Faculty of Computer and Information Systems

Islamic University of Madinah

Saudi Arabia

CIS 2202-System Analysis and Design

Accident Assistance Service Report

Section: 1517

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Table of Contents

1. Introduction

Accident Assistance Service is a subscription-based service that makes drivers receive a call from an automated call center when they have accidents, this call aims to make sure the driver has not injured. If the driver was injured the call center will alert Emergency services and provides them car location and information.

The service progress is done through these steps:

1 -When the car has an accident, the built-in device sends an automated message to the call center include car VIN and GPS location.

2 -The call center will place a call to the driver phone.

3- If the driver doesn't answer the call center will inform emergency services of the accident and provide them the car location and information.

The main system functionalities are:

1- Send an automated message to the system.

The device send an automated message to Accident Assistance Server. The message includes the car's location (GPS) and VIN.

2- Place a call to the driver's phone.

Using an automated call center, the system will place a call to the driver's phone.

3- Alert emergency services

If the driver doesn't answer the call, the system will alert emergency services (police, ambulance), and provide them the accident's details.

4- Store customer information

Store some information about customers e.g. phone numbers, also store some information about customers' cars e.g. VIN number, plate number, model, color, etc.

2. Requirements Specification for understanding the problem

In this section, we are going to get a full understanding of the system and specify its specifications. First, we will collect all the required information, then we will analyze the collected information to check either the system is feasible or not.

2.1 Information Gathering

After reading system description we found that it does not provide enough information, so to gain the missing information we interviewed the system owner, and we distributed and collected a questionnaire for end users. Below, we put the templates of the interview agenda and the questionnaire.

2.1.1 Interview agenda:

i. **Discussion and interview agenda**
Setting Objective of Interview • Information required for registration and other inputs • Clarify how the system performs • Specify the system process in some exceptional cases Date, Time, and Location March 7, 2019, at 11:00 a.m. in Dr. Abdullah Alshanqiti's office. User Participants Dr. Abdullah Alshanqiti, System owner. Project Team Participants Ali Mohammad, Abdulrahman Shahata, Mohammad Gamal, and Ali Domlo.
Interview/Discussion • What is the required information for registration? • How the device will send the message to the system's server? • If the customer has several phone numbers, which one will be called? • In case of the car has several drivers, how can we determine who is driving now? • What is the information will be sent to emergency services? • How the system will alert the emergency services?
Follow-Up Date and time of next meeting or follow-up session.

2.1.2 Questionnaire template:

Accident Assistance Service questionnaire

This questionnaire is being sent to cars' owners. We are developing a new Accident Assistance Service system for alert emergency services if the driver injured in an accident.

The purpose of this questionnaire is to obtain preliminary information to assist in defining the requirements for the new system.

Please, circle the appropriate answer for each question

1- How many cars do you have (or you are using frequently)?

   a- One b- Two c- More than 2

2- Are there other people sharing the car with you?

   a- Yes b- No

3- If your answer for (2) was yes, how many people?

   a- One b- Two c- More than 2

4- Do you have many phone numbers?

   a- Yes b- No

5- If your answer for (4) was yes, do you use one of them as a primary number?

   a- Yes b- No

6- Do you want to notify someone if you have an accident?

   a- Yes b- No

7- Do you change your phone number frequently?

   a- Yes b- No

8- If your answer for (7) was yes, what is the rate for changing your phone number? ……

Please, write down what you expected from the Accident Assistance Service system.

……..

……..

……..

……..

2.2 Feasibility Analysis

After collect system specifications, we are going to analyze them to decide either the system is feasible or not. In Feasibility analysis we focused on four aspects that are:

2.2.1 Technical feasibility

In this section, we will analyze the feasibility in terms of two aspects:

- The possibility of implementing the system technically:

  The implementation of the main operation of the system does not require a lot of specifications, it only requires a server and automated messages and calls center, and a connection to the Emergency services.

- Our team ability to build the system:

  a- Familiarity with the application:

  Some of the team members are familiar with this type of applications because they worked on some similar projects. The members who don't have enough experience could get some training to be familiar with this type of applications.

  b- Familiarity with the technology:

  Our team members have some experience with automated messages and call centers, and they fully trained to use database servers.

  c- Project size:

  Due to the number of team's members, and the small number of functionalities provided by the system, we can conclude that the size of the system is suitable for the size of our team.

Based on the above, we can conclude that the system is technically feasible.

2.2.2 Operational feasibility

In this section, we will analyze the feasibility in terms of two aspects:

- The degree to which the system fulfills customer requirement:

  The overall requirement of the system is to alert emergency services about car accidents, the system easily can fulfill this requirement.

- Users' feelings about the system:

  According to our questionnaire results, we found that many users see the system is important and provide a service that helps to save the drivers lives.

Based on the above, we can conclude that the system is operationally feasible.

2.2.3 Economic feasibility

Economic feasibility is shown in the table below (All costs are estimated):

	Year		
	2019	**2020**	**2021**
Development costs			
Development team salaries	16,000 SR	-	-
Development team training	3,000 SR	-	-
IaaS subscription	4,000 SR	4,000 SR	4,000 SR
Call center	4,000 SR	-	-
Operation costs			
Communication charges	2,000 SR	2,000 SR	2,000 SR
Call center maintenance	-	2,000 SR	2,000 SR
Total costs per year	29.000 SR	8,000 SR	8,000 SR
Total	45,000 SR		

Based on the above table, we can conclude that the system is Economically feasible.

2.2.4 Scheduling feasibility

Based on our planning, our team can complete the project within the deadline (4th of July) as we show in the project plan in the next section. Thus, we can conclude that the system is feasible in terms of scheduling.

3. Development Strategy and Task Scheduling

In this section, we are going to determine the development methodology and time plan.

3.1 Methodology

After studying the system and its requirements, we proposed that one of the best potential methodology is the waterfall methodology, because the following reasons:

-It is easy to understand and use.

-The system requires high quality implementation because people lives depend on it.

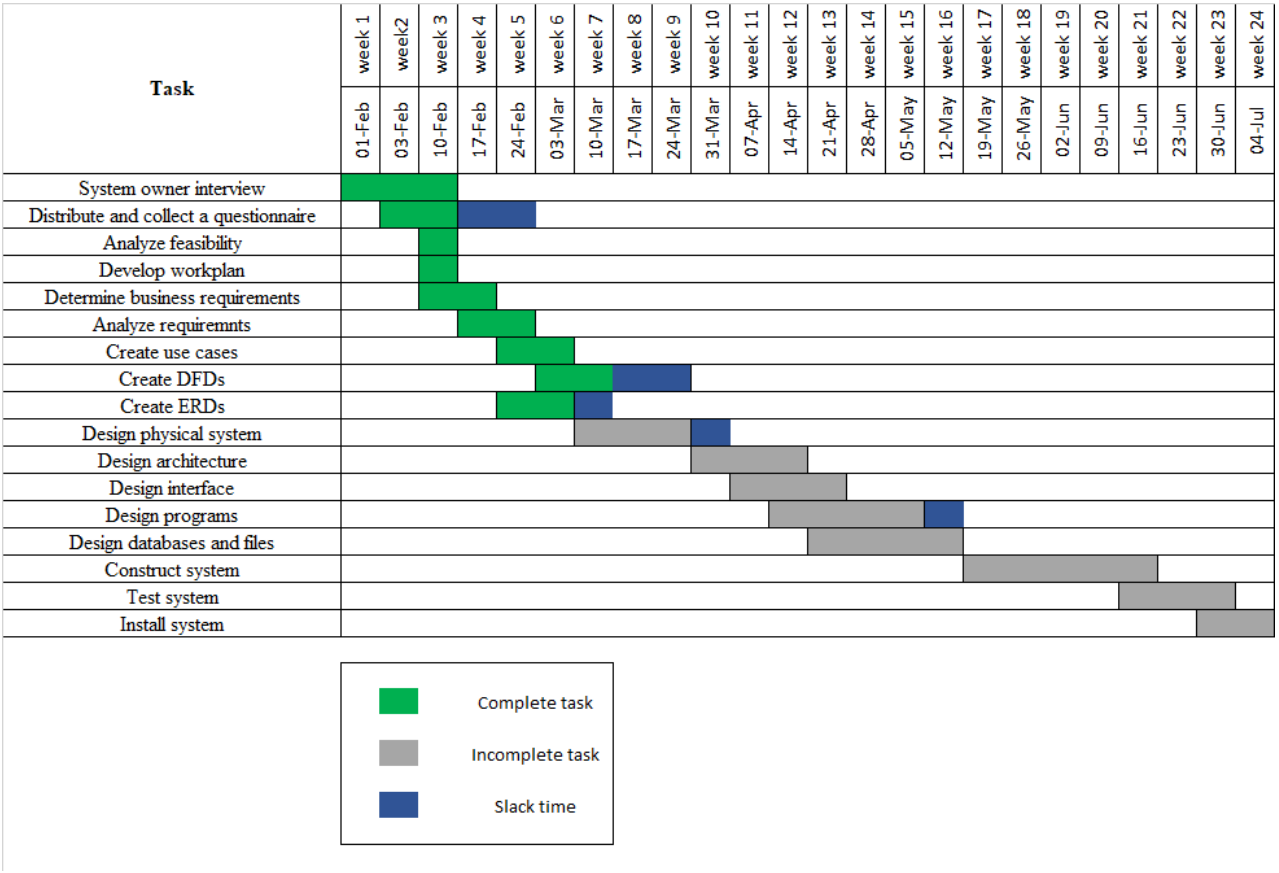
-The system requirements are well-defined.

-Our team is familiar with used technologies.

The main drawback is it takes long time. To avoid this drawback, we can use parallel methodology which divides the project into a series of subprojects that can be designed and implemented in parallel, then integrate them into final project. The main advantage of parallel methodology is reducing the time required to deliver a system.

3.2 The plan for scheduling tasks (Gantt chart)

Because of the short available time, we used the reverse scheduling strategy, we established scheduling from the project deadline and then scheduled backward from that date. Project time plan is shown in the Gantt chart below:



3.3 Critical path tasks

Here we are going to discuss three tasks that appear in critical path:

1- System owner interview
   It's the first task in the project because it determines whether the team continue the project or leave it, also it states the main aspects of the work plan.
2- Develop workplan
   Work plan guides the team to accomplish other tasks and coordinate the development process progress.
3- Determine business requirements
   All the next steps depend on determine business requirements because the overall project aim is to develop a system that accomplishes the business requirements.

3.4 Tasks within the slack time.

As we shown in the Gantt chart there are four tasks are scheduled within the slack time.

4. Requirement analysis

In this section, we are going to specify, classify, and analyze the system requirements.

4.1. Requirements list

The system requirements divide into two types:

4.1.1 Functional requirements:

We can define them as the activities that the system must perform.

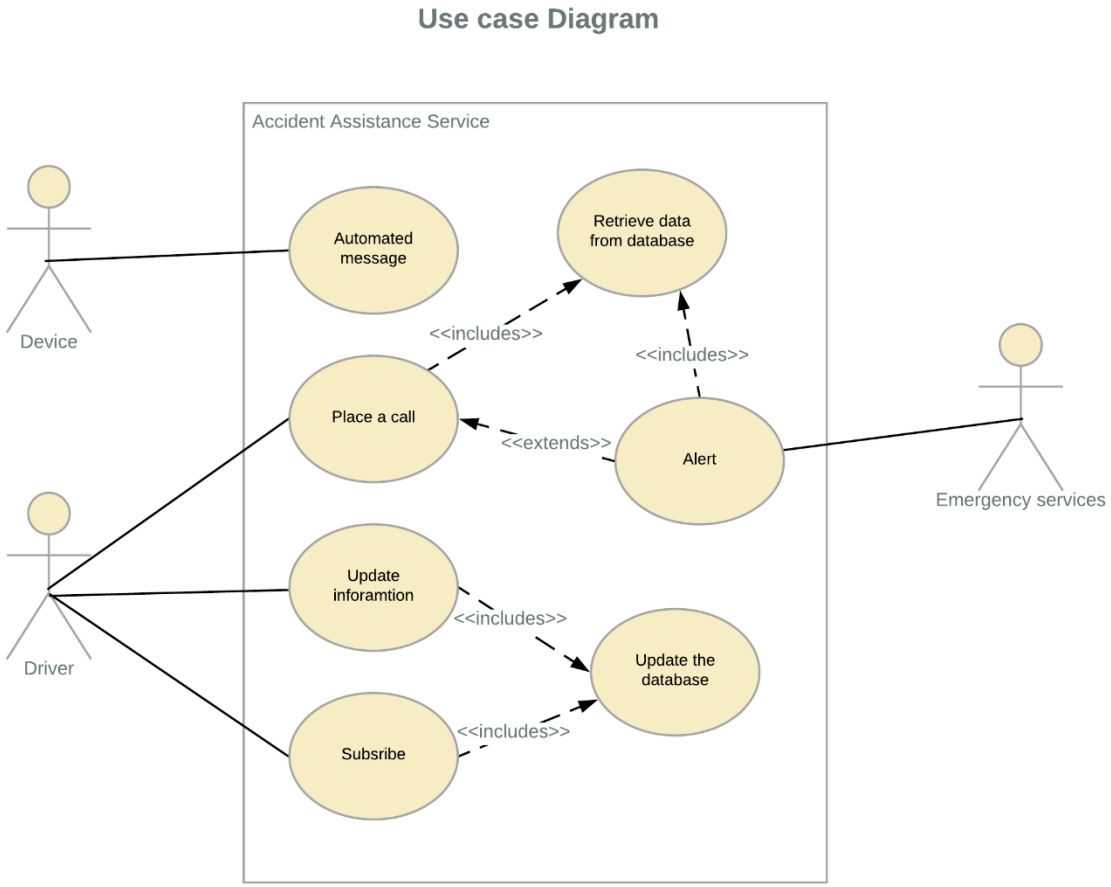
1- Send an automated message to the system.
   The accident triggers the device to send a message to Accident Assistance Server. The message includes the car's location (GPS) and identification number.
2- Place a call to the driver's phone.
   Using an automated call center, the system will place a call to the driver's phone.
3- Alert emergency services
   If the driver doesn't answer the call, the system will alert emergency services (police, ambulance), and provide them the accident's details (Car's location and information).
4- Store customer information
   Store some information about customers e.g. phone numbers, also store some information about customers' cars e.g. VIN number, plate number, model, color, etc.

4.1.2 Non-functional requirements:

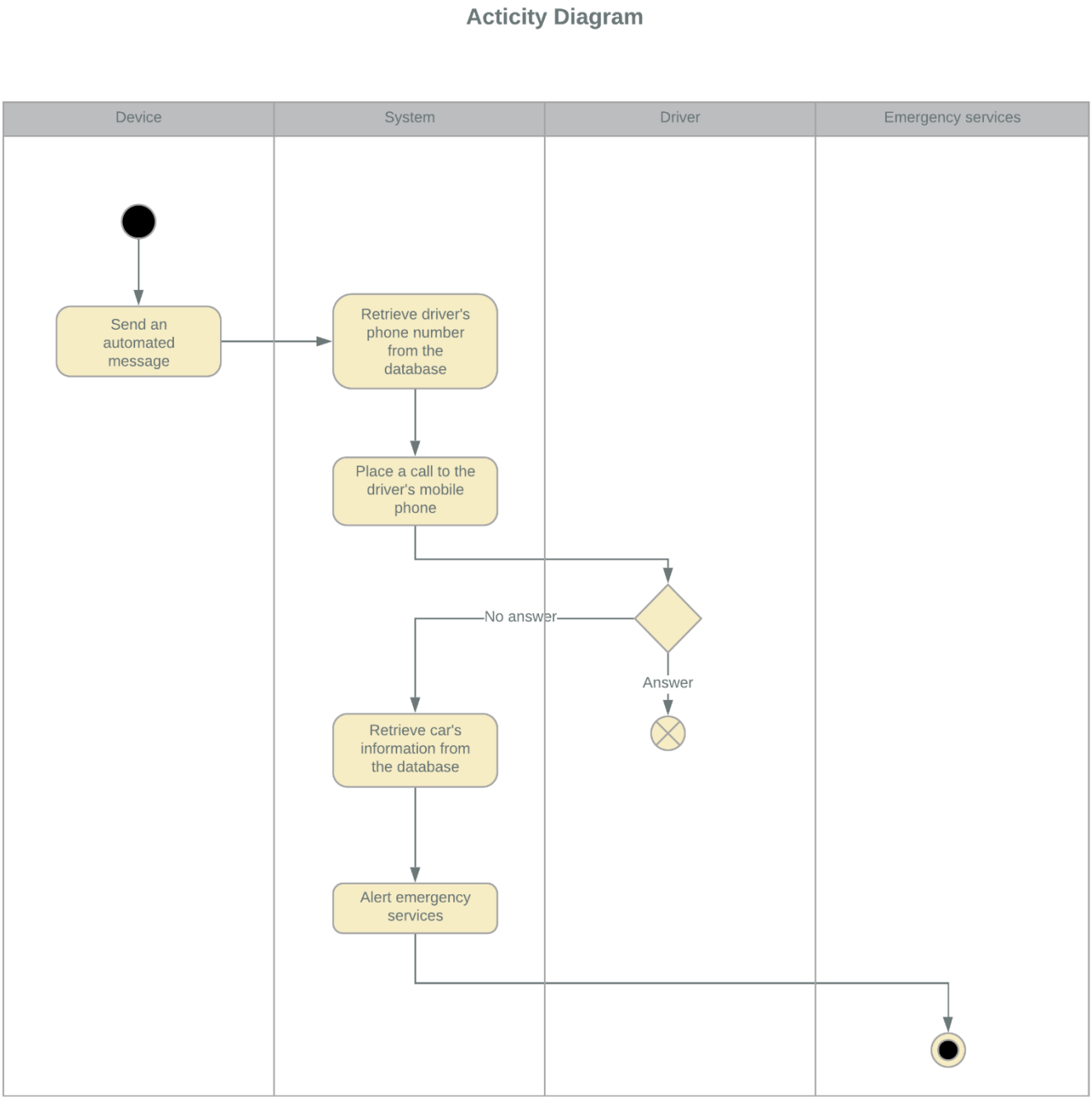
We can define them as system characteristics other than the activities it must perform or support.

1- Renew the subscription, and update customer information online
   The customer can renew his subscription with no need to visit the company (using a mobile application, or website).
2- Varying choices for payment methods
   Cash, checks, credit or debit cards, money orders, bank transfers, and online payment services such as PayPal.
3- Very quick response
   Place a call within 30 seconds after receiving the message.
4- Encrypted messages
   Encrypt the messages from the device to the Accident Assistance Server.
5- In case of alerting emergency services, send a notification to a number specified by the car's owner as an optional feature.

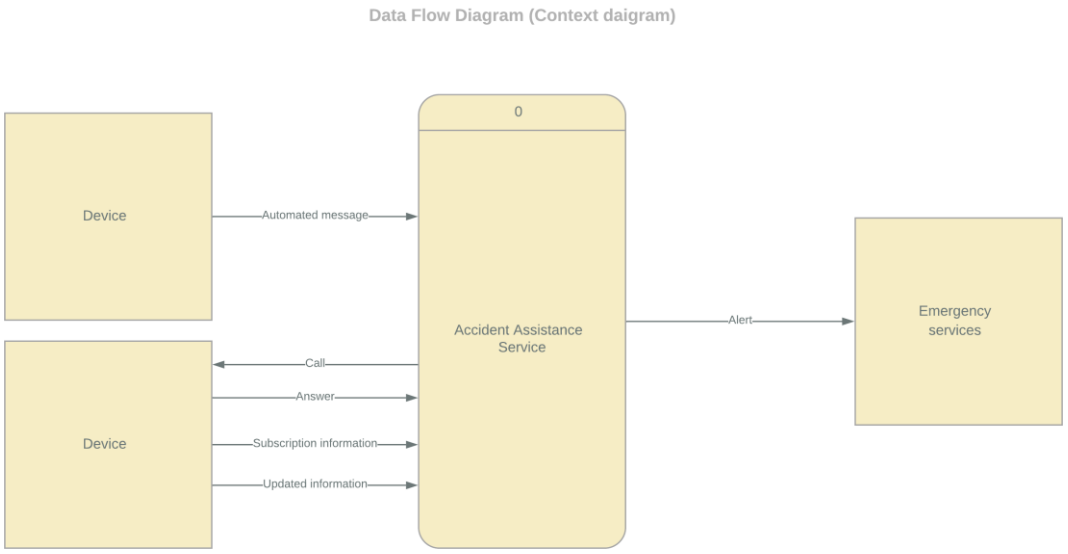
4.2 Use case diagrams

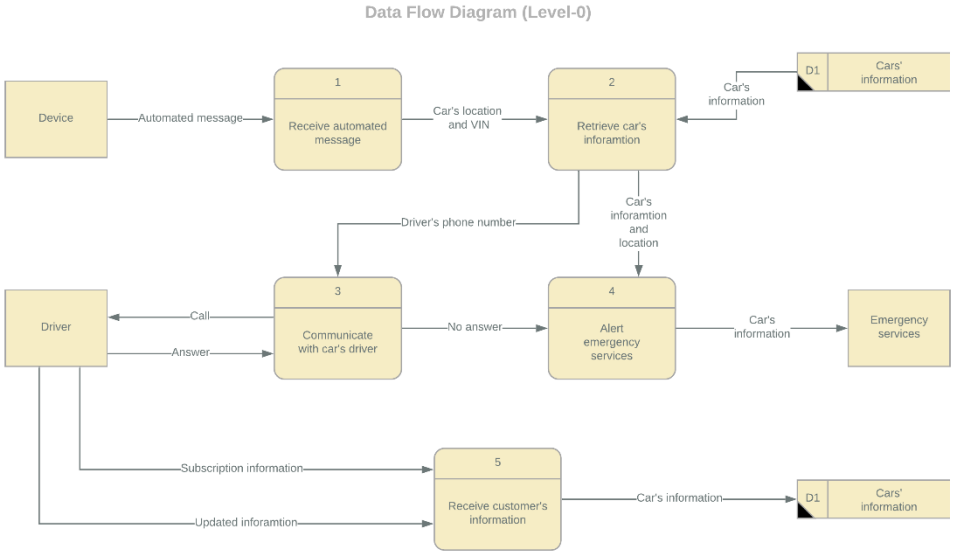


4.3 Activity diagrams



4.4 Data Flow Diagrams





4.5 Entity relationship diagram