ÇANKAYA UNIVERSITY FACULTY OF ENGINEERING COMPUTER ENGINEERING DEPARTMENT

Project Report

CENG 407

Innovative System Design and Development I

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Visual Assistance for Blind People

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1. Literature Review

1.1. Introduction

Our visually impaired people follow the yellow lines on the sidewalks with a wand or stick. However, this solution cannot prevent to disrespect. There are people who visually impaired that miss the lane because of the parked cars on it. As a result, they are being lost. Our aim is to give a support while alerting if there is an object on the sidewalk and to eleminate this obstacle as much as possible.

In this paper, we are going to discuss what will be done with this technology. In this way, it will be easier to see the pros and cons of our project. Moreover, we will mention the work done and planned works with this technology.

People with visually impaired have difficulty in taking directions or finding the way when they go from one location to another. One of our goals is to find a solution to this problem. There are some projects that are using image proccessing. However, because of its cost, it seems to difficult for us to reach their points. Our aim is to produce as much solution as we can produce at low cost. Another problem with this issue is the lack of undersanding of predestrian crossings and trafic signs. Therefore, people with visually impaired have a lot of difficulty in crossing a road.

We have tried to mention the information you can obtain at the end of this report above. Apart from these, we are going to mention about the aim of the image proccessing, the challenges, and the issues to be considered.

1.2. Abstract

The Project that we prefer finding solutions to people's problem by keeping pace with developing technology our purpose is to help visually-impaired people's difficulties in their lives. In the document, we state the technologies that we want to use, usage areas of these Technologies and why this technology is preferred. Image processing is a technology that eases our lives in different aspects even if we are not aware of it. In other words, various mechanic machines use image processing technology in real life. Thus, we can realize the objects which escape from the attention of us. Also, our lives can be made more secure by courest of used Technologies in the areas like national security.

1.3. Image Processing

1.3.1. What is Image Processing?

Image processing is an important and rapidly developing area which takes place in signal processing scope. Image processing is a process that tries to create a new picture as a result of changing the view and attributes of the real-life images that are become numerical picture.[2]

1.3.2. Benefits of Image Processing

Even if eyesight of the people is designed as far as sensitive and excellent, human eyes have a certain capacity. By the help of growing technology, there are no borders and capacities. If the accurate technologies are used, human eye can distinguish more images apart from each other diffusively. We can come up with more performance with using this softwares and technologies by decreasing the error margin as much as possible according to algorithms that will be developed. [2] For example, there can be blind spots on the both left and right rear-view mirrors that are originated from the volume of cars even if every possible situation is taken into consideration while designing cars. However, by the help of the technology that we use, even if you miss, the red dots on the mirrors indicate that there is an object. This technology is developed by the help of image processing. Despite it does not indicate what the object is, knowing that there is an unknown object may say your life. Apart from all these, if we want to talk about technologies that are used in military services, situations that threaten the national security for countries can be handled more effectively by the help of used technologies in warplanes and unmanned air vehicles. Pilots of warplanes can examine the situation better from their screens, inform their commanders effectively and orders can be given efficiently. [8]

1.3.3. Usage Areas of Image Processing

Image processing is used frequently in the areas as military industry, underwater screening, security, criminal laboratories, medicine, robotic, traffic, astronomy, radar systems, animal breeding, oil exploration, physics, art, space sciences, biomedical etc. As an example, in military services, identifying and reporting the unknown objects that are seen in borders, identifying contraventions of vehicles according to type of it while measuring the speed in the traffic. In medicine, devices that are developed with image processing technology help the doctors in many operations. In robotics, generally, machine learning and image processing are used together to make the robots learn specific objects and make moves in a sensible manner.

1.3.4. Difficulties in Image Processing

There are some remarkable points while developing a technology with using image processing. Most important point is that deteriorations in object-glasses of cameras. These deteriorations cause difficulties on identifying the objects. Lightning situations should be considered, and shootings or transmissions should be done with an expedient camera. Also, if lightning is not done appropriately, objects cannot draw attention of camera because of extra light beams. [5] Another difficulty in that subject is blur view in motions. Object that moves continuously can be perceived again and again. Algorithms that will be used are very significant accordingly. On the other hand, camera can have difficulty to focus on the continuously moving object because of motion blur.

1.4. Image Processing Technology

1.4.1. Used Programming Languages

Several programming languages can be used to implement image processing. However, while implementing this technology, performance of the chosen language on the application must be considered.

C++, Java, Pyhton, C# are the languages that are commonly used on image processing, but most preferred language is Python on modern-day technologies. However, as far as we know, Java is cross-platform language and this language can be preferred against Python in some situations.

1.4.2. Used Technologies

1.4.2.1. PaintbrushJS [3]

PaintbrushJS is a browser-based image processing library that allows us to apply various filters to images on a website. Thus, we can obtain more functional images without damaging their original versions.

1.4.2.2. AForge.NET

AForge.NET library is founded by Andrew Kirillov in 2006, and it provides us to make both manual and automatic processes on the image that is obtained on computer environment. While doing these processes, AForge.NET provides us to use various mathematical operations and work on both inputs and outputs. In other words, AForge.NET helps us to perform a visual art on computer environment.

1.4.2.3. OpenCV [8]

OpenCV is an open-sourced image processing library. It had been started to develop by INTEL in 1999 but now it is developed by various companies and communities. It was developed by C programming language, however developers kept pace with developing technology and they have continued to develop this library with C++ programming language. OpenCV is a free-platform library nowadays. Thus, it can be developed and works on all operating systems. Another benefit of OpenCV is that there are more than 2500 algorithms for both machine learning and image processing.

1.5. Related Works

1.5.1. OrCam [1]

In modern-day technology, we can easily say that OrCam is one of the best technologies that have ever developed. This product that makes the life easier for people consists of two components: A camera inside frame of glasses and a microprocessor. Additionally, this frame can be used with any kind of eyeglass. Another benefit of it is that it can work with the devices which are used by hearing impaired people.
However, this product is mostly practical for visually impaired people. It provides a feature so that these people can identify and learn the objects and writings just by using their fingertips.

Also, this product can identify which light is active on traffic lights. Additionally, OrCam can learn and save the information of who is using it and reminds you when you come across with it in different environment. Thus, life can be made easier for visually impaired people. This product not only helps us to identify the objects but also find them. This product is submitted with a set of data to the customers. In addition to these, this product has a high capacity of learning so that it can remind you for the things that you forget. A scientist from Israel has worked on this device in 2010 and still researches are being made on it.

1.5.2. Obstacle Distance Detection System For Sight-Disabled People [7]

In this project, necessary parameters which are taken by two USB cameras are calculated in MATLAB platform. Thus, system aims to warn the visually-impaired people with gathered results and calculated distances.

There are three steps while this process is executed. First step is calibration step to make the system works correctly. If calibration cannot be made correctly, parameters cannot be calculated properly, and correct distance map cannot be obtained. Second step is stereo matching. In this step, distance map is obtained according to the images that are gathered from cameras. Thus, necessary distances can be measured. In the last step, there is an electronic hardware that contains a microcontroller. Thus, communication is obtained with a hardware and informing a visually-impaired person is provided.

This project is developed by Nerin KANAY and Umut Engin AYTEN in Yıldız Technic University and they mainly aim to inhibit the accidents that visually-impaired people cannot take precautions.

1.5.3. Seeing Al [6]

Seeing AI which is the most functional product in the implemented projects guides the visually-impaired people on what is going on around them. This application is introduced in Microsoft Build Conference, but it has not released yet, researchers are still working on it.

Application was designed as a cross-platform application so that it can work on both smartphones and smart glasses. Thus, expenditure on this application can be decreased on customer side. For example, user can hold his/her phone like s/he is taking a photograph or clicking on his/her glasses to give an examination order to the application so that it can examine and report to the user about the environment. Thus, application tells everything including the people’s gestures to the visually-impaired person. This application which is prone to be developed can be practical in different working areas.

2. Software Design Description

2.1. Introduction

2.1.1. Purpose

The purpose of this Software Design Document (SDD) is providing the details of project titled as "Visual Assistance for Blind People".

First of all, our target audiences are blind or low vision people. This assistance service aims, help to disabled people in their daily life. Assistance service has online website, family relatives or volunteers will help to get information of what is standing in front of them.

There will be two data base parts. One is Local another is Online part. Local has local variables such as contacts of the family. These informations are private. There is no need to publish other users. Also, local user can upload an image of a new face or a new object instantly. Online part has common datas. For instance, a tree or car. There will be access from web site to volunteers and user's family relatives or friends. They can upload an image for a new item. There will be a weekly controls and updates to confirm the datas before publish to users.

On the other hand, the service provides distance concept. It will calculate the distance between user and the object. However, the program works only for objects. The user doesn't need to know a face's distance. In order to provide a better comprehension, this SDD includes various diagrams such as UML diagram of the project, activity diagram and block diagram.

2.1.2. Scope of Project

This document includes brief and complete description about the design of Project which is named as Visual Assistance for Blinde People.

We are going to use Phyton Programming Language while implementing our project. The main reason to use Phyton is that it provides us with the convenciences that it provides in the implementation process of the software development as well as its ability to work in harmony with every environment. Python programming language is a language that does not need complation like in C or C++. This reason makes Python faster than others. We prefer to use MySQLdb as a storage system. MySQLdb has a Python interface that provides secure connection between Python and the MySQL. In this way, we can use MySQL easily and safer while using Python. Because of that MySQL can work as remote database and also local database, it will help us about data storage. If our user has a network problem while using our product, it is able to work on local database to avoid service interruption with less work time.

Panels which are will be used by both users and authorized people will be programmed by using PHP programming language. The reasons for using PHP language are that it is object oriented language, it is processed by servers and can run with MySQL perfectly. Also we will use markup languages to visualize our project like HTML5 & CSS3. Main purpose to use these is making our porject easy to use for everyone. In this way, each part of the product we will make, will work together with using the same database to provide common work place. It is aimed to provide a better experience to users . An API that is coded by using Python language will work on the connection between platforms and data transmitting.

2.1.3. Glossary

Table Glossary of
SDD

Term	Definition
Database	The infrastructure which is keep data in a regular basis.
Block Diagram	The type of schema which the components in the system are displayed in blocks.
SDD	Software Design Document.
UML Diagram	It is a modelling language which is used in Software Engineering.

2.1.4. Overview of Document

Detailed information of the remaining parts' content is clarified completely in this part. Part 2.1. is a architectural design section which represents information about the development phase of the project. In this section, detailed explanations were identified about Class Diagram. On the other side of architectural design, user types which are related with project were explained. Basically, short explanations were identified about given authorizatioıns and permissions. Also, there are some brief information about security countermeasures and presented properties.

In section 2.4, a map was created by defining the operation of the processes and activity diagram and a brief information about that diagram is represented. Databases which will be used were seperated into two parts and these two parts were explained.

In this project, user safety and information privacy are prioritized. So, an article about how can we provide these things is placed into this document.

2.2. Architecture Design

2.2.1. Project Design Approach

For developing the project, we have planned to use Python programming language for searching face, object and also for calculating the distance. Python is easy to use and the libraries of Python is current technology. The main reason to use Python is that it provides us with the conveniences that it provides in the implementation process of the software development as well as its ability to work in harmony with every environment. Python programming language is a language that does not need completion like in C or C++. This reason makes Python faster than others. We need to broadcast datas to at the same time. That’s why we prefer Python.

For keeping the datas we will use MySQL with MySQLdb. MySQL is also easy to use and the interface of that works perfectly with not only Python also website. It fits us. MySQL and Python connects each other with MySQLdb attachment. Python and MySQL are perfect match. Thus, the product at the end can include less bugs and errors and with this kind of product, it is easier to attract the people.

2.2.2. Class Diagram

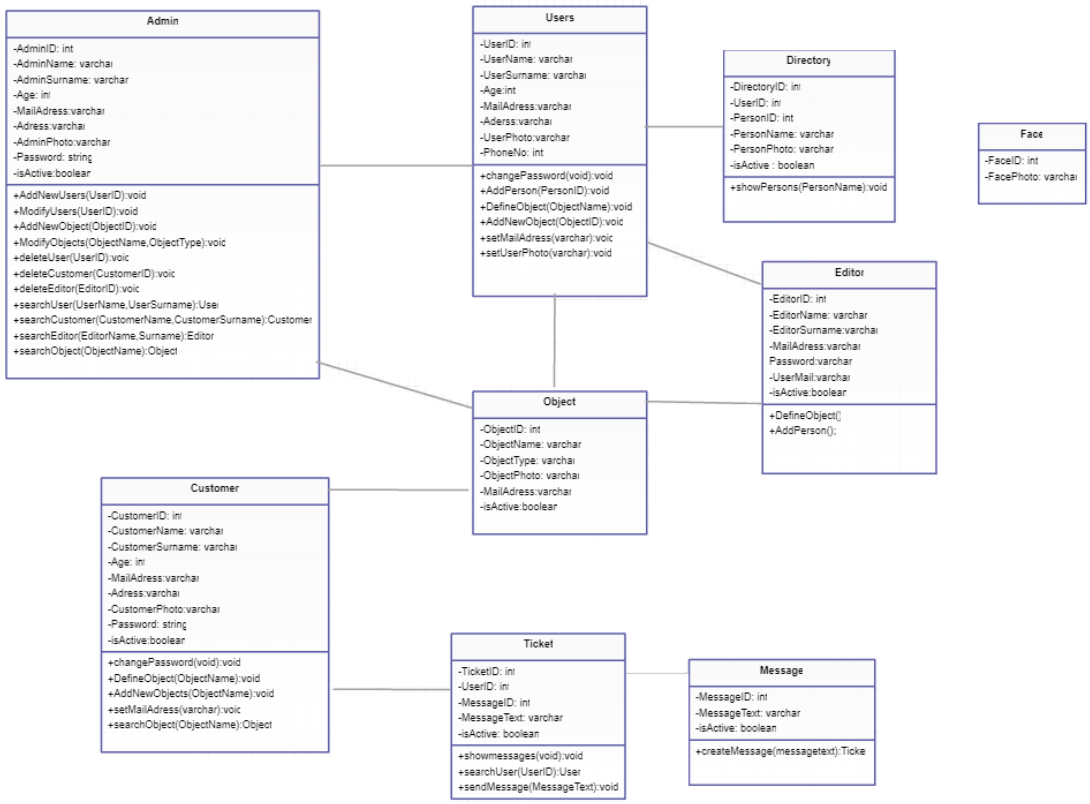

Figure 1 Class Diagram of Visual Assistance for Blinde People

Figure 1 shows the relationships between connection and connection. The center of the Visual Assistance for Blind People project is object oriented. Editing and naming of undefined objects can be done by all users on the system. Customers and users can edit their personal accounts. The admin group has all the functions on the system. Admin group users can edit, delete, add and search objects. The message generation function can provide functions such as user search and message display through the table it is connected to. The editor has functions that allow users to define objects and to identify user's guides for which they are relatives. The functions in tables are generally used to describe undefined objects. In this database system that operates on both sides of the server and local area, the importance of reaching objects is of great importance for the users. In this system where the objects need to be correctly communicated to the users, besides the artificial intelligence, there is a need for the customer and editor group.

2.2.3. Architecture Design of Visual Assistance for Blind People

2.2.3.1. Editor Operations

Summary : This system consists of the operations that editor can do for user. This is an interface that editor can create a support request. Editor also can follow the every situation of these support requests. Besides, editor can create a user list for users.

Actor: Editor

Precondition: Editor should have an account which can reach the panel.

Basic Sequence:

• Editor should login to the system with username and password. • Editor should add a new person by clicking "Add New User" button with taking a picture of the user's face and related information about the picture. • Editor should identify the new person by clicking "Save" button. • Editor should correct the missing or wrong information about the users. • Editor should create a support request from the user menu by clicking "Requests and Complaints" button. • Editor should follow the situation of his/her support requests by clicking "My Open Requests" button from the user menu. • Editor should logout from the system by clicking "Logout" button.

Exception: Database error can be occurred.

Post Conditions: None

Priority: Low

2.2.3.2. Admin Operations

Summary : This system consists of the operations that admin can do in the behalf of his/her authorizations. Admin can reach all the information of user and change them. Thus, admin have an authorization to fix the problems.Also, admin can do deletion, correction and confirmation.

Actor: Admin

Precondition: Admin should have an account that access the panel.

Basic Sequence:

• Admin should login his/her own panel with his/her username and password. • Admin should confirm the objects which are waiting for confirmation by clicking "Objects" button from the menu on the panel. • Admin should correct the names of the object which are written wrong from the menu on the panel. • Admin should see the unsolved support requests by clicking "Requests" button on the panel. • Admin should see the profiles of the users by clicking "Users" button on the panel. • Admin should assign an "Editor" role to the user by clicking "Change As Editor" button on the right of the user's row in the list of all users. • Admin should update the information of editors who forgets their information. • Admin should do synchronization operation with the locat database that is connected to the user. • Admin should logout from the system by clicking "Logout" button.ş

Exception: Database error can be occurred.

Post Conditions: None

Priority: Low

2.2.3.3. Reporting System

Summary : Users and editors should follow the result and solution process of the situations which they found wrong by reporting them. Thus, system becomes better and provides a better user experience. Likewise, missing parts that are identified by users and editors should be reported too. Users should know whether an action is performing on these issues or not.

Actor: Editor, user, admin

Precondition: Actors should have the product.

Basic Sequence:

• User should enter the reporting system and create a new report. • Admin should give an answer to the issue which is reported by user after it was examined. • Users should follow the issues and works on them by report. • System should give a detailed information about the report after it is completed.

Exception: Database error can be occurred.

Post Conditions: None

Priority: Medium

2.2.4. Activity Diagram

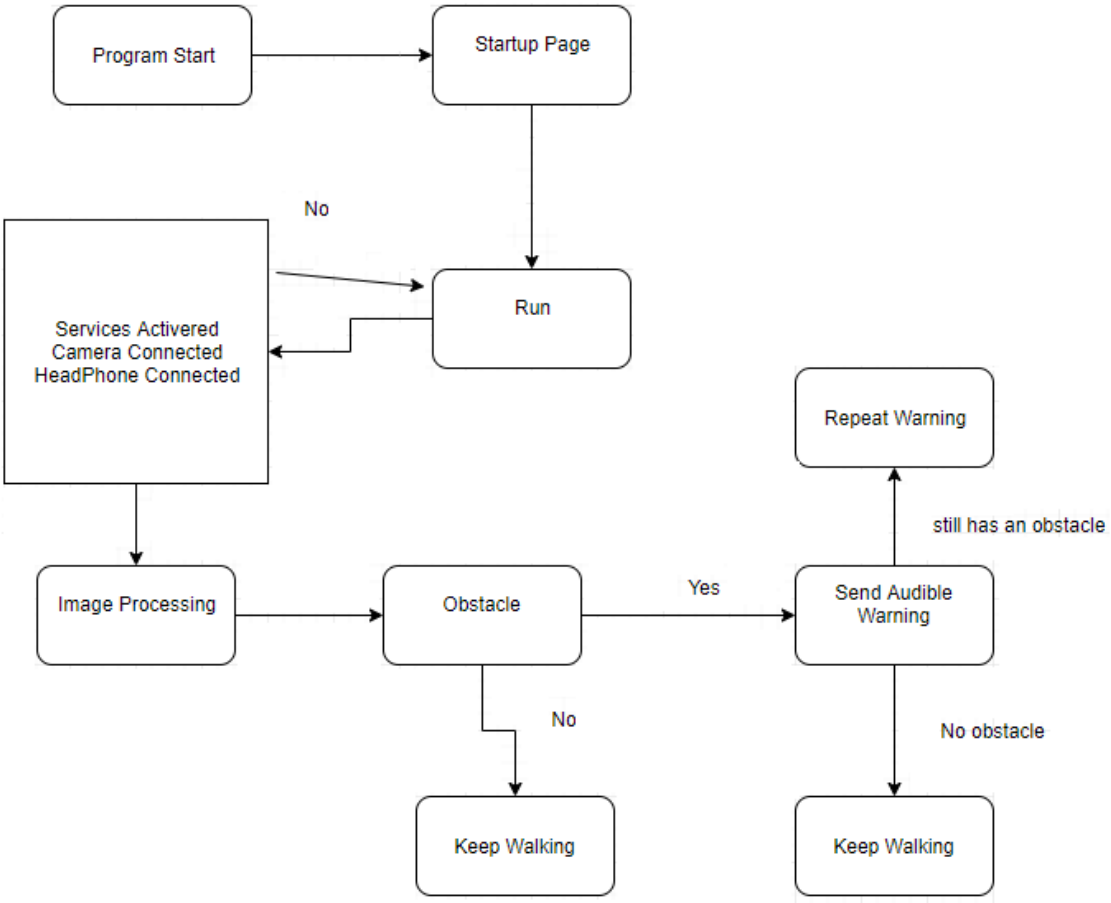

Figure 2 Activity Diagram of Visual Assistance for Blind People

Figure 2 shows how Visual Assistance for Blind People sytsem Works as an activty diagram. After the program is started, the user is redirected to the start page. Firstly, the services are checked as soon as they start working. It is important that the camera and headset connections are working. In case our services and connections are not active, the system provides return. When connected, the image processing process starts. The main focus of our system is to enable the user to walk. If the system sees an obstacle during image processing, the user is notified when the buzzer is activated. If the obstacle is still closing the area of our user, the warning is activated again. In cases where there is no obstacle, users can continue their movements without warning. We are looking for simple and useful ways to ensure that users can walk in this logic process without being harmed.

2.2.5. Database Diagram

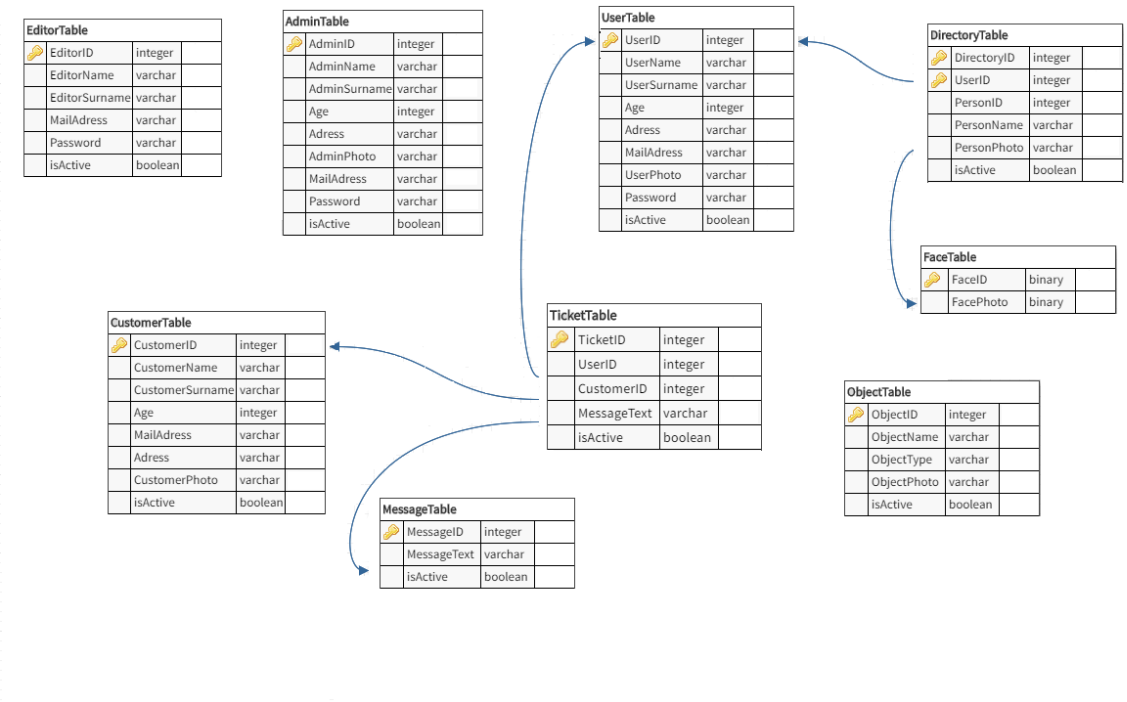

Figure 3 Database Diagram of Visual Assistance for Blind People in Global

Figure 3 shows the database diagram of the Visual Aid for the Visually Impaired System. The sections where the Editor, User and Admin tables are separated by the types of users in the system. User table space for the visually impaired. The people in the Customer table were identified as people working in the website and development area. Users created in the Editor table are users dedicated to identifying unidentified objects that are shared on the website. Object table for each object in a detailed way to record the database according to the type. The Directory Table enables the visually impaired user to register his contacts with his face recognition system. The Ticket Table and Message Table are working together. A section dedicated to communicate with users who have problems through the website.

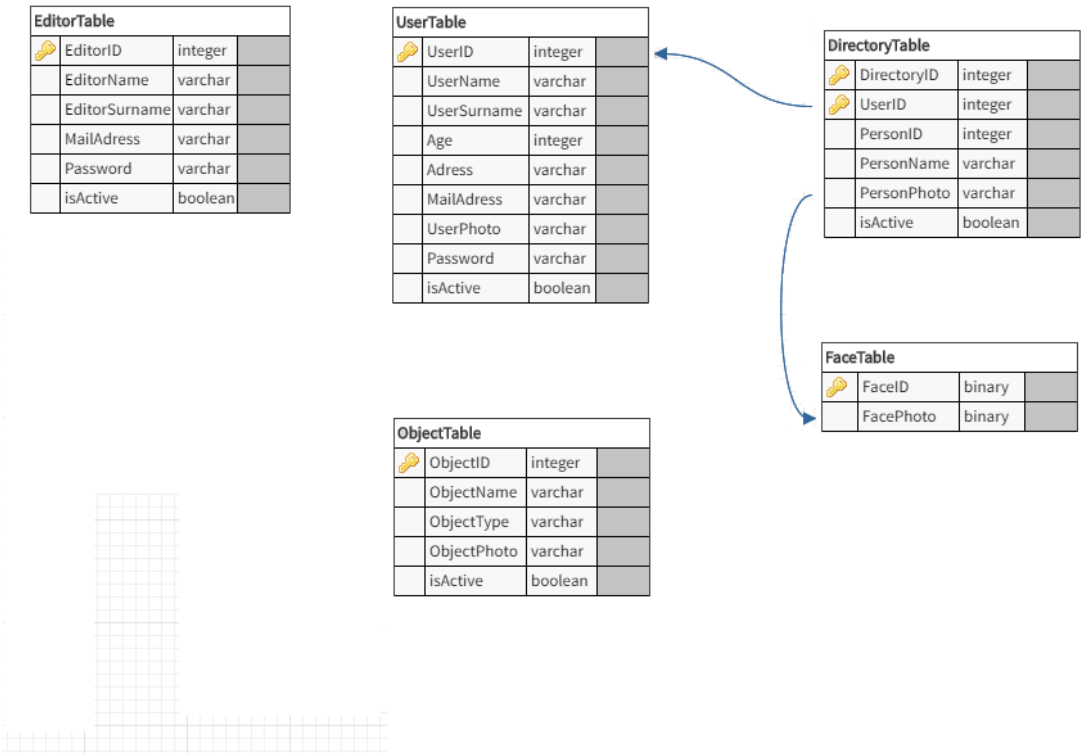

Figure 4 Database Diagram of Visual Assistance for Blind People in Local

First of all, the reason of our 2 different database design is to keep minimum data at the local and to obtain a fast running system. Admin, Costumer, and Ticket and Message tables were not used in the local database compared to server side. In this way, we keep user information, information about the objects and the guide in the local section. The table and data density in the server area will increase in quantity over time, but users need to operate their devices without interruption. Considering the performance and battery life of the product, one of the places where we should be thrifty in the system is the database. 2.6. Use Case Realizations

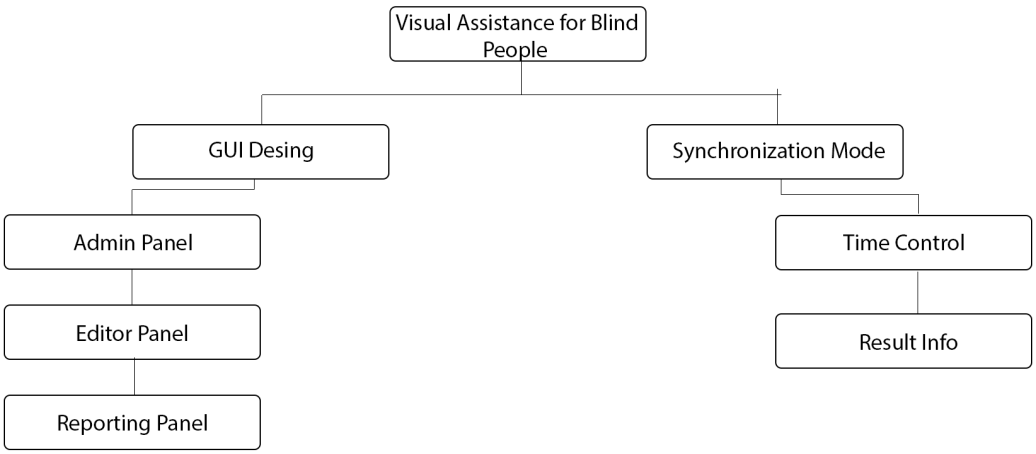

Figure 5 Components of Visual Assistance for Blind People

2.2.6.1 Brief Description of Figure 5

In Figure 5, two main modules and their properties are stated. These are GUI Desigb and Synchronization Mode. These modules have five sub-modules in total. Detailed information is given below.

2.2.6.1.1. GUI Design

2.2.6.1.1.1. Admin Panel

The admin panel will be done using PHP programming language. Admin will be able to access users' data through the panel. This panel shows user settings and also editing panel in it. In this way, the user will get help with that. Design will be done using HTML5 & CSS3 as much as possible to give the user a better experience. JAVASCRIPT will be consulted where necessary. Access to admin panel will be possible with username and password. Extra security measures will be taken after the test plan has been completed.

2.2.6.1.1.2. Editor Panel

Editor panel is a panel that can be used by relatives of the user. Editor panel will be done using PHP programming language. The support panel can be created via the editor panel and these requests can be checked regularly. In addition, password change operations can be performed. A list of contacts will be available to the user and a new contact will be available from the editor panel. The actions will be performed on the local server. When the synchrozation mode is activated, it will only transfer the necessary data to the global server. Editor will be able to add new object through panel.

2.2.6.1.1.3 Reporting Panel

The reporting panel is a separate panel where the only editors can log in with their user name and password and report errors about the system. Admin has given the priority especially this matter. This part was added to the project considering the development of the project. In this way, the users are intended to transfer their experiences better. With these reports, developer teams develop better.

2.2.6.1.2. Synchrozation Mode

2.2.6.1.2.1. Time Control

This sub-module is included in the project for the realization of synchrozation without being installed on the system. By creating a queue at the times determined by the system, data will be exchanged by running an API between all user devices registered in the system by performing a synchronization between the global and local database. Therefore, the time control will perform a healthier process by determining the hours we will load on our server.

2.2.6.1.2.2. Result Info

This sub-module is intended for the purpose of transmitting information to the user. All synchrozation processes that are performed regularly in the database will be recorded with time and date formats and this information will be displayed in the editor panel. When a setback occurs, the result information can be checked and the necessary operations can be done manually. If the system makes synchrozation, the user will be informed regularly about this situation.

Project Work Plan

START DATE: 23.09.2018		23.09.2018 30.09.2018	01.10.2018 07.10.2018	08.10.2018 15.10.2018	16.10.2018 23.10.2018	24.10.2018 31.10.2018	01.11.2018 07.11.2018	08.11.2018 15.11.2018	16.11.2018 22.11.2018	23.11.2018 29.11.2018	30.11.2018 07.12.2018	08.12.2018 15.12.2018	16.12.2018 23.12.2018	23.12.2018 30.12.2018	04.01.2019
WEEKS		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14
WEEK 1-5															
PPF	TEAM														
TEAM SETUP	TEAM														
PSF	TEAM														
GH	TEAM														
PWP	Buğra Gülay														
Week 5 - 10															
LR	H. Enes Dirik														
SRS	Y. Anıl Değirmenci														
WEB	Buğra Gülay														
WEEK 11-15															
SDD	TEAM														

PR / PTF	TEAM														
PRES	TEAM														

3.Software Requirements Specification

3.1. Introduction

3.1.1. Purpose

This document describes visual asistance service for blind or low vision people. This asistance service aims to provide a life without hindrances for disabled people. There are classifications for this service to be installed on the system. This visual asistance service has two cameras to see faces and objects. Also calculate the distance where the object is and sends the information to the headphone. The Sofware Requirements Specification document (SRS) describes the hardware and software (functions and it's activity).

3.1.2. Scope of Project

The system we want to develop is used with different characteristics of different companies in the World. Some companies transfer the objects to the users via the server, some of them just working on the users by reading the text on paper. The most advanced system for visually impaired people has been developed by the company OrCam. The company can provide information about objects with the glasses they use. The difference between the projects we develop as software is minimal. In this project, the most significant feature of our own project compared to other companies is the price difference. According to sources, the price of this product is around 50 thousand dollars. A blind person must have very good income to buy this product. But in projects developed for people in need of help, those with low financial conditions should also have. Therefore, if we can fulfill the promises we want in the project we will develop, we would like to present it with an appropriate sales price.

3.1.2.1. What We Do

• Image processing; identify objects that the camera sees.

• Distance measurement; measuring the distance without hitting objects by seeing the objects around the user while on the move.

• Audible warning depending on the distance of objects; report the situation by making a user with a buzzer after the distance measurement.

• Audible warning system; A warning mechanism that converts the text into a sound by finding the objects found in the library after image recognition.

3.1.2.2. What We Will Do For

• Visually impaired

• People with vision difficulties

3.1.2.3. What Are Our Goals

• To enable a visually handicapped person to walk as far as possible without the need of a staff member.

• To ensure that users do not hit when approaching objects. Active distance measurement allows the user to walk without hitting obstacles.

• These objects to recognize certain objects; car, sheet, garbage containers, etc. Improved alert with advanced object recognition algorithm.

• Alert (3 meter - 2 meter - 1 meter) when approaching objects.

• The system should be able to select the objects by actively examining all aspects of the image being monitored and to inform the users of the obstacles.

• To ensure that the visually impaired people have a product by keeping the costs low. Compared to other firms working on the same problem, we need to produce a cheaper product to meet the needs of consumers. Our goal is that the people who need; visually impaired people to buy the product.

3.1.3. Glossary

Table 1 Glossary of SRS

Term	Definition
Software Methodogy	The software methodology determines how the project progresses and how it works.
Stakeholders	Any person or company who has rights on the project.
Software Development Lifecycle	Terminology that defines the phases of the software development.

3.1.4. Overview of Document

On the first part of the document, we have oppurtunity to mention our goals that we want to reach at the end of the project. Besides, we have talked about whom this project will be done and differences from similar projects. Moreover, we have mentioned the requirements of the project, the software development methodology which we are going to use and the functionalities that the product will have.

3.2. Overall Description

3.2.1. Product Perspective

This product will develop for blind or low vision people. The aim of this service is to help someone blind or low vision however, this service works with the stick. The most important purpose of this service which will process broadcast, is to protect the user from a possible accident. If user wants to open an account to relatives, the relative or close family member can introduce contacts to this service, in this way the software recognize the contact and tell the user. This contact list prepared by relative of the user. A support system will be created considering the bug's. At the same time, a reporting system was considered considering the possibility of taking the project further.

3.2.2. Development Methodology

The methodology we plan to use when developing the project is the agile software methodology. In the interviews we had before, we had access to a few people to help us. Agile software development; It is necessary to implement the activities of the software development process in a recursive manner and gradually improve the software product by using the values created by Agile union and by applying the principles. We prefer this methodology as it should be a project developed with the user. After sharing the demos we need to take regularly, we will be able to get a project process that is open to change and development according to the user's ideas.

3.2.3. User Characteristics

3.2.3.1. User

2.3.1.1. User must be blind people

3.2.3.2. Editor

2.3.2.1. The editor must be a relative of the user

2.3.2.2. Editor must have enough authority to use system on the software.

3.2.3.3. Admin

2.3.3.1. Admin must have knowledge of software maintenance process.

2.3.3.2. Admin must have enough authority to edit user data on the software.

2.3.3.3. Admin must have knowledge of software platform.

3.3. Requirements Specification

3.3.1. External Interface Requirements

3.3.1.1. User Interface

There are not any external user interface requirements.

3.3.1.2. Editor Interface

The required interface will be designed with HTML5 & CSS3. It needs a computer and a web browser. The user must have a user name and password to access the interface.

3.3.1.3. Admin Interface

The required interface will be designed with HTML5 & CSS3. It needs a computer and a web browser. In order to access the interface, you must have a user name and password with admin authority.

3.3.1.4. Hardware Interface

There are not any external hardware interface requirements.

3.3.1.5. Software Interface

There are not any external software interface requirements.

3.3.1.6. Communications Interface

There are not any external communications interface requirements.

3.3.2. Functional Requirements

3.3.2.1. Login System Use Case

Use Case :

• Login as Editor

• Login as Admin

• Forgot Password

• Logout

Diagram :

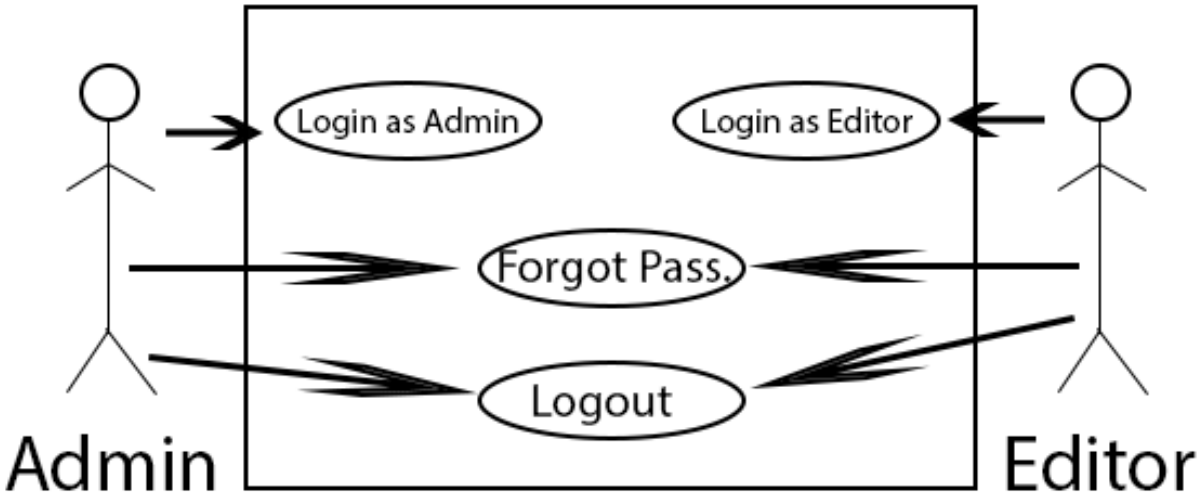

Figure 6 Login System's Use Case Diagram

Brief Description:

Persons with editor and admin authority will be able to use the login system. There are two separate panels defined in these two roles. Both user types will be logged in with the user name and password defined. If users forget their passwords, the system can send e-mail to the registered address and request a password change. Users will be able to leave their user accounts when needed.

Initial Step by Step Description:

1. The editor logs in with the appropriate username and password.

1.1. If the editor's username and password are invalid, they will be redirected to the login page again.

2. Admin will log in with the appropriate user name and password

2.1. If the username and password of the admin are invalid, they will be redirected to the login page again.

3. Admin or Editor can click "Forgot Password" button.

3.1. If the admin or editor clicks on the "Forgot Password" button, the system will ask the user the email address registered in the system

3.2. The system will send a special link for the password change to the email address entered by admin or editor.

3.3. After clicking the link, password and password repetition will be requested.

3.4. The new password entered will be updated in the system.

4. All users will log out of the system

3.4. Software System Attributes

3.4.1. Scability

All actors of the system must be warned when there is a change in the system.

3.4.2. Adaptibility

Every corrected data that is entered by editor must be saved in database system in the appropriate tables of database.

3.4.3. Usability

When the users such as editors or admins enters their attributes wrong, an error message should be displayed that explains the reason why the users failed.

3.4.4. Performance

Appearance time of the interfaces should not be more than 3 seconds.