Software Requirements Specifications

for

Smart Assistant for the Visually Impaired

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2.1- Introduction

2.1.1- Purpose

The purpose of our model is to guide the visually impaired people so that they can avoid the obstacles that come in their way making their day to day life easier.

2.1.2- Document Conventions

The document follows MLA (Modern Language Association) format. Bold faced text has been used to emphasize section & sub-section headings. Highlighting is to point out words in the glossary & italicized text is used to label & recognize diagrams.

2.1.3- Intended audience and reading suggestions

This document is a prototype to be read by the development teams, project managers, marketing staff, testers & documentation team. The target audience for this project are the visually impaired people. Our model will be guiding them so that they can easily avoid all these obstacles in front of them.

2.1.4- Project Scope

The purpose of our model is to ease day to day tasks for the visually impaired people and people having poor vision. Our model will enable the user to perform activities and will act like a guiding agent to them.

2.1.5- References

- Object Oriented System Development by Ali Bahrami.
- https://belitsoft.com/custom-application-development-services/software-requirements-specification-document-example-international-standard
- http://www.cse.chalmers.se/~feldt/courses/reqeng/examples/srs_example_2010_group2.pdf

- https://www.python.org/
- https://www.w3schools.com/python/
- https://www.dev47apps.com/droidcam/windows/
- https://keras.io/
- https://www.tensorflow.org/
- https://www.cv-foundation.org/openaccess/content_cvpr_2016/papers/Redmon_You_Only_Look_CVPR_2016_paper.pdf
- Refactoring: Improving the Design of Existing Code" by Martin Fowler
- https://www.numpy.org/
- Learn Python 3 the Hard Way by Zed Shaw
- Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems by Aurélien Géron
- https://opencv.org/

2.2- Overall Description

2.2.1- Operating Environment

Minimum system requirements are:

- Android Lollipop (version-5.1.3) and above.
- Qualcomm Snapdragon 430 processor (1.2GHz) and above.
- 3 GB RAM and above.
- 20MB storage space on device.
- 5MP rear camera.
- GPS enabled smartphone.
- Earphones.

2.2.2- Constraints

It is assumed that the user has an Android smartphone with the following specifications:

- Detects objects upto a distance of 20-25m.
- Requires well lit areas to function.
- Battery needs to be charged enough to work.

2.3- Functional Requirements

2.3.1-Usability

Usability is the the degree to which something is able or fit to be used. It should be easy for the user to become familiar with and competent in using the user interface during the first time use. This is the most important functional requirement since our primary audience mainly consists of people with poor vision so they need to be able to use it by easy and voice commands.

2.3.2-GPS tracking

Our model is equipped with a GPS tracker which will track the user's location in real time and will help him reach from the source to the destination with ease. It will only work in places where the GPS signal is available.

2.3.3-Object detection

Our model is will predict the objects in front of the user which are potentially obstacles in the user's way. These objects may be cars, wall, other people, pets, street lights etc.

2.3.4-Text to speech conversion

Since the primary audience consists of people with poor vision, our model consists of text to speech converter which will convert the obstacles or items coming in the way in the form of speech and convey it to the user. Multiple languages are supported like english, spanish, french and other languages can be downloaded as well.

2.3.5-Reliability

The system should be highly reliable and the rate of failure should be very low. There should be no compromises with the health or safety of the users. Hence reliability is a functional requirement in this case.

2.4- Non-functional requirements

2.4.1-Performance requirements

The application must be free from any sort of lags that is any task being performed must be completed at that very particular instance. Most of the high end mobile devices should be able to support all major functions of the application. More over the application should be immune to frequent crashes.

2.4.2- Safety requirements

If there is extensive damage to a wide portion of the database due to catastrophic failure, such as a disk crash, the recovery method restores a past copy of the database that was backed up and reconstructs a more current state by reapplying or redoing the operations from the backed up log, up to the time of failure.

2.4.3- Security requirements

Our model has a very secure security system, immune to most attacks on the applications' database. It can identify its user's voice hence the issue of resolving forgotten passwords, addressing account lockouts, and expiring inactive sessions shall be solved by a 2 way Authentication process wherein the user receives an Email as well as an OTP on the registered mobile number to regain access.

2.4.4- Software Quality Attribute

The requirements in this section specify the required reliability, availability, security and maintainability of the software system. The application has been adapted to different android versions for phones of different specifications. The application is very flexible to use for daily life need ranging from automatic alarm to auto voice and facial recognition. The application is also portable, easy to maintain, reliable, testable and reusable.

2.4.5- Business Rules

- All prices are inclusive of GST
- The price of the application may vary from region to region depending on the currency.
- The application may not be available in some countries due to the laws pertaining to that country.