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**A
Software Requirement Specification
Document
ON
WELP:
Mobile Application To Find Nearest Ambulance**

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**A SOFTWARE REQUIREMENT SPECIFICATION DOCUMENT
SUBMITTED TO THE DEPARTMENT OF ELECTRONICS AND
COMPUTER ENGINEERING IN FULFILLMENT OF THE
REQUIREMENTS FOR THE LAB REPORT OF SOFTWARE
ENGINEERING (CT601)**

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ABSTRACT

Due to untimely arrival of ambulances in place of emergencies many people have lost lives that would have been saved. There is time lag between calling any ambulance and it arriving at the incident spot. Especially in developing countries where proper ambulance management infrastructure does not exist properly. Our project will help in reducing the time delay of an ambulance arriving at required places. This system would be a map based cross-platform application where users could see all the near by available ambulances and users can send a distress signal to all of them. By sending distress signal, all the nearby ambulances would be notified and the ambulance driver can accept to help. The ambulance who have accepted to help would be shown on the users mobile app via map service. This system would use real-time location tracking of ambulances to show the user where the ambulance has reached. This system can reduced time delay by notifying all the ambulances nearby and the user doesn't have to call individually to all of them. One button click would make all nearby ambulances available for service.

Keywords: real-time location tracing, cross-platform, distress signal

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LIST OF ABBREVIATIONS

CHAPTER 1

INTRODUCTION

1.1 Purpose

Especially in developing countries proper ambulance management system is lacking. And the methods that a general person uses to reach out an ambulance during the time of emergency is by calling nearby hospitals, ambulances and volunteering services. However, this is a lengthy process and takes a lot of time to reach out to ambulance when it is most needed. This could cause devastation and may cause loss of lives that could have been saved if the ambulance was time. And keeping track of all ambulance positions by their operators is not done properly as results ambulances are not placed where they are needed the most. As result, ambulances are clustered at certain region but lack at places where they need the most.

1.2 Project Scope

The WELP system will provide major services like: users can notify all nearby ambulances, nearby ambulances can respond to distress calls, real-time location tracking of the ambulances which is all powered by map service which will show location of everything and so routes and guidance.

The WELP system consists of two main components: a Client-side application which will run on any platform from where clients would be able to request ambulances, and the Ambulance operator side application from where the operators would be able to respond to crisis. This system also has Server-side application which contain Database and server for running this platform's back-end.

1.3 About this Document and its Readers

The system requirements specification document describes what the system is to do, and how the system will perform each function. The audiences for this

document include the system developers and the users. The system developer uses this document as the authority on designing and building system capabilities. The users review the document to ensure the documentation completely and accurately describes the intended functionality.

This version - version 1.0 - provides general descriptions of the system. The system developer should review the document to ensure there is adequate information for defining an initial design of the system. The users should review the document to affirm the features described are needed, to clarify features, and to identify additional features needed within the system.

The next version - version 2.0 - will be the result of more detailed requirements analysis. When Version 2.0 is written, the system developer and users will be asked to review this document. The document is structured to follow IEEE 830-1998 standards for recording system requirements.

1.4 Document Conventions

This document follows the IEEE standard. Bold faces used to emphasize section and sub-section headings. Highlighting is to point out words in the glossary and italicized text used to label and recognize diagram and tables.

CHAPTER 2

OVERALL DESCRIPTION

2.1 Product Perspective

The WELP project is a new, self-contained sophisticated system for any type of platform (Android, web, desktop, iOS). This system is intended to reduce time delay between calling ambulance to emergency location and ambulance arriving at the location. This system will also help in managing all the available ambulances by tracking their real-time location so that they can be placed in effective locations. The WELP system will greatly help general public in time of emergency and also help in saving numerous human lives. The other intent of this system is to help ambulance operators better manage their ambulances. Our cross-platform UI would serve as front-end for the users to interact and WELP back-end serve would manage all the database and live tracking. Below is a diagram of the WELP system which illustrates the interactions between the server and client applications.

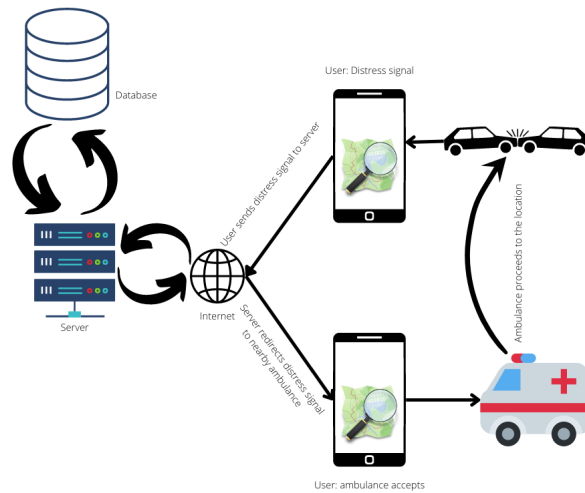


Figure 2.1: WELP system execution illustration

2.2 Product Features

The server consists of two important parts – a central database management system to manage all the user data, uploading and storage of information, and a real-time server system to track the location of the ambulances. The front-end consists of an app interface where users can request for ambulances and interface for ambulance operators to accept to offer help.

The Product functions are more or less the same as described in the product perspective. The functions of the system include the system providing different type of services based on the type of users.

1. Users should be able to create, update and delete their profile.
2. Ambulance operators should be able to register their vehicle on our platform.
3. Users should be able to notify nearby ambulances in time of emergency.
4. The application should display all the nearby ambulances.
5. The ambulance operators should get notification and should be able to accept the request
6. The application should show routes, estimated time of arrival and other guidance information on the map itself.
7. The users should be able to report any false alarms.

2.3 User Classes and Characteristics

- The user class of this WELP system will be:-

UCC1: Ambulance operators - This class of users should register their vehicle to provide service through our platform. This class of users would be able to process incoming requests for help and accept the requests. This class of users should

accept the distress signal of user within a limited time-frame, not doing so would penalize this class of user on the platform.

UCC2: General public - This class of users should create an account to request ambulance service in times of emergency. However, if this class of user is found to create any false alarm over the platform would be banned.

UCC3: WELP staffs: This class of users would be responsible for providing customer services, managing all user data, verifying ambulance operators and deciding on any violation of terms and condition of this platform

UCC4: Maintenance and support team: This class of users are responsible for maintenance the system so that is can run smoothly. This class should remove any errors in the systems, upgrade the system time and again and ensure that there is no security violations

2.4 Operating Environment

The rule for selecting hardware and software is that the components/application must be functionally efficient, capable of interfacing with other software, and easy to maintain.

OE-1: The System shall operate with the following Web browsers: Microsoft Internet Explorer, Safari, Chrome, Firefox and any modern day browsers. The system shall operate above android version 4.0(kit-Kat).

OE-2: The System shall operate on Certified and Accredited servers running the current Corporate approved versions of operating systems as appropriate.

OE-3: The client-side components of the software system must operate within common web-browser environments using Secure Sockets Layer (SSL) / Transport Layer Security (TLS) cryptographic protocols at a minimum encryption level of 128 bits.

2.5 Design and Implementation Constraints

CO-1: Portability: The application codes generated during prototyping may not run properly When re-hosting the data system to a non-Windows OS or transferring the data system to another location.

CO-2: The system shall be in compliance with all Accessibility, Web Design, and Security Policies applicable.

CO-3: As part of standard operating procedures, a testing plan will be documented during the Design phase. The testing plan will be based on user roles, modules or use cases, required tasks and expected outcomes.

CO-4: All WELP services must be available over a RESTful API

2.6 User Documentation

User documentation will consist of the several components usually expected of a modern cross-platform software application, including a tutorial, help pages, FAQ's with an online request form, and a complete user's manual. **UD-1:** A tutorial will provide a quick start, a walk-thru of major system features, and further Reference source for the complete system features.

UD-2: Users would be able to access FAQ's for our platform via web pages.

UD-3: The user's guide (or user manual) will contain sufficient information and instructions Required to access and use the data system. It will include:

UD-3.1: Overview of the system features and architecture.

UD-3.2: Instructions for accessing the system.

UD-3.3: Samples of screens, where appropriate.

2.7 Assumptions and Dependencies

- The users have sufficient knowledge of computers and android devices.
- The users know the English language, as the user interface will be provided in English
- Graphics support tools
- The platform can access real-time location of users
- Users are connected to internet
- OpenStreetMap for map service
- TurfJS for routing engine

CHAPTER 3

SYSTEM FEATURES

This section of the SRS describes the requirements for the system's features. Specifically, requirements for component functionality, data creation, and software system administration are defined.

3.1 User registration/login system

This section of SRS deals with functional requirements for user registration on WELP system.

3.1.1 Registration

When using WELP, users would be prompted to login with a user account. If the user does not have a pre-existing account, the user will be shown a registration form to create a new account. In case of extreme emergency, user can login in to the system by verifying their mobile number using OTP. Later users can verify their accounts using KYC.

3.1.2 Login

Users already registered in the system should be able to login to the system and access all their previous data such as images, history etc.

3.2 Ambulance Registration

3.2.1 Registration

Any ambulance operator wishing to be a service provider on our platform can register by using a registration form in our application. The application will be

reviewed by staffs of WELP to maintain quality of service. Verified operators will be provided with login credentials.

3.2.2 Login

Verified ambulance operators with login credentials can login to the system and access their information such as images, history and can start giving service to the users.

3.3 Users can send distress signal

This section of SRS deals with functional requirements of the platform for users to send distress signal in time of emergency.

3.3.1 Distress signal function

Users can send distress signal on our platform for requesting ambulances by pressing 'request help' button. This will execute function which accesses user's current location and send it to the nearby available ambulances.

3.3.2 User location access

To provide ambulance operators the location of emergency, this platform will access user's current location and send it to nearby ambulances.

3.3.3 See nearby ambulances

All the nearby ambulances in the vicinity of the user will be visible in the map of the user's application. This is achieved by real-time location tracking of the ambulances in the region.

3.4 Ambulance operators can accept the signal

This section of SRS deals with functional requirements for ambulance operators being able to see distress signals and respond.

3.4.1 Notification System

If a user sends a distress signal, all available ambulance within reach of the user would be notified by push-notification on their device along with sharp notification sound.

3.4.2 User location Access

Ambulance operators can see the location of emergency.

3.4.3 Map routing

When the ambulance operator accepts the distress signal of the user, they would be able to see the best suited route to the location along with ETA and other guidance information

3.4.4 Penalizing System

The ambulance operator would be given a time-frame to accept the response, if they fail to do to they would be penalized by the system by permanently banning.

3.5 Feedback and reporting system

This section of SRS deals with functional requirements for feedback and reporting system of the platform so that the quality of service and integrity can be maintained over the application.

3.5.1 Feedback form

After the service of the ambulance is completed, the user and the ambulance operator both will receive feedback form which will be reviewed by the employee of WELP.

3.5.2 Report feature

If any user created a false alarm any ambulance operator who have witnessed the incident can report it. Similarly, against any ambulance operator registered on our platform who is unwilling to provide service a complaint can be filed. The reports would be reviewed by the WELP.

3.6 Use Case Models

The following illustration (Figure 3.1) shows use case diagram of different users interacting with the WELP system.

List of Users:

- UCC1: Ambulance Service Provider
- UCC2: Service seeker in emergency
- UCC3: Customer service department and moderator
- LOGIN SYSTEM: Checks login credentials of users
- User Database: Stores user data (login credentials)
- LOCATION SYSTEM: Responsible for location tracking

3.7 Hardware Requirements

HR-1: Data Storage - The system needs cloud data storage system to make it available to everyone worldwide.

HR-2: NETWORKING - The system needs cloud served to make it available worldwide and CDN services to make access able faster.

3.8 Software Requirements

SR-1: Backup software

SR-2: Database management software

SR-3: Security software

3.9 Software Quality Assurance

To ensure data quality in the system and integrity of the system all the ambulance operators will be manually verified by the employee of WELP and all the users need to verify themselves with legal identity card after certain time-frame.

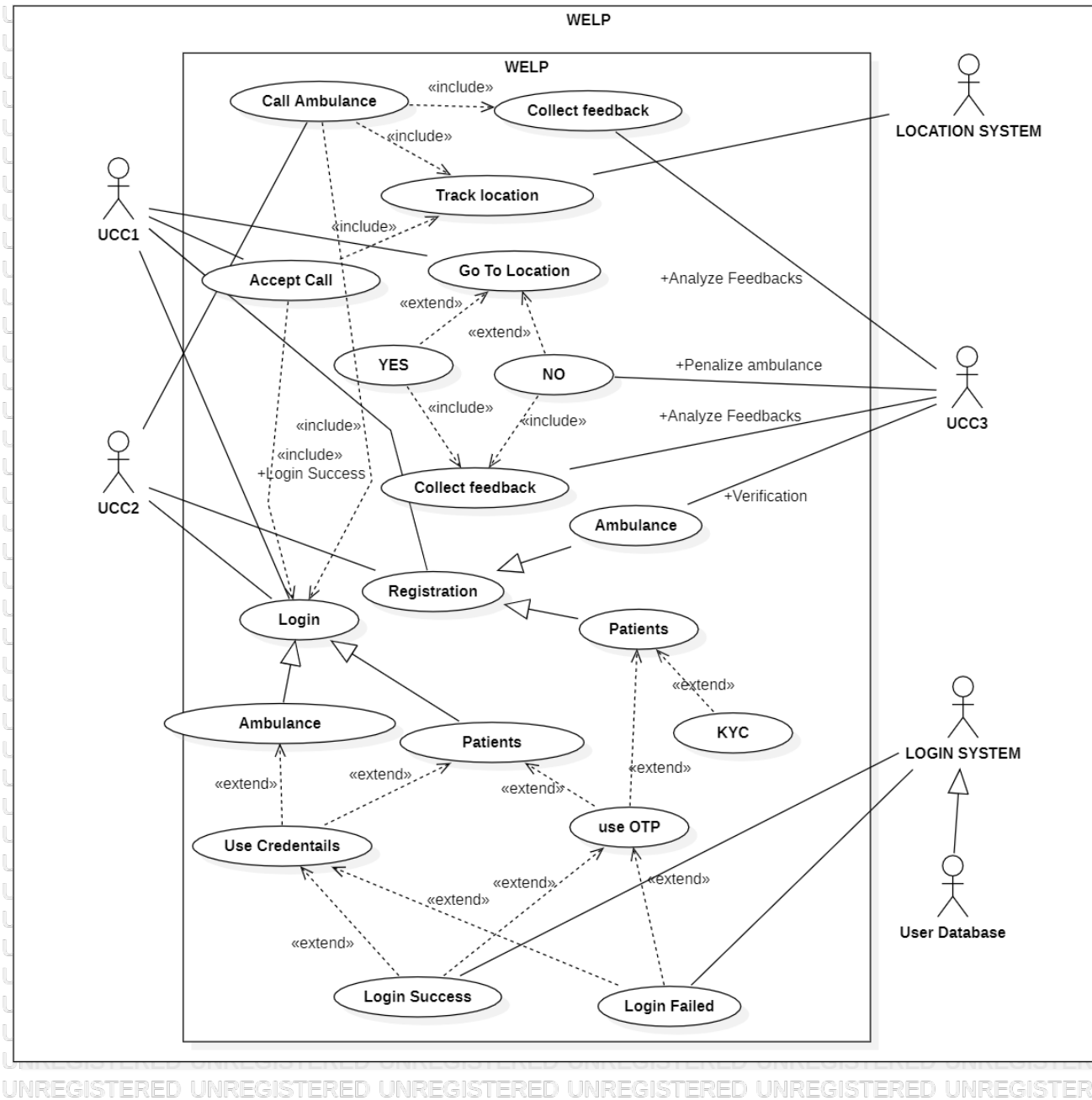


Figure 3.1: WELP Use Case Diagram

CHAPTER 4

EXTERNAL INTERFACE REQUIREMENTS

4.1 User Interfaces

The user interface will be simple and consistent, using terminology commonly understood by the intended users of the system. The system will have a simple interface, consistent with industry standard interfaces, to eliminate the need for user training of infrequent users. The WELP team will evaluate the user interface of similar systems and apply appropriately. For additional details see Appendix E. User testing will be used to ensure the user interface is clear (simple, commonly understood vocabulary, intuitive to use without training), complete (users can perform all functions from the interface), and consistent (buttons and wording are the same throughout the system).

4.2 Hardware Interfaces

No extra hardware interfaces are needed. The system will use the standard hardware and data communications resources provided by the WELP data center. This includes, but is not limited to, the general Ethernet network/T1 connection at the server/hosting site, network servers, and network management tools. This system will include a warning message when a low transmission speed is detected, and a non-graphical interface option will be available.

4.3 Software Interfaces

The system will use the standard software resources available in the Internet and some other resources provided by the WELP data center. This includes, but is not limited to, JavaScript, HTML, CSS, NodeJS, ExpressJS server, and MongoDB server and also if there is another necessary resource needed by the WELP system this should be included when it is developing.

4.4 Communications Interfaces

The system will use the communications resources provided by the WELP data center. This includes, but is not limited to,

- HTTP/HTTPS protocol for communication with the web browser and the web server.
- TCP/IP network protocol with HTTP protocol.
- SMS Gateway for communication among android phones for argent events without an Internet connection.

This is done for compatibility and stability purpose.

CHAPTER 5

OTHER NON-FUNCTIONAL REQUIREMENTS

5.1 Performance Requirements

PR-1: Response time: The data system shall show no visible deterioration in response time as the number of persons increases. Response times seen by users should be on the order of a few seconds or less.

PR-2: Loading speed: The data system shall load as quickly as comparable productivity tools on whatever environment it is running in.

PR-3: Number of user: the server shall be capable of supporting no less than 1000 concurrent connections from any combination of surface computers, tablets and displays.

5.2 Security Requirements

The WELP system will have reasonable controls consistent and in compliance with the campus.

The system shall provide three levels of access:

- A system operator level for unrestricted access to system functionality
- A poster for access to poster functionality
- A user for access and display information

The system security requirements will have three primary components. They are authentication, confidentiality, and availability.

SCR-1: Authentication

- WELP will follow industry best practices for authentication. Authentication addresses security requirements to ensure those using system are who they say they are. This is of greatest concern when locations are being shared . This is primarily done through poster Ids, passwords, KYC and mobile numbers.

SCR-2: Confidentiality

- Confidentiality security requirements describe the need to protect the information appropriately. WELP system will use the user classes described in section 2.3 above to define boundaries of information sharing to ensure confidentiality as appropriate. Any data or information that should be viewed by a restricted audience must be protected with appropriate security features.

SCR-3: Availability

- The third consideration for security requirements is availability. The system must be available to the intended audience 24 hours per day, 7 days a week with, 99% availability. For this system, availability will be concerned with the reliability of the software and network components. Intentional “denial of service attacks” is not foreseen as a significant concern.

5.3 Safety Requirements

Data on the server should be protected from power loss but data in transit from server to requester could be lost. Given that these data will also remain on the WELP system, rather than expend resources to prevent this loss, such failures will be monitored and the uploading or posting process will be repeated i.e. The system shall be capable of restoring itself to its previous state in the event of failure (E.g. a system crash or power loss)

5.4 Software Quality Attributes

SQ-1: Portability

- This System's database will be built for the WELP system and may not be portable but results to queries will be portable between many environments.

SQ-2: Adaptability

- Implementation of the application software/code and design of the system should be flexible enough for the necessary change in the later phase.

SQ-3: Availability

- Availability is defined here to mean the ability to use the system during its intended period of operation as defined in SCR-3 above.

SQ-4: Usability

- The system shall allow the users to access the system from the Internet using Mobile App or its derivative technologies. The system uses a web browser or android platform as an interface.
- Since all users are familiar with the general usage of browsers and android phones no Specific training is required.
- The system is user friendly and self-explanatory.

SQ-5: Reliability

- The system has to be very reliable due to the importance of information and the damages incorrect or incomplete information can do.

CHAPTER 6
OTHER REQUIREMENTS

none

REFERENCES

Data Flow Diagram Level 0

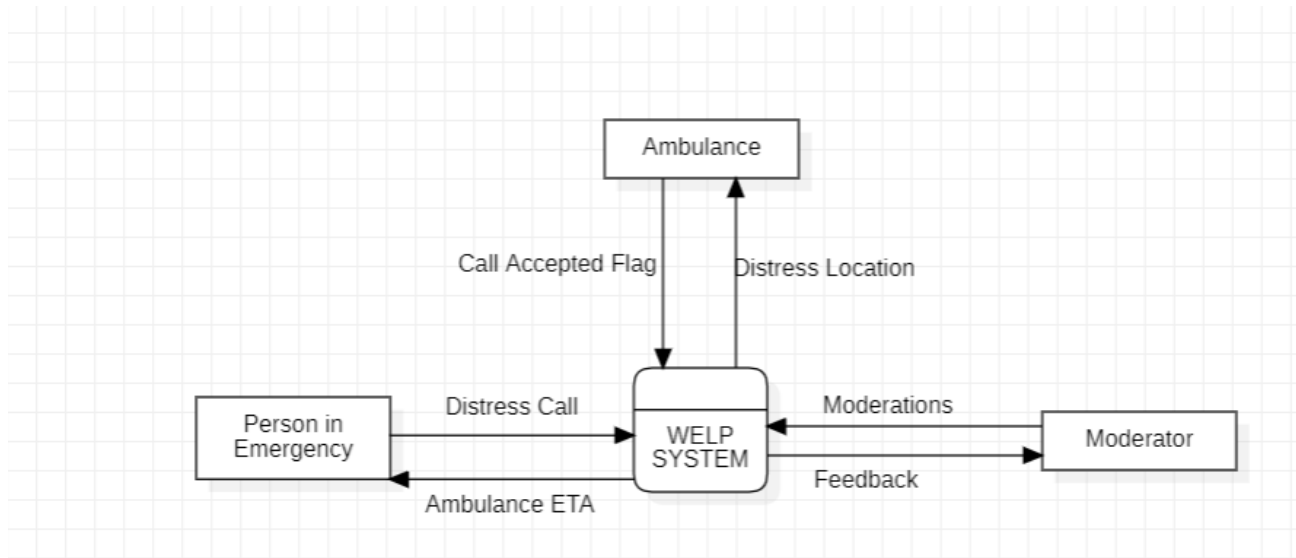


Figure 6.1: Data Flow Diagram Level 0 WELP System

Data Flow Diagram Level 1

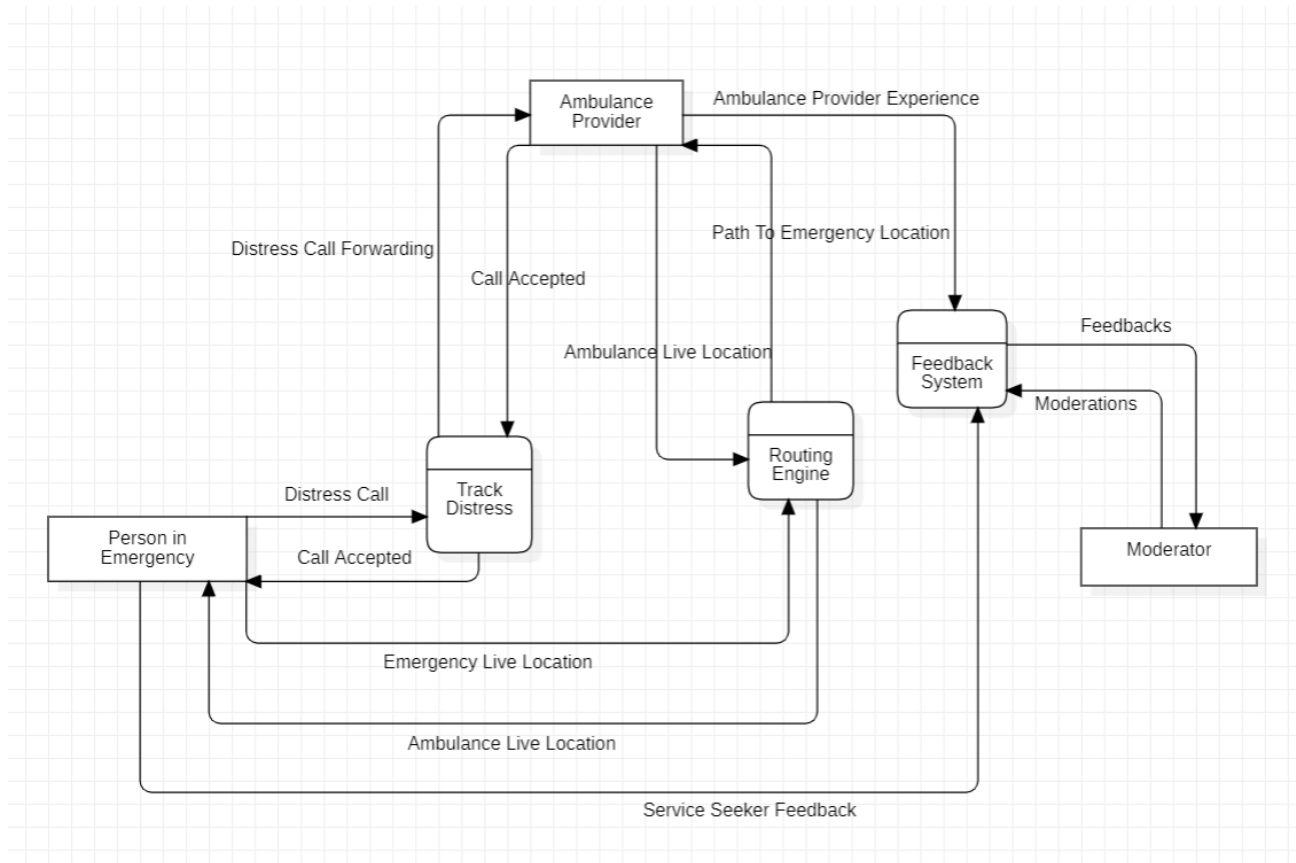


Figure 6.2: Data Flow Diagram Level 1 WELP System