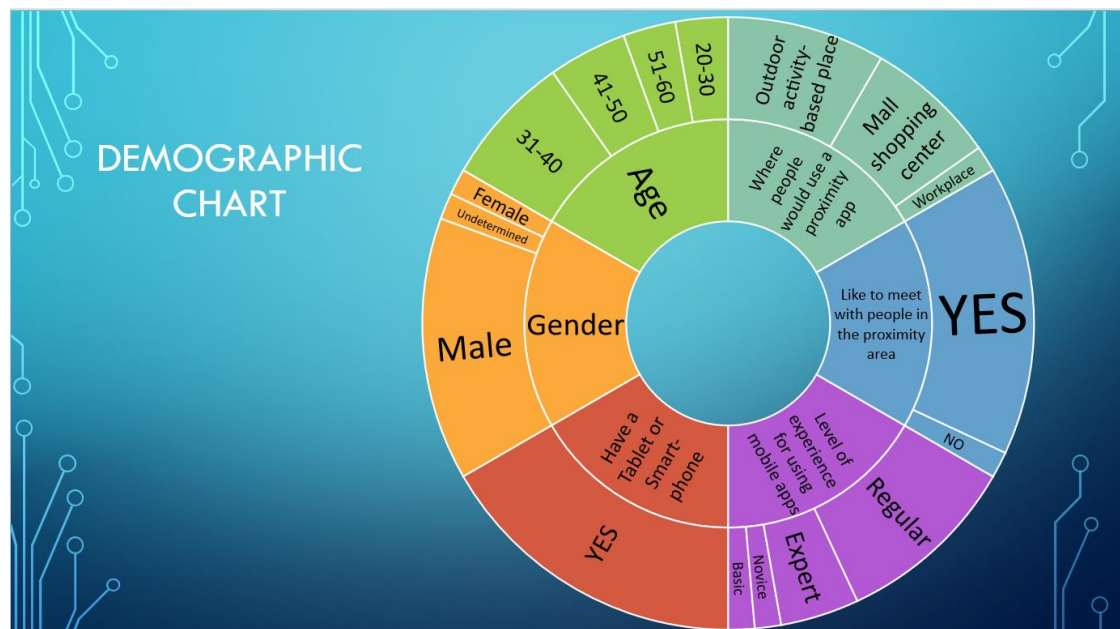
Figure 3. Demographic chart of participants to the survey

A small number of the participants would like to use FAM kind of apps in workplaces; however, most of them would like to use it in outdoor activities and shopping malls which both are the target places for this app.

4.3 Usability Evaluation questionnaire

Next, the knowledge about the usability and interface of the application is considered. All information such as; the interface as text, clarity, simply learnability,

and all other knowledge related to the mobile application. It is very important to create a very simple application avoiding any kinds of complexity. The users could be a group of people whom they are not familiar with mobile applications so for that reason, the interface should be very simple and user friendly. The participants were asked about the usability of the app with the following rating:

UQ1 - Please, rate the Visual Clarity of the User Interface

UQ2 - Please, rate the level of Learnability of the User Interface

UQ3 - Please, rate the level of Memorability of the User Interface

UQ4 - Please, rate the level of Intuitiveness of the User Interface

UQ5 - Please, rate the Information Conciseness of the User Interface

UQ6 - Please, rate the Design consistency of the User Interface

UQ7 - Please, rate the Aesthetic Integrity of the User Interface

UQ8 - Please, rate the Textual Comprehensibility of the User Interface

UQ9 - Please, rate the Navigability among the different levels of the User Interface

Figure 4 shows the usability of graph based on the answers gained from the questions. These ratings are rated from 0 to 5. As shown in the bar, the average of the rates is about 4.08 and the respondents of the questionnaire believe that it could be a useful app. In this graph, learnability has the highest rate and memorability has the lowest rate.
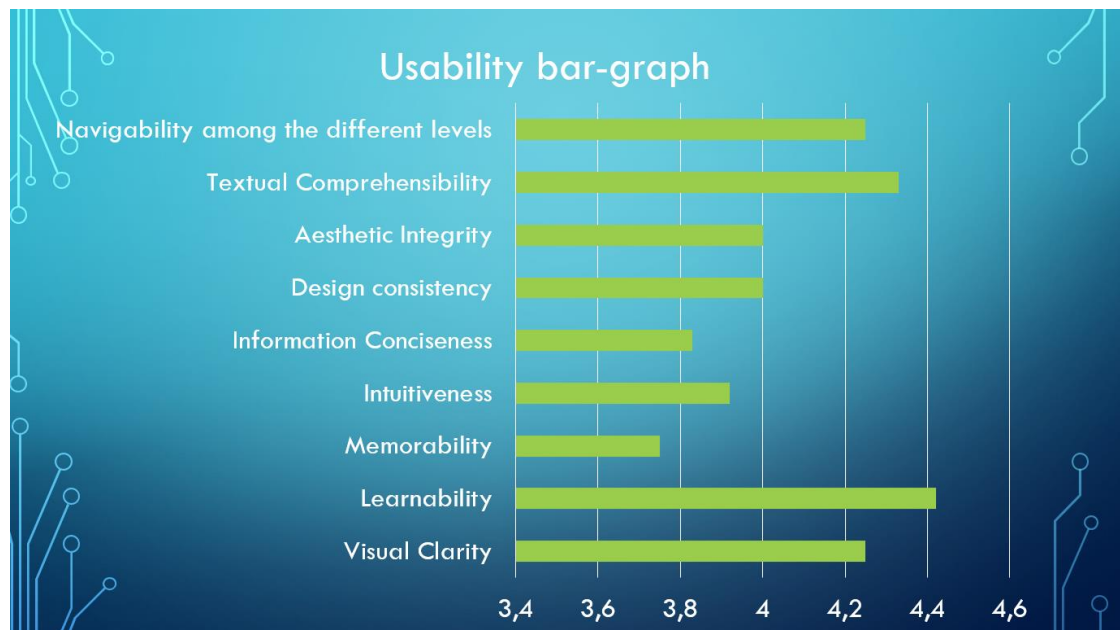
Figure 4. Usability bar graph

4.4   User Ability (UA) correlation table

Appendix 1 is User Attribute Correlation which investigates the correlation between attributes on the same node based on data from all nodes. The high correlation will give useful information to designer to use the value presented for one attribute on the node to predict the other attributes. Attributes used for this study are: Visual clarity, Learnability, Memorability, Intuitiveness, Information Conciseness, Design Consistency, Aesthetic Integrity, Textual Comprehensibility, Navigability among different levels

4.5   User experience (UX) questionnaire

The users opinion and feedback about the application is the aim of this part of questionnaire. It is aimed to know how this application could be attractive to for people and what they think about novelty and usefulness. Sometimes some ideas are good and new for creators, but those are not attractive for users. This kind of questionnaires gives good viewpoint to creators to estimate the interest of society and be able to come to better decisions. The respondents were asked about the usability of the app with the following rating:

XQ1 - How would you rate the USEFULNESS of this App Idea?

XQ2 - How would you rate the NOVELTY of this App and its functions?

XQ3 - How would you rate the Reliability of our proposed solution?

XQ4 - How would you rate the User-Friendliness of our proposed solution?

XQ5 - How would you rate the Connectivity with other users of our proposed solution?

XQ6 - How would you rate the level of Pleasantness to use of our App idea?

XQ7 - How would you rate the level of ATTRACTIVENESS of our proposed solution?

XQ8 - How would you rate the level of Influence of other users on your behavior with our proposed solution?

XQ9 - How would you rate the level of Confidentiality of our proposed solution?

XQ10 - How would you rate the level of Affordability of our proposed solution?

XQ11 - How would you rate your level of Collectiveness in community decision-based of our proposed solution?

XQ12 - How would you rate the level of Reliability to other users of our proposed solution?

Figure 5 shows the user experience for FAM application. The rates are between 0 to 5 and the questions focus on Novelty, Usefulness, Affordability etc. The average of the rates is 3.92. "Novelty" has the minimum rate of all; where as "Influence of other users" has the highest score.

The low rate for Novelty is because of the lack of good description or good understanding, since in the beginning the respondents thought that this app is very similar to existing apps, although in the presentations the differences between FAM and other similar apps were explained and it was described that their aim is totally different than that of FAM.
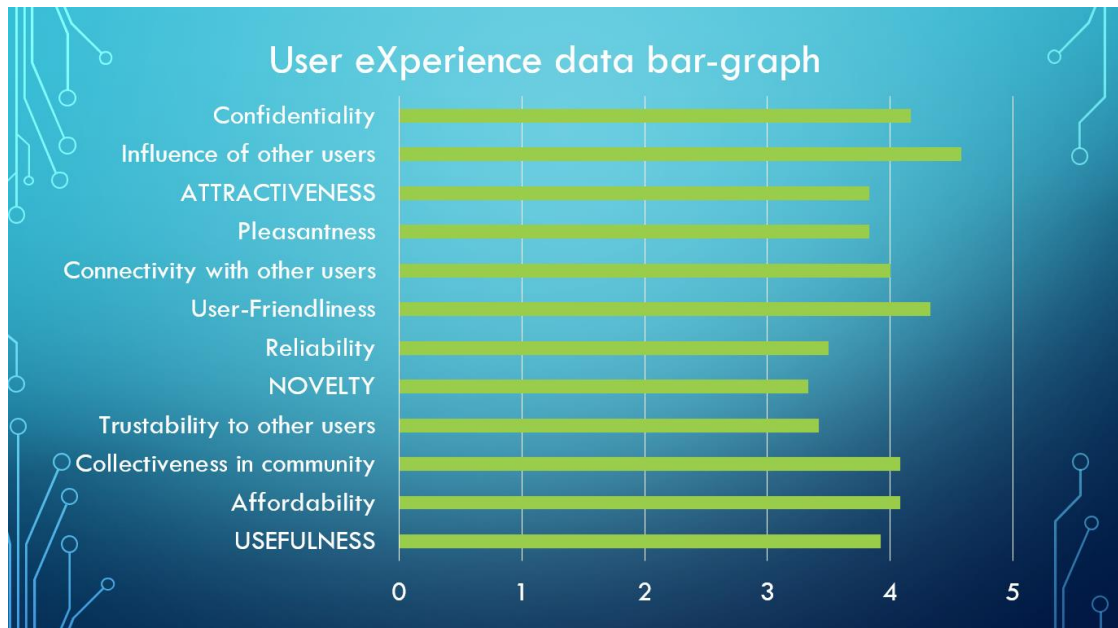
Figure 5. User experience data bar graph

4.6   UX correlation table

In this study, FAM is presented to a group of people and asked for their ideas. Regarding the responses of participants, in the case of getting knowledge about User Experience Correlation matrix, a table between sets of variables has been arranged. Appendix 2 allows the designer to see the highest correlation pairs between different variables. Variables used for this study are: Usefulness, Novelty, Reliability, User friendliness, Connectivity, Pleasantness, Attractiveness, Influence of other users, Confidentiality, Affordability, Collectiveness, Trustability.

4.7   Qualitative collected data

In Jaxber application, there is text edit field that users can also use to add their feedback and notes about worries, or comment their opinions about every question. There were many widely written texts about each part, and the following list is a summary of them. These are not all answers that FAM received; however, they cover almost all feedback that was collated. The texts are not edited but are quoted word by word based on how the respondents wrote them in the questionnaire. The most important textual elements are listed below as follows:

- You cannot see other users state of mind
- It looks pretty standardized
- Some aspects could be improved
- Easy to move from one level to one another
- There have been many apps for this but none of them has gone popular
- It would be easy to check if any of my friends are nearby
- I think sometimes we lack such possibility for meeting friends
- Is it free?
- Cost of position sharing is too high for me
- It was not clear how people are connected in this app. Good stalker app!
- Worried about privacy
- I haven't seen similar app before
- Haven't heard app like this
- There are existing apps close to this idea
- These kind of apps were popular before people got worried about privacy
- The UI is ok, but if I understood correctly the user has to separately set when they are visible in the app
- Feel really linked to others
- Totally connected!
- So nice to have opportunities to meet colleagues in an unplanned way
- I am not the person who likes to have an app everything. Calling someone will be enough for me
- I don't like to share my position with anyone

In general, as positive feedback the app got comments such as: people like such apps to meet friends face to face and as negative feedback: people worry about the privacy and sharing their location.

4.8 UX and UA Strength, Weakness, Opportunity, and Threat (SWOT) analysis of App

FAM is a new application; hence, it is necessary to analyze its weaknesses, strengths, threats and opportunities. It assists the designer in recognizing the mentioned factors to improve the usability of the application. In this study, to obtain the mentioned knowledge a SWOT analysis-marketing tool is used. According to Dr. Pallot UCD course material (2018), UX SWOT attributes used for this study shown in Appendix 3 are Usefulness, Affordability, Collectiveness in community, Trustability to other users, Novelty, Reliability, User-Friendliness, Connectivity with other users, Pleasantness, Attractiveness, Influence of other users, Confidentiality.

Additionally, UA SWOT attributes used for the study shown in Appendix 4 are Visual Clarity, Learnability, Memorability, Intuitiveness, Information Conciseness, Design consistency, Aesthetic Integrity, Textual Comprehensibility, Navigability among the different levels.

5 Big Data and Artificial Intelligence (AI)

5.1 Big Data

Today a human being faces a huge amount of data. Every single second people are generating and using millions of bytes of data in extremely huge amounts and sizes, so big data management is a very necessary issue in the management of all this data.

A large volume of mentioned data which is potential to be used in information, machine learning projects and other advanced analytics applications are; structured, semi structured, and unstructured data.

For example, only at one single airport it is possible to collect billions of bytes of data to use. There are e.g. the flight timetables, customer lists, worker lists, each work point data, camera data, sensor data, Wi-Fi data used by passengers, technical data plans, cargo data and thousands of other sections data. Those amounts of data which are huge are simply called big data. As shown in Figure 6, from Big Data University Team courses, there are five different Vs related to Big Data concept: Volume, Velocity, Variety, Veracity, and Value. Short descriptions of each are listed below:

- Volume means the amount of data people are using in big data compared to old data sources
- Velocity means of the speed of data generating which is very fast and processors never stop from processing the data
- Variety means data sources; people get data from very different sources e.g. machines, sensors, people and many other places compared to old data.
- Veracity means the quality and reliability of data which people get.
- The Value of all those parts of data which make Big Data.
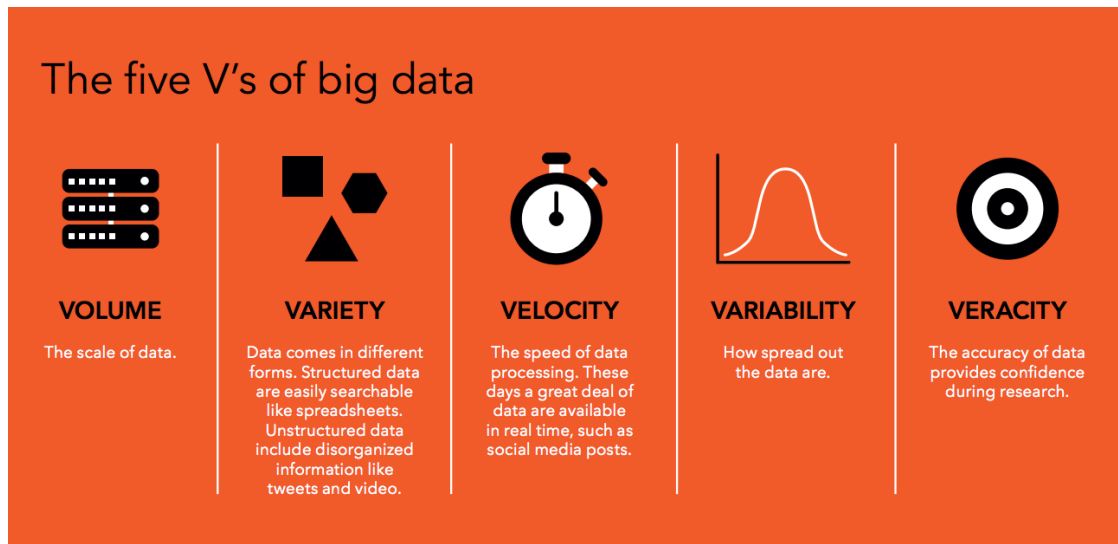
Figure 6. The five Vs of big data (School of nursing Health analytic Collaboratory, Big Data finding its mark, 2018)

5.2   Artificial Intelligence

Artificial Intelligence (AI) is one of the developing techniques presented during last ten years and still it is in the developing process. As a matter of fact, AI is related to big data. Nowadays engineers can create algorithms that are able to understand big data in a reasonable manner and manage some parts or all parts of missions in the close future.

As an example, computers use AI technology to know about the users more and more to use the collected knowledge in different fields. Virtual programs hidden in apps or cookies could know easily that a user needs to buy e.g. a camera so they manage all related advertisements available on the internet to further this aim. Many years ago, most of the advertisements were not related to a user's need and interest; yet, nowadays almost all ads somehow are related to the user's interest, so they motivate the user to think about them.

Another example can be YouTube service which is based on videos. YouTube can recommend some videos which are interesting for specific people. It is so common now to see on the first page of YouTube interesting videos related to the user's interests. It could happen that regardless of the goal of user to enter YouTube, YouTube has directed him/her to another direction.

Google, YouTube, Facebook and many other applications perform the mentioned behaviors based on big data and artificial intelligence. Nowadays, many applications have started to use this technology to get optimized results from their services.

Based on Forrester's analysis, here are Top 10 Hot Artificial Intelligence (AI) Technologies from the Forbes website:

"Natural Language Generation: Producing text from computer data. Currently used in customer service, report generation, and summarizing business intelligence insights. Sample vendors: Attivio, Automated Insights, Cambridge Semantics, Digital Reasoning, Lucidworks, Narrative Science, SAS, Yseop.

Speech Recognition: Transcribe and transform human speech into format useful for computer applications. Currently used in interactive voice response systems and mobile applications. Sample vendors: NICE, Nuance Communications, OpenText, Verint Systems.

Virtual Agents: "The current darling of the media," says Forrester, from simple chatbots to advanced systems that can network with humans. Currently used in customer service and support and as a smart home manager. Sample vendors: Amazon, Apple, Artificial Solutions, Assist AI, Creative Virtual, Google, IBM, IPsoft, Microsoft, Satisfi.

Machine Learning Platforms: Providing algorithms, APIs, development and training toolkits, data, as well as computing power to design, train, and deploy models into applications, processes, and other machines. Currently used in a wide range of enterprise applications, mostly `involving prediction or classification. Sample vendors: Amazon, Fractal Analytics, Google, H2O.ai, Microsoft, SAS, Skytree.

AI-optimized Hardware: Graphics processing units (GPU) and appliances specifically designed and architected to efficiently run AI-oriented computational jobs. Currently primarily making a difference in deep learning applications. Sample vendors: Alluviate, Cray, Google, IBM, Intel, Nvidia.

Decision Management: Engines that insert rules and logic into AI systems and used for initial setup/training and ongoing maintenance and tuning. A mature technology, it is used in a wide variety of enterprise applications, assisting in or performing

automated decision-making. Sample vendors: Advanced Systems Concepts, Informatica, Maana, Pegasystems, UiPath.

Deep Learning Platforms: A special type of machine learning consisting of artificial neural networks with multiple abstraction layers. Currently primarily used in pattern recognition and classification applications supported by very large data sets. Sample vendors: Deep Instinct, Ersatz Labs, Fluid AI, MathWorks, Peltarion, Saffron Technology, Sentient Technologies.

Biometrics: Enable more natural interactions between humans and machines, including but not limited to image and touch recognition, speech, and body language. Currently used primarily in market research. Sample vendors: 3VR, Affectiva, Agnitio, FaceFirst, Sensory, Synqera, Tahzoo.

Robotic Process Automation: Using scripts and other methods to automate human action to support efficient business processes. Currently used where it's too expensive or inefficient for humans to execute a task or a process. Sample vendors: Advanced Systems Concepts, Automation Anywhere, Blue Prism, UiPath, WorkFusion.

Text Analytics and NLP: Natural language processing (NLP) uses and supports text analytics by facilitating the understanding of sentence structure and meaning, sentiment, and intent through statistical and machine learning methods. Currently used in fraud detection and security, a wide range of automated assistants, and applications for mining unstructured data. Sample vendors: Basis Technology, Coveo, Expert System, Indico, Knime, Lexalytics, Linguamatics, Mindbreeze, Sinequa, Stratifyd, Synapsify.,,

6   Similar apps

6.1   In general

There are already some apps looking like FAM, which show friends' location and activity. They also show the users to each other and share their locations to be visible to their friends. In this case, what is the advantage of using FAM?

First, existing apps have been created for some other reasons so none of them target the requirement described before. The existing apps currently show only the location, which would be somehow similar to FAM; however, arranging and suggesting participation in some occasion in some specific place to visit friends with support of Big Data issues, FAM is exclusive and none of the existing apps currently include these properties. Some similar apps and FAM advantages to them are listed as follows.

6.2   Facebook

Nowadays, Facebook sends some notifications as suggestions of a specific activity mostly in the living area or city of a person and highlights the attending friends in the person's friend list. These activities are mostly e.g. concerts, political or social meetings. The main difference of this Facebook property with FAM is the lack of time and motivation to spend time with friends freely, since the aim of joining each other is different. As a second difference, Facebook shows only public and big activities and does not care about people's free time. Thirdly, Facebook shows activities regarding the registered living city and covers a big area like a city or town whereas FAM covers a smaller area such as a mall or park in which the user is at a specific time. Regarding the main aim of FAM being designed for free time in a certain time and place, Facebook's option for events is not totally like FAM. Figure 7 shows some general activities and major events, and the number of friends interested in it with their names.
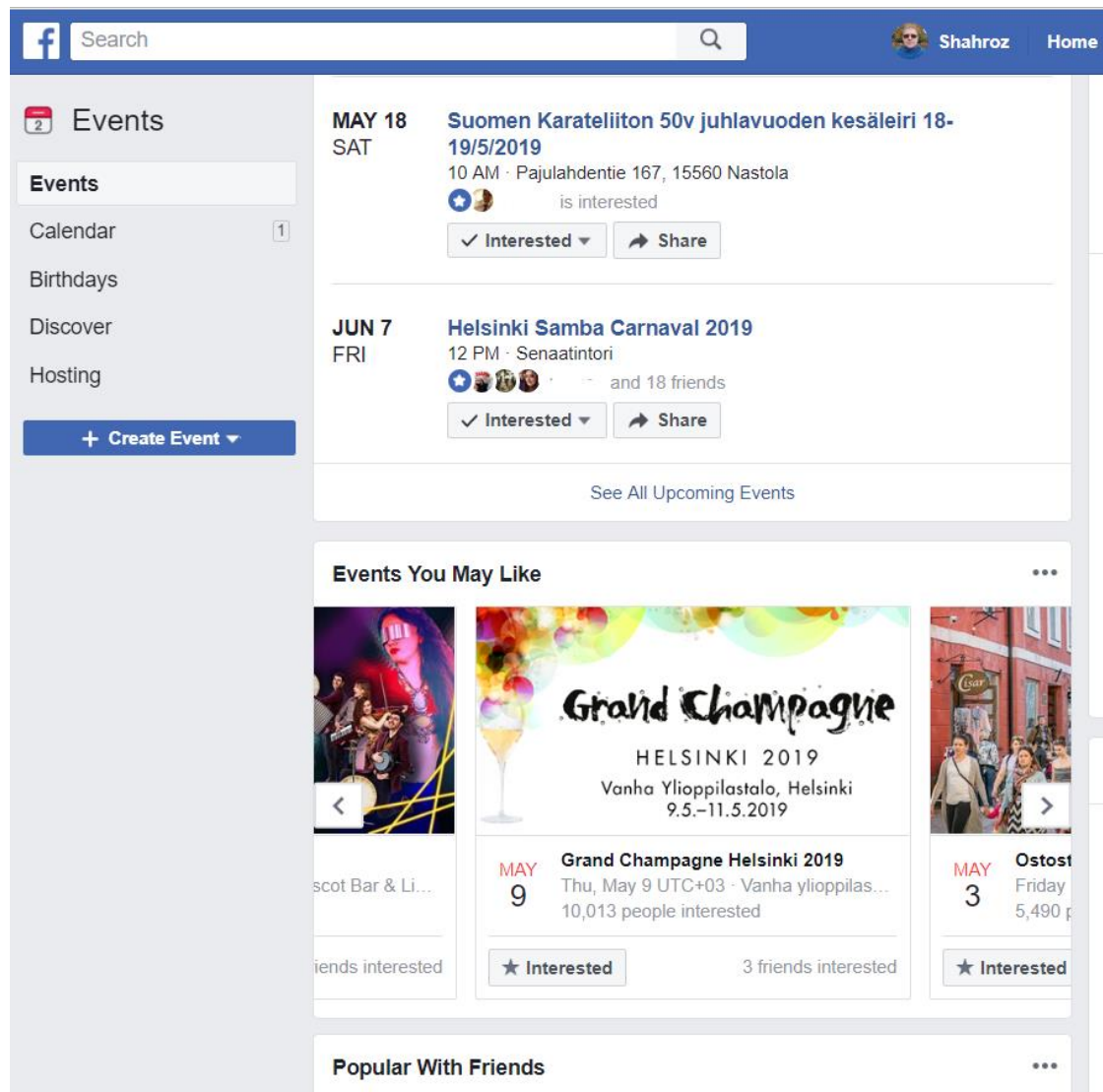
Figure 7. Facebook events

6.3   Google map

Google Maps is a very useful and powerful application supported by almost all smartphones, and they either have it or have a similar one installed. In Google Maps, the users can share their location to other people, so friends are able to see the exact location of a person at any certain time. First, this app does not care about a friend's free time. It just shows the location of friends sharing it; however, it does not offer any information about their current situation if either they are available to meet a friend or not. Secondly, the user should select friends one by one each time, so it is not formal and handy. The third and a very important difference is location sharing all the time. Nobody will be happy to share one's own live location all the

time. In FAM, the user shares the live location only to those friends who are nearby and desire to be visible; however, in Google Maps, even people in different countries can see each other's locations. This may harm the privacy of people, which would make them unhappy. Figure 8 is a Google location sharing which shows friends' locations all the time even if their distance is far from the user. Here friends between Turku and Helsinki are shown to each other, which it is not a good feature for the majority of the users.
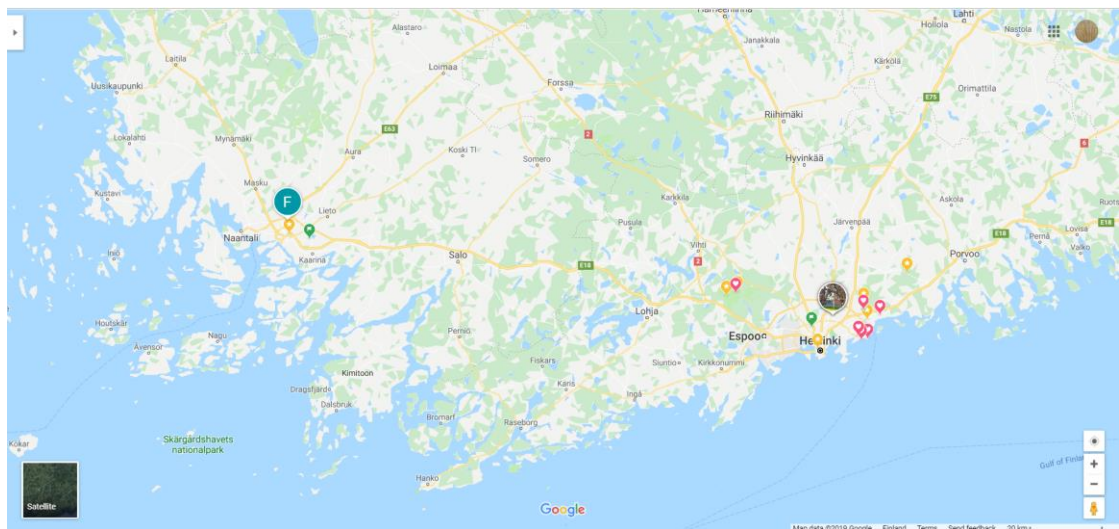
Figure 8. Google location sharing

6.4   Snapchat

Snapchat like Google Maps shares the location of all friends every time it is activated, even if someone is in a different country. In such apps, a user's live location appears for almost all friends and especially at old age, users do not like these situations. Figure 9 shows the Snapchat application with a friend's location even from other countries to everyone, which could break a user's privacy.
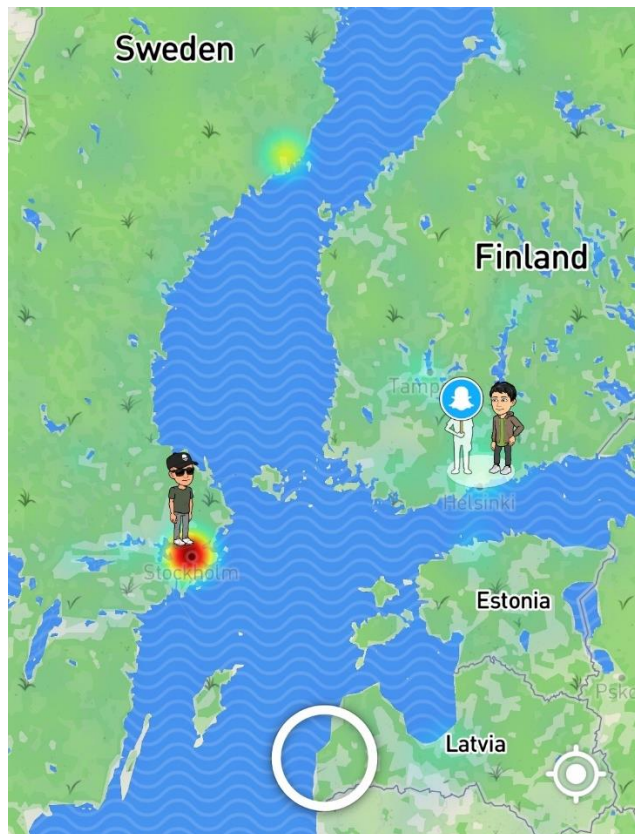
Figure 9. Snapchat location sharing anywhere in world

7   Friend Around Me (FAM)

7.1   FAM as friend finder

The first part of this application is simple, and in it one looks for those friends who are around the existing location in specific available free time. Since it is not possible to call and ask all friends about their availability, this application was designed and planned to show the location of desired friends in a specific environment around the app user.

For example, going to shopping malls is boring for some people; however, most people like to stop at many shops. Some shopping centers have made some possibilities for non-shopping fans to spend their waiting time. In such cases, to avoid following the shopping fans for several hours, most people who they know are in the same place and most probably in the same situation spending the boring free time separately without knowing about each other.

Here, FAM application starts its duty to find and show the users to their friends who are in the same location and would be interested in spending their free time with a friend. After finding out who is available by using the app, it is possible to connect to each other and arrange some place to meet, have a cup of tea or coffee and spend time together. The user activates this application only in desired times, meaning this application does not show the location of the user in undesired times.

7.2   FAM as a time arranger

The second part of FAM is different to the first part. In the first part, the user is already available in a specific place to meet with a friend, so the application tries to find other available nearby friends. However, in the second part, the application itself tries to arrange the time to see the person's relatives or friends. It means the application gives the users advices to manage time in order to be in a certain place at a certain time to visit relatives.

For example, one user is at home and has free time but lacks motivation to go somewhere. In this case, the application monitors other friends and suggests the user to go to the same place and join a friend's activity. The application can learn about users, for instance, about their activity, free time, political views, favorites, hobbies and many other things. The app can learn about friends and recommend mentally or physically appropriate or their activities to each other.

FAM knows about the activity of one user, e.g. he or she likes gym so at the same time, one of the other friends who is the user of app sees that he or she has the same hobby. If the application finds some free time to both friend users, it can immediately suggest for both of users a specific time and gym to be able to see each other and have the same activity together. Most probably this part could be more useful because sometimes people are really challenging about what to do and where to go in their spare time. Via this application, people could carry out their activity together and avoid loneliness, which as mentioned is a big problem.

7.3   Security

In fact, in this part big data technology and artificial intelligence are required; therefore, the main problem in this case could be the privacy that maybe someone could be worried about. The privacy issue could be decreased and the system could be forced to be more secure by coding the app information in a hidden code system so even in bad cases, no one would be able to know about the user's information that they have shared manually or via other applications.

Currently smartphones and applications are already using this kind of technology, in which apps learn about the users and use the information to send related advertisements to them. It will be explained in detail in the chapter about the technology; however, FAM application will be designed to be very careful about privacy, so the offenders would not be able to use it in a wrong way easily.

FAM like Google and other applications just gives a nickname as a long number for each user; hence, it compares considerably and works on those numbers. Only in the final step in the use case will the real name be recognizable under the coded number. Until that step, everything is private and even in the case of data stealing, matching virtual data and the actual person would be impossible.

8   Impelementing techniques

8.1   Planning and implementing the application

The creation for the first part of FAM is simple. For the mentioned app, the permission of sharing a user's location is needed and in the activating case, it could recognize the location of a user. FAM will follow the location of users continuously, so it will try to find friends around the user at any moment.

The first issue is how a user can use FAM. The user activates it only in free times, i.e. times when the user is available to meet a friend. Before opening it, the user can set a kilometer radius range, which will be visible to friends in that area. For example, if a user sets FAM radius range to 3 kilometers, it will show only people in that area, so a user will be still invisible for the friends outside of that area and vice versa. In similar

existing applications such as Google location sharing or Snapchat if the user activates it for a person, that person can monitor the user all the time. In that case, it would be a question of privacy. In the case of FAM, it makes the location visible only to friends who are physically near the user.

It is also possible to divide friends into different groups to enable users to decide to share the location for all groups or customize it to some special people. In the setting option, users can customize groups completely based on their desire, because the aim of the app is to ease the meeting of users with their friends in desired cases. It presents the user availability to be invisible for certain people who are not likely to meet and visible to desired ones.

After the user has activated the application and set the visibility distance, he/she continues the normal routine life and there is no need to do anything. If some of user's friends are in the same area with similar free time related situation, they can get a notification about it, so they can optionally contact each other to meet.

Figure 10 is a sample image of the application's interface that shows how a user can be visible to his/her friend and how a friend can be visible to the user.
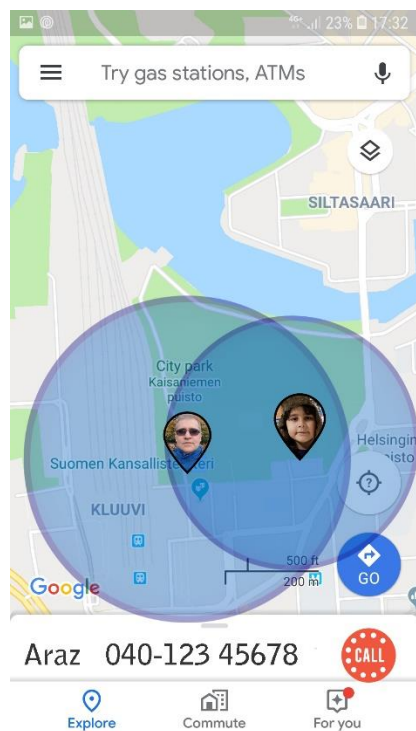
Figure 10. FAM view in a specific area

The circles with blue color are based on the distance setting, so user can be visible for others only in that set range. In the case of travelling out of a city or country, a person would be available to meet friends in free time, for instance in a hotel, so the mentioned person would be happy to meet friends even if they are far but in the same city or town. In such cases, users can enlarge the radius range in settings to for example 20 kilometers to cover the whole town. Now the user is visible to the whole town, so if he/she has some friends there, they can connect to each other and arrange time to meet. In general, all settings are based on the user's wish, so the user can decide to either turn the app on or off.

After FAM app has found some friends, the user can click on the found friend's icon to view related information such as phone number, distance, how many hours he or she was there and some other information which the targeted friend has accepted to show. Figure 11 illustrates detailed information about a targeted friend in FAM.
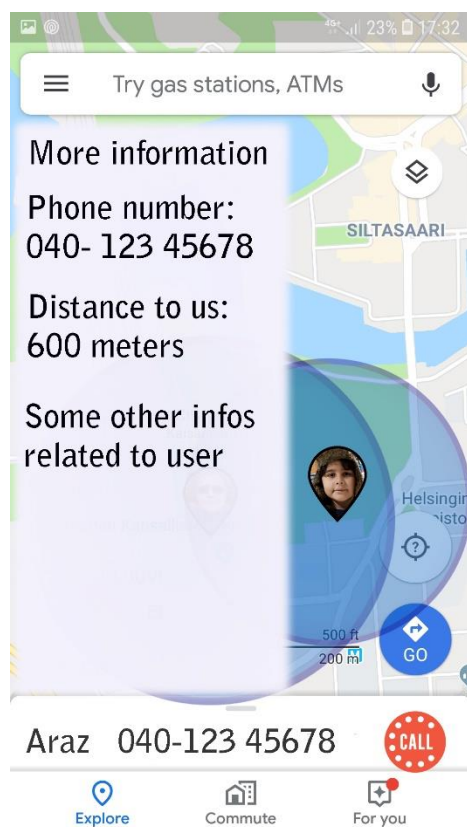
Figure 11. View of FAM to show detailed information about targeted friend

Figures 12 and 13 show a simple algorithm behind the idea. It is divided into two parts including how a user is visible for others and how others are visible to a user. As mentioned before, a user can decide freely any step; thus, all selections are under the user's control.

How user shown as visible for others

| FAM activated | → Yes → | Check if Other friend is on user selected radius area | → Yes → | Show user location to friend |

No → Hide user location from others

No → Keep user invisible to all

Show user contact information like phone number to contact
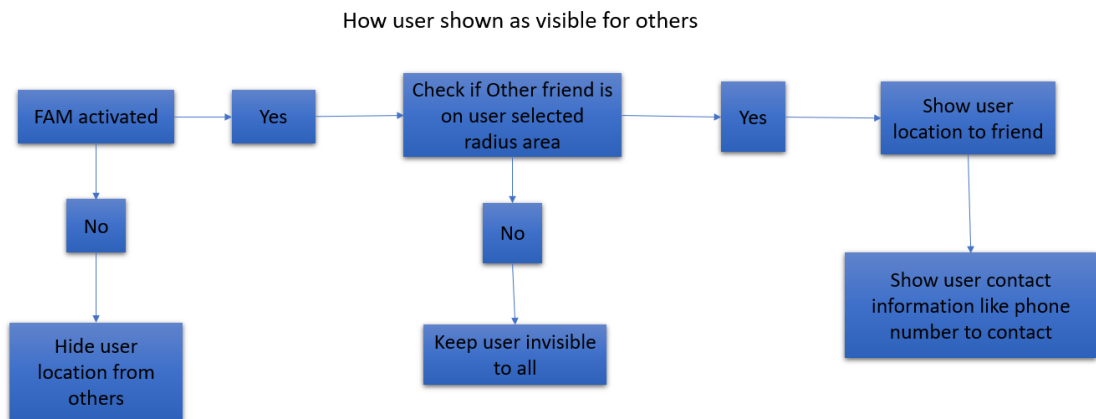
Figure 12. Algorithm for how user is shown as visible to others

How others shown as visible to user

| FAM activated | → Yes → | Check if user in friend's accepted radius area | → Yes → | Show their location to user |

No → Users are invisible to each other

No → Users are invisible to each other

Show their contact information by clicking on their logo or image

Figure 13. FAM visibility algorithm

FAM design and implementation requires different technologies for each Application including; Utilities, Development and Operation (DevOps). For example, Google Maps is one of the most important utilities used in FAM. Google Maps is a famous

developed map-based application which consists of many useful features. To use Google maps, users can discover places e.g. shops, gyms, departments, and many other places easily, so it is useful to understand deeply what they can find around themselves.

In the application and data part, FAM will use AWS (Amazon Web Services), also its different features. AWS has powerful tools to use, and all of them are based on cloud services. For mentioned reasons it is not necessary to be afraid of maintaining server issues, so applications as well as all operations will locate in cloud servers. Figure 14 simply shows some applications and utilities used for the first part of FAM, so based on these technologies, users can find other friends around themselves.
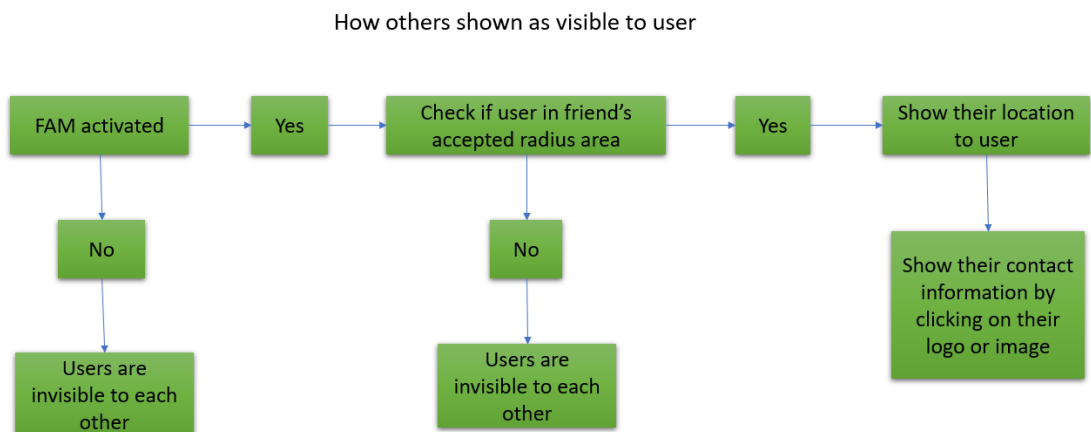
Application and Data

| PHP | Python | MySQL | AngularJS | PostgreSQL | Amazon EC2 | Amazon S3 | Heroku |

Utilities

| Google Maps | Dropbox | SendGrid | Twilio | Amplitude | Google Cloud Messaging | Mode |

DevOps

| Git | Docker | VirtualBox | Android Studio | Amazon CloudWatch |
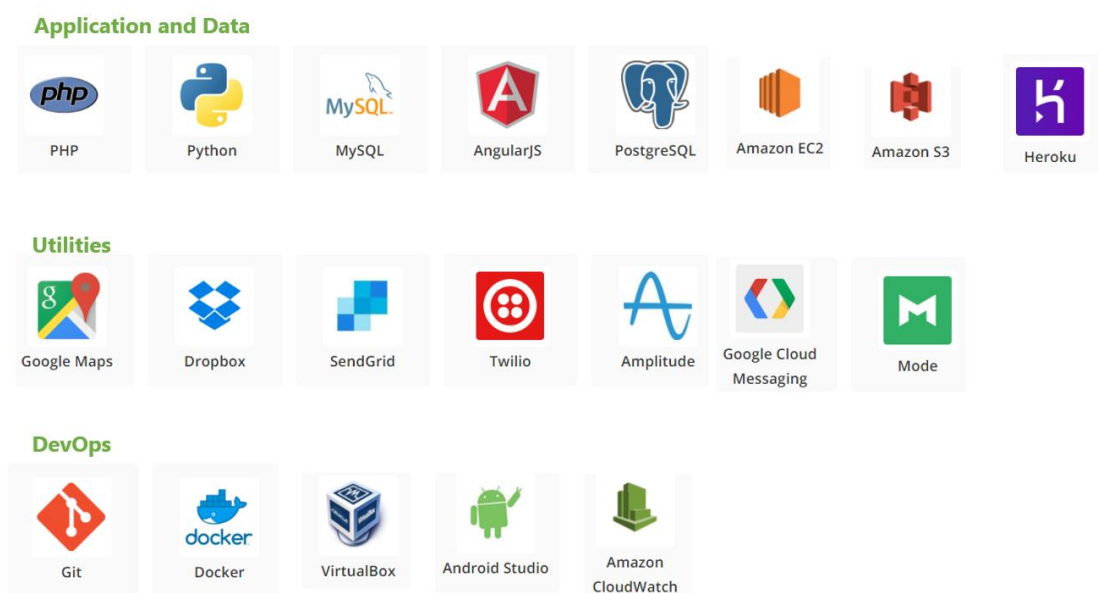
Figure 14. Technologies used in FAM

8.2 Planning and implementing Big Data with AI to manage free times

By using Big Data and artificial intelligence technologies, FAM will manage people's free time. First, the user gives permission to the application to collect all data used on the phone. This data could be websites the user visits, places the user has visited, shops, life activities, sports activities, resting time in e.g. parks, and much more information about a user with secured methods to avoid any privacy risks. All actions

take place regarding the coding and security instructions; for example, before any action performance, the application gives a long number code for each user, so every action is performed under that code unknown to public. As shown in Figure 15, FAM first converts the user's name and other identification information to a unique code and sends all data in a secure way to the server. In this case, any action is totally unknown and in the case of server hacking or similar, no one can understand the real identification of the user, and it cannot be abused against a real person. Each user has a private and separate file in the server part collecting all data about the user in different tables with a related special algorithm.
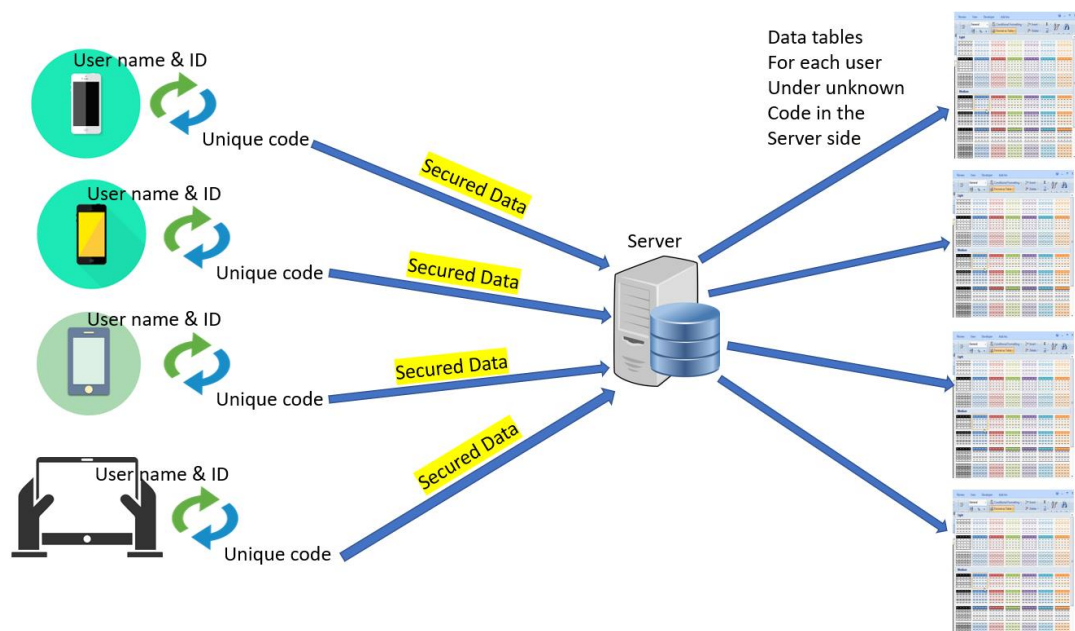
Figure 15. FAM converts ID to Unique code and sends it to server

From a special algorithm, which the application uses in server side, the AI part of the application will learn about the users as much as possible. What kind of activity does the user have, what is his or her daily work time and free time, which places does the user like to visit? In which part of the city is the user located? Which part of the city does the user visit mostly? All information will be created in a table about every user. All mentioned actions will take place on the server site outside the phone or application itself and the application only sends that information and data to the server. As mentioned before, in the case of any kind of danger or hacking, all data is

private, and that information is related to one unknown code number which impossible to decode or decrypt. Figure 16 shows a table of collected data for each user in different sub tables in the server side. Users have no ID names and all data are collected under unique codes. In this step, by means of related big data and AI tools, the app can compare tables in a friend's network. For example, the server side can find two users whom they match to each other such as based on information such as both have the same sport activity or both are walking in the park.
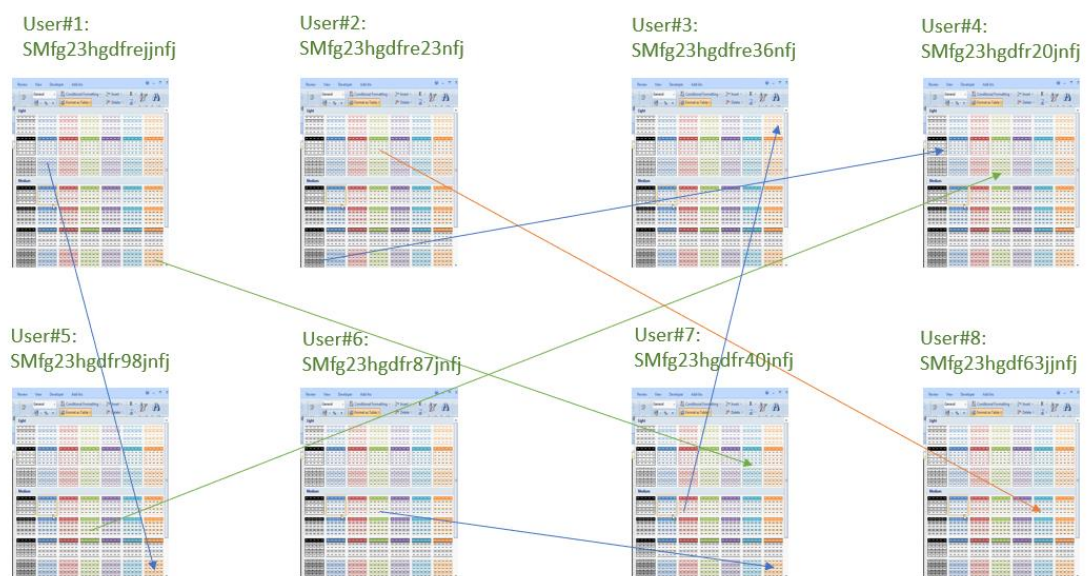
Figure 16. User's data in separate tables in server side

Figure 17 shows basic idea about how managing time happen in server side and how it is work in relation between data, server, and application itself. To collect data, FAM will use big data technology programs, which means the server can get all huge data to manage and categorize it into columns and rows as tables to use. Here it is very important to use Big Data technology in the right way to get reliable and fast tables of each part of user activity. It requires to be considered that it is sending all users' activities every day, so it is indeed a huge amount of data for one single user.

The server-side does the same activities for all other users separately and collects each user information under a specific code with the grouping of different acts.

Until this point, a huge amount of data about each user is collected, and the app starts to use artificial intelligence to perform the mentioned data. AI processes the collected data and categorizes a user's activity.

In the next step, FAM compares users in the group to find the best match. The best match means a friend or relative who is in the same situation, has free time, and is preferably the one with a similar mindset or common activity. For example, one user is at home with free time and as his/her hobby attends a gym. At the same time, there is one other friend, who enjoys the gym and has free time; hence, hobby wise they could be the best match to each other.

The application plan to send a message to both users and ask "What do you think about going to gym with X user and enjoy free time together over there?" In case of acceptance from both sides, they get the motivation to go to the gym, have fun with sport and chat with each other. This part is very important in the sense that FAM application gives suggestions for those users who have free time and have no motivation to take up some activity.

In FAM application, it is possible to create different types of groups for friends and relatives. For example, groups of very close friends, close friends, friends, and not close friends. This could help AI's algorithm to prioritize the people, e.g. in the first group and after that for second groups. In addition, users can create an "unlikely" friends' group that for any reason user does not like to have time with, so in such cases, the algorithm skips those friends. Briefly, these settings are totally based on a user's wish, and the user can decide anytime to change the settings.

Certainly, the members of groups would be flexible, which means the user can change the members at any time without any limitation. If any changes are made, the server updates all data and information based on new data.
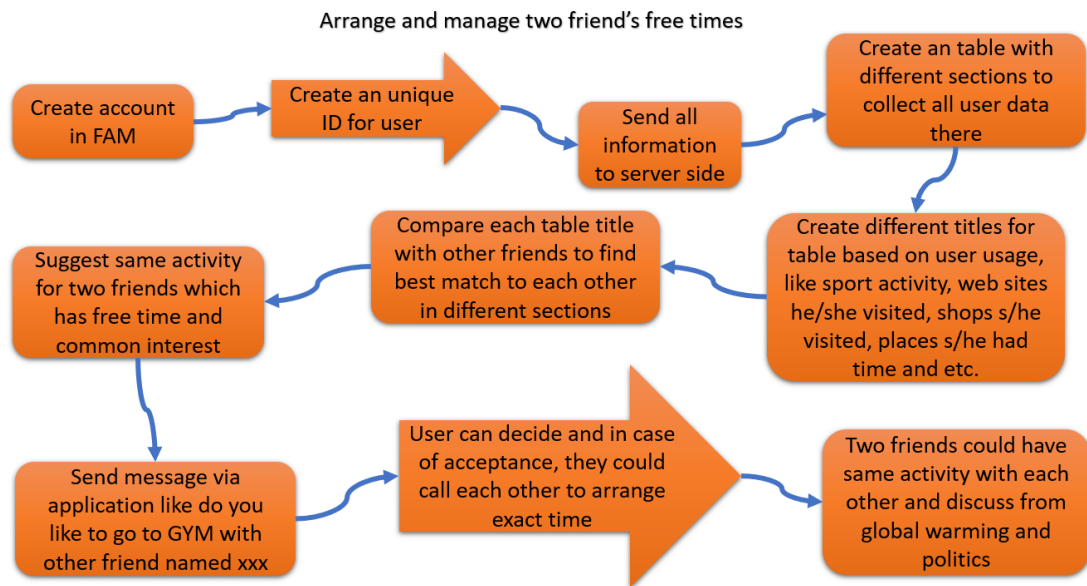
Arrange and manage two friend's free times

Create account in FAM	Create an unique ID for user

Send all information to server side

Create an table with different sections to collect all user data there

Suggest same activity for two friends which has free time and common interest

Compare each table title with other friends to find best match to each other in different sections

Create different titles for table based on user usage, like sport activity, web sites he/she visited, shops s/he visited, places s/he had time and etc.

Send message via application like do you like to go to GYM with other friend named xxx

User can decide and in case of acceptance, they could call each other to arrange exact time

Two friends could have same activity with each other and discuss from global warming and politics

Figure 17. Arrange and manage two friend's free time

9 Conclusions

The industrial revolution affected people in a way that people started their labor lives and moved from villages to cities with different types of challenges. The last and newest revolution was technological revolution which affected human life more and more. The technological revolution took place very fast with much more effect on people's lives. Of course, the majority of effects was good and positive; however, besides that, some negative effects also took shape in people's lives.

Some of the major problems after technological revolution are loneliness and other problems related to loneliness. People are more alone than before and this causes depression and suicides. Some believe that humans have to go far from technology to solve social problems but it is impossible to go back and forget technology, especially when it has brought so many good benefits to their lives. One other way is to use technology itself to solve this and other kinds of problems.

This thesis is based on big data and artificial intelligence, and one application was created which makes a connection between lonely friends in their free times. In one part of the application named Friends Around Me (FAM), friends around people are shown in case of he or she is free and has activated the app. In the second part of the

application, user's daily activity is collected in the phone and real life via some other applications, and artificial intelligence technology could suggest opportunities to friends to visit each other and enjoy their free time with just speaking or have common activity.

This app aims to target all people, especially persons with loneliness and depression in their lives. After some weeks, big data and related technology will learn about the users and can send new opportunities and advertisement relatively.

In general, FAM aims to reach people before they need to use it. For example, even if a person does not need it or has not heard about it before, via other friends this person could be invited to install the application and become an actual client of the app.

FAM immediately converts all names to unknown IDs and codes and sends all information and data under that unknown code. This is because, in case of hacking, a user's data is safe and nobody can access the user's private data. All processes take place in the server part with high security.

This application is not a location sharing application and it shows user location to few friends who are physically nearby, and the user has already accepted to be shown to them in free times. Additionally, this application is not a friend-finding application; it just organizes friend's times to see each other in their free times.

In this application, the user has all control and can decide all the time what kind of data or information he or she wants to share. They can also delete data anytime if needed. This app is using machine learning technology but final decision and control is not in the machine or application control; it is the human who decides.

Finally, this application and such other applications is hoped to affect a human's social life in a right and positive way to make people happier than when they are alone.

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Appendices

Usability Attribute	Quantitative scale 1 to 5	Qualitative comments	Correlation	Explanations
Visual clarity	4.25	Rather positive	Correlated	Almost clear-You can't see other users state of mind- Graphic UI looks easily understandable- Looks clear- Simple and clear- It's easy to use- Seems straight forward
Learnability	4.42	Rather positive	Correlated	Looks learnable- Its learnable-Seems very easy to learn- Nothing too complicated- Easy to learn
Memorability	3.75	Rather positive	Correlated	Almost memorable- Not memorable in because its fancy. Its functional- Probably memorable after using it for a while- Memorable- Looks memorable- Memorable- Nothing complex to memorize-Its memorable
Intuitiveness	3.92	Rather positive	Correlated	Very intuitive- I feel I would know how to use it without help- Quite standardized- Mostly intuitive
Information Conciseness	3.83	Rather positive	Correlated	Almost concise- Everything is clear- No lengthy text-

				Mostly concise- Yes very concise- Just enough info
Design Consistency	4	Rather positive	Correlated	Almost consistent- It looks pretty standardized -Looks consistent- Its consistent- Stull, simple and easy- Mostly consistent-Looks nice
Aesthetic Integrity	4	Rather positive	Correlated	Again simple is the way to go-Aesthetic-Looks mostly aesthetic-Yes, it is aesthetic- Some aspects could be improved - Mostly unaesthetic
Textual Comprehensibility	4.33	Rather positive	Correlated	I feel I can understand what each thing does- Comprehensible-Do not require big cognitive effort-Looks comprehensible- Easy to understand-Mostly comprehensible-App is comprehensible
Navigability among different levels	4.25	Rather positive	Correlated	Many menus-Almost navigable-Its navigable- Seems easy-You can see other users-Everything is a logical place-Navigable- Easy to move from one level to one another-Looks easy

Appendix 2. User eXperience (UX) correlation table

UX Property	Quantitative scale 1 to 5	Qualitative comments	Correlation	Explanations
Usefulness	3.92	Rather positive	Correlated	It help meet friends- It would be easy to check if any of my friends are nearby- I think sometimes we lack such possibility for meeting friends- Very welcome to meet colleagues when not planned
Novelty	3.33	Rather positive	Correlated	I haven't seen these kind of apps - I haven't seen a similar app before- Haven't heard app like this-I don't know if there is same app yet-Seems fresh-There are existing apps close to this idea- Even Facebook has this function.
Reliability	3.5	Rather positive	Correlated	Almost reliable- If your friends have the same app this will work- Is it working inside buildings - Would be reliable-Nothing really making it unreliable-I would be worried about privacy
User friendliness	4.33	Rather positive	Correlated	Looks like easy to use-The UI is ok, but if I understood correctly the user has to separately set when they are visible in the app- Looks user-friendly- Nice- Friendly Simple and intuitive- Mostly friendly- Seems simple and easy to use
Connectivity	4	Rather positive	Correlated	This is the apps main idea-Feel really linked to others- Totally connected!-Mostly connected- Its connected-

				Mostly connected- Depends on if app is used
Pleasantness	3.83	Rather positive	Correlated	Nice but also bit scary-Mostly pleasant- Funny - Would be pleasant- So nice to have opportunities to meet colleagues in an unplanned way
Attractiveness	3.83	Rather positive	Correlated	I am not the person who likes to have an app everything. Calling someone will be enough for me-Emotionally loaded-Mostly attractive- Its attractive- Like this kind of app- Looks cool!
Influence of other users	4.58	Rather positive	Correlated	Might be or not- No reason to use if others are not using-Influential-I do believe that one can adapt on other invitations to meet- Using this app will influence you and your friend's behavior- Invite system helps scaling
Confidentiality	4.17	Rather positive	Correlated	User data must save secured-Confidential- It depends on the way personal location is secured-Would be confidential- I don't like to share my position with anyone- Mostly not confidential-Worried about privacy
Affordability	4.08	Rather positive	Correlated	Is it free?- Its free- Especially if for free with some ad- Almost affordable I don't know price- Mostly affordable- Its affordable

				Unaffordable in a way that the cost of position sharing is too high for me
Collectiveness	4.08	Rather positive	Correlated	Did not understood the question- Have to decide together to take the opportunity to meet or not- This app main theme is collectiveness- Mostly collective- Keeps friends together- Would be collective- Mostly collective
Trustability	3.42	Rather positive	Correlated	Very trustable- It was not clear how people are connected in this app. Good stalker app!- Mostly not trustable- Worried about privacy- Feels like trust worthy- Mostly trustable Colleagues are mostly trustable persons- I would trust

Appendix 3.   UX SWOT analysis of App

UX Property	Strength	Weakness	Opportunity	Threat
USEFULNESS	It is useful to find friends nearby	If other part not activated app, it is unprofitable	Easily could see friends in free times	Peole could afraid sharing location with others and if other friends doesn't use this app, it will be unprofitable for us as well
Affordability	Easy and cheap to have it		could add some feathures and earn money	

Collectiveness in community	Collect friends and relatives in free time		Decrease Depression in society because relatives can have much time with each other	
Trustability to other users	Users need to trust only to the selected friends	People could worry to share live location	Could add important issues close to user based on his/her location	Sharing location could make worried people. Some friend-looking people could use in bad way if they know your location
NOVELTY	It is no exactly same application	It is some applications close to this one but they show in special events	Could add to show other interesting things for user	Could similar apps develop and add this feature as well
Reliability	It's reliable	Friends have to have same application	Could invite friends from phone contact list to add this app	This could be reliable only if other part have also same app. Otherwise this app in not reliable
User-Friendliness	Simple and nice looking		Could add some information by text	This is based on map and it could be un-friendliness if people can't really understand map

Connectivity with other users	Highly connected	Maybe users and friends free time is not suitable to each other	Could add events and interesting things instead of visiting friends if no friend in that time	This connects people if they are at the same area and same time. Otherwise it is no connection between people
Pleasantness	It is funny to see friends in free time at the same area		Could add special themes to be more funny	
ATTRACTIVENESS	It is cool and emotional		Could make more attractive if we make two new friends to each other	If user find more friends at the same time and visit them, maybe these friends are not comfortable with each other
Influence of other users	Could other users activity influence us		Could create new activities via our friends interest	Could friends influence us in that way we don't like
Confidentiality	It is because we activate only in wanted	User could forget to deactivate application and friend can see his	Could add reminder to deactivate to continue sharing location or	If friends forget to deactivate application, means all times you show your location for friends who physically close to you

	times and places	activity in daily time	limited to some hours	

Appendix 4.   UA SWOT analysis of App

Usability Attribute	Strength	Weakness	Opportunity	Threat
Visual Clarity	Simple and clear		Could make more dynamic	
Learnability	Very easy to learn		Could add small text in corner to any act	
Memorability	Nothing complex			Users map understanding could be a threat because this app based on map and some users have problem with map understanding
Intuitiveness	Quite standardized		Could make more standard to google map to use some google map features	In small size of screen could be a little difficult to monitor whole nearby
Information Conciseness	No lengthy text and everything is clear		Could add a small text box on top of icons and buttons to	

			improve understanding	
Design consistency	Aesthetic, simple and easy			
Aesthetic Integrity	Simple is the way to go	Some aspects could be improved	Could use more colorful and simple maps to integer with icons and buttons	The way which people like something or not is different and need some small research to understand better how majority of people likes
Textual Comprehensibility	Looks comprehensible		Could add some information about nearby friends like duration they were there	
Navigability among the different levels	Everything is a logical place		Could add some upper pages as new level	