

PATH

Requirements Definition

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1. Introduction

1.1 Purpose of this document

This document describes in detail the requirements of the project “PATH: if you go, my advice to you (PATH)”. The requirements of the project in mainly depicted through Use Case diagrams which are easy to understand the requirements from the customer or user perspective. The document also prioritizes the requirements to make a clear distinction on most essential requirements and additional requirements.

1.2 Intended Audience

This document serves the below audience to get an overview of requirements of the project made by the project group.

- Customer: To reflect that the project team understands the requirements put by the customer.
- Score supervisors: To gauge the project performance while evaluating the project for competition
- Steering group: To monitor whether the project group are inline with the requirements of the project.
- Project group: This document will serve as a hand book during the implementation to make sure that the higher priority tasks are given importance over lower priority tasks.

1.3 Scope

The document gives a detail description of the requirements of the project through Use Case diagrams and description. The scope includes the origin, priority, type of requirements.

1.4 Definitions and acronyms

1.4.1 Acronyms and abbreviations

Acronym or Abbreviation	Definitions
PATH	By the way
API	Application programming interface
DDL	Data definition language
DML	Data manipulation language

2. Requirements Description

2.1 Introduction

This document gives a clear understanding of the project requirements which is performed as part of Distributed Software Development course. As per the project plan designed, requirement analysis is the first and foremost task to be taken up. This document will, signoff all the requirements and their priorities. Any change in requirement will be handled appropriately during the project at runtime.

2.2 Requirement engineering Approach

We used Analysis Search and Conclude (ASC) approach to manage problems. It contains simple steps that are based on reviewing problems in peers. The chart below shows ASC technique phases.

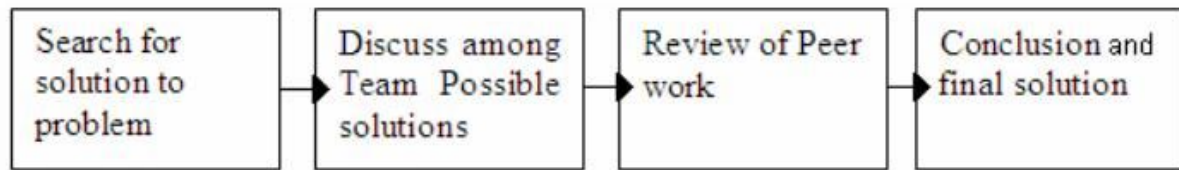


Figure 1 ASC Model for problem management

By this we were able to solve many problems during the project. By ASC we were able to find real customer by using web survey.

2.3 Web Survey

Our SCORE supervisor recommended to the team to find real potential customers of PATH. We designed a set of questions which were used to capture the requirements from the potential users of system.

Requirement survey was done with following set of questions:

- What details of an area do you think are important when planning a journey?
- What aspects of other route planning systems (e.g. Google maps) do you find most useful?
- What would you like to see in a route planning system?
- What is the single most important piece of advice you like to know while planning a journey?
- What features would be important for you to provide advice to another person about a route or location?
- Which methods of giving advice do you find easiest/best (Audio/Text/Video/Image)?
- How important is it to be able to personalize the system? Example Change settings which control which information is displayed. If possible give some examples of things you would like to be able to customize.

30 people who were interested in the topic and familiar with similar tools like Google map responded. Responses were collected and analyzed. Figure 2 Result of the questionnaire from 30 people regarding to their interests shows the result of the survey. We showed different group of requirement on different colours. As it is clear, mostly picture and text are preferred by users to store their advices. Talking about journey, most users wanted to know about restaurants and mountains.

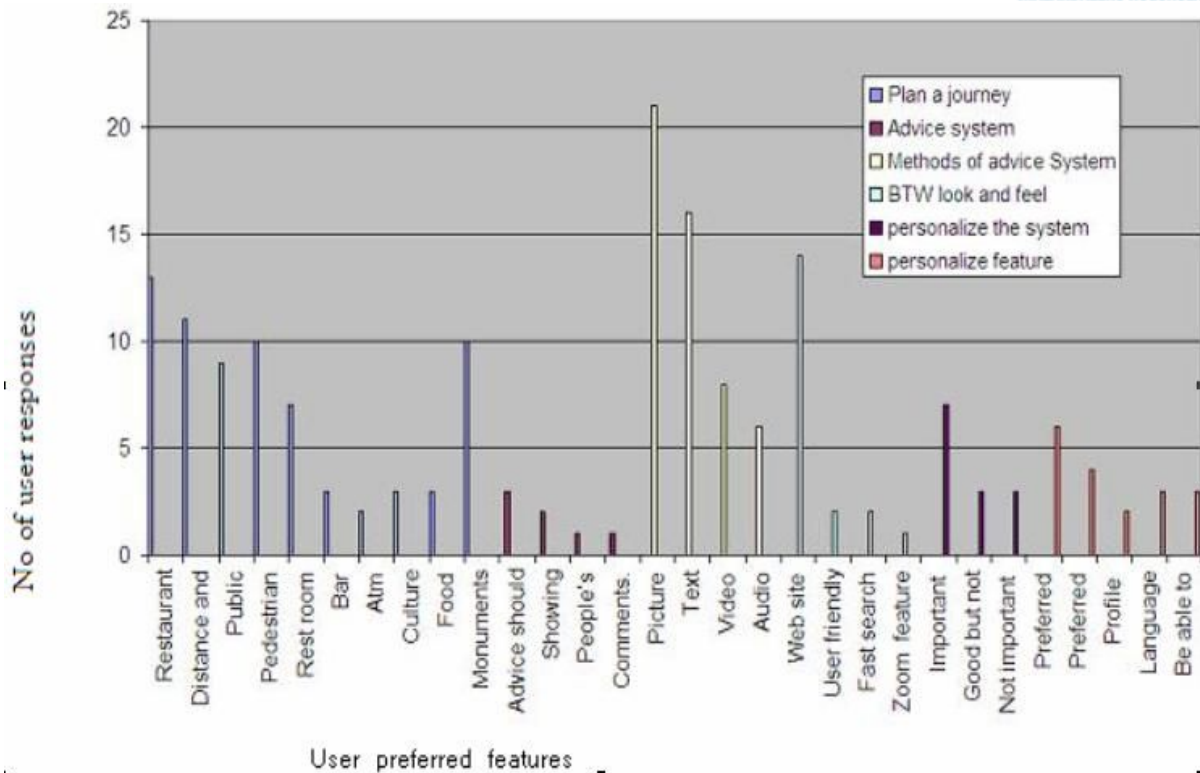


Figure 2 Result of the questionnaire from 30 people regarding to their interests

By this web survey the requirement of PATH has been finalized.

2.4 General requirements

The requirement of PATH project is to build a web application, integrated with Google maps API. The project hosted on web can provide web users an easy way to prepare their travel itinerary. The main focus of this project is to provide advices embedded with the travel itinerary. Advices are basically filtered using the profile of the registered user which would further attract more users to register as the advices will suit the person's profile. Users can update their experiences or advices which would build our database dynamically and grown large in real time with more user base.

2.5 System Users and Requirements

The system has three users, user, system administrator and manager of PATH. All the three users inherit from base user who has a login functionality which is common to all three users. The user is the general public who wish to seek advice while travel. They can be registered users as well as non-registered users. Non-registered users just have the right to view information, seek advices and find travel route. Registered user is an extension of non-registered user who's a profile stored in the system and the advices given to him are filtered based on his profile. The registered user can enter advices to the system so as to help other travelers with his experience. Blog administrator is an extension of registered user who can accept or reject changes suggested by registered users. System administrator handles the maintenance and system failure.

2.6 Database Requirements

The database is designed to avoid redundancy in the tables for efficient space utilization. The Database basically consists of advices with their position on the map. The advices can be categorized into three categories, area advice, route advice and point advice. The database is designed to handle all the three advices and populate them on to map when required.

The users can edit information and after a validation, the information has to be updated in database, hence the database grows dynamically in size and should be efficient to handle large data.

A data access later will be created for efficiently handle DDL (data definition language) and DML (data

manipulation language) operations on database. This would provide a faster access to database when multiple users try to connect to database.

3. Use Case Models

3.1 Use Case – 1

Figure 3 depicts the use case for the project with a detail explanation of all the activities that are performed by the manager of PATH and system administrator. The Use Case diagram is followed with the description in a tabular form explaining the activities on detail.

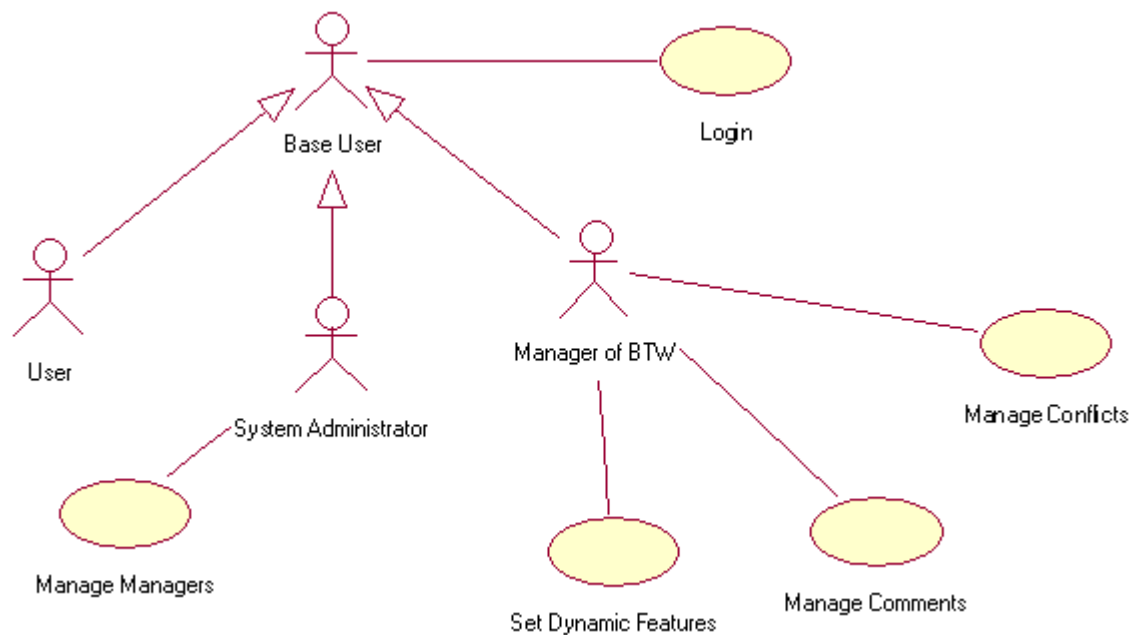


Figure 3: Use Case - 1

Use Case Element	Description
Use Case ID	1
Use Case Name	Login
Use Case Description	The system provides an opportunity to login to perform different operations based on the user type. This use case is for a base user, who is inherited by all the other users.
Requirement Reference	Register and login [USR-3]
Primary Actor	Base User
Precondition	No Precondition exists
Basic Flow	The base user should be able to login using his username and password.
Alternate flow	Username and password does not match. Please reenter.

Use Case Element	Description
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Use Case ID	2
Use Case Name	Manage conflict
Use Case Description	A single page or data information can be edited by multiple users and they may lead to conflicts. This conflict has to be handled by the Manager of PATH who will be able to view the conflict and use other source of information to judge the best advice.
Requirement Reference	Manage conflicts [PATH-1]
Primary Actor	Manager of PATH
Precondition	The manager of PATH should be logged in
Basic Flow	View and solve the conflict
Alternate flow	No alternate path exists

Use Case Element	Description
Use Case ID	3
Use Case Name	Manage comments
Use Case Description	The user is allowed to add comments and the manager of PATH will be able to monitor and delete if required based on the policies of the PATH system.
Requirement Reference	Manage comments [PATH-2]
Primary Actor	Manager of PATH
Precondition	The manager of PATH should be logged in
Basic Flow	The manager will be able to view, edit and delete comments based on PATH policies
Alternate flow	No alternative flow exists

Use Case Element	Description
Use Case ID	4
Use Case Name	Manage managers
Use Case Description	Managers of PATH are a special users who are trusted by the system administrator and provided the rights to handle conflicts. The creation of managers of PATH is handled by system administrator
Requirement Reference	Manage managers [SADM-1]
Primary Actor	System administrator
Precondition	The system administrator should be logged in.
Basic Flow	The system administrator will be able to give managers of PATH privileges to trusted users.
Alternate flow	No alternative flow exists

Use Case Element	Description
Use Case ID	5

Use Case Name	Set dynamic features
Use Case Description	The user may enter features that might affect the measurement of a particular value provided by Google API. Such parameters are called dynamic parameter and the manager of PATH will find and update such effect of dynamic feature.
Requirement Reference	Set effects of dynamic features [PATHM-3]
Primary Actor	Manager of PATH
Precondition	The user should be logged in
Basic Flow	The effect on measurement due to change in dynamic feature will be sent to Google API.
Alternate flow	A client side validation throws error for basic errors.

3.2 Use Case – 2

This use case depicts the user activities in detail. This is in continuation use case 1 with more activities performed by the user.

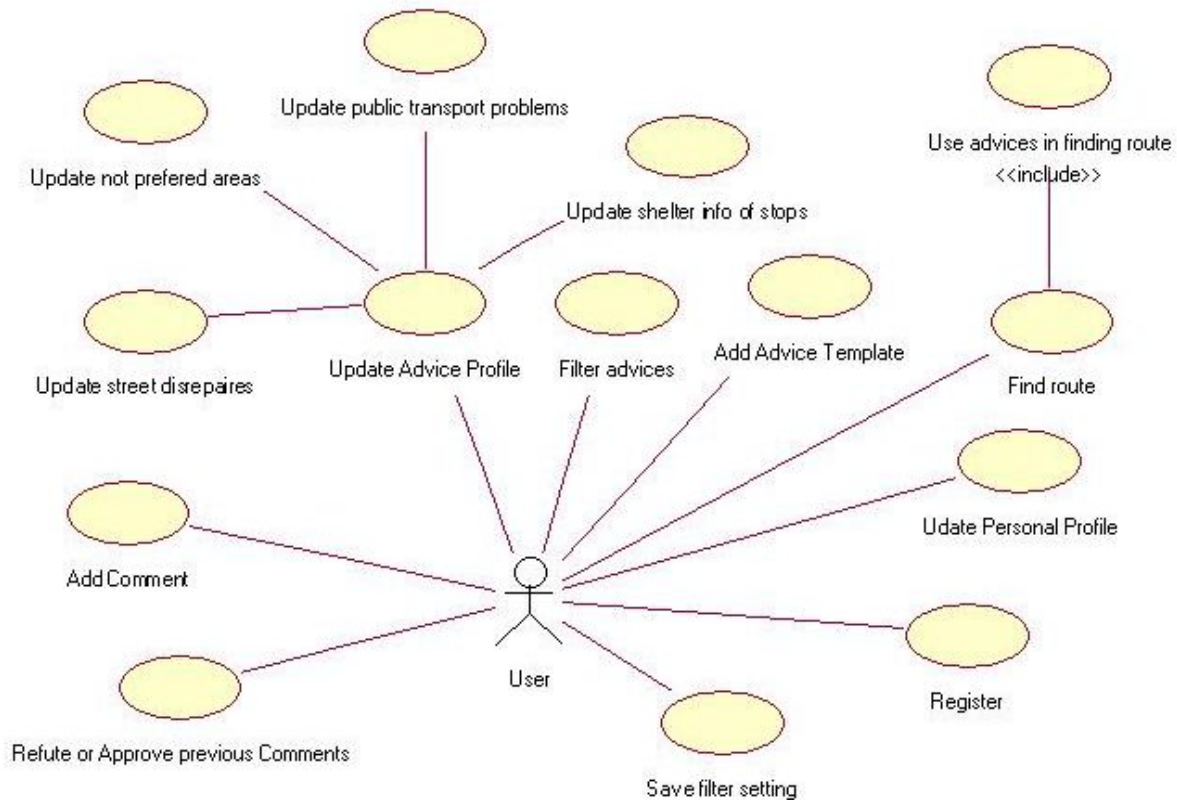


Figure 4: Use Case - 2

Use Case Element	Description
Use Case ID	6
Use Case Name	Find Route

Use Case Description	A traveller will request for a travel itinerary from point A to point B. It is expected that the trip between A and B will be a reasonable one in terms of walking or mass transport. A route will be returned.
Requirement Reference	Find route from point A to point B [USR-1]
Primary Actor	User
Precondition	No Precondition exists
Basic Flow	The user should be returned a travel itinerary as requested with advices
Alternate flow	A proper message with reason should be thrown if the route is not found.

Use Case Element	Description
Use Case ID	7
Use Case Name	Use advice in finding route
Use Case Description	Route finding subsystem can possibly take advice into account while displaying route to the user. This is included by the find route use case.
Requirement Reference	Seek advice on the map to travel [USR-2]
Primary Actor	User
Precondition	No Precondition exists
Basic Flow	A travel itinerary is displayed to the user with route, advice and possibly advice based route.
Alternate flow	A proper message with reason should be thrown if the route is not found.

Use Case Element	Description
Use Case ID	8
Use Case Name	Update advice profile
Use Case Description	The user is provided with the option of updating the profile of the advice. A history of the profile is the profile is stored for admin activities.
Requirement Reference	Add advice profile based on their experience [USR-7]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The User login in and clicks update either on the map or search geographical point and put advice on the location. The advice entered is validated before entering into database.
Alternate flow	<ol style="list-style-type: none"> 1. A client side validation throws error for basic errors. 2. No such location exists

Use Case Element	Description
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Use Case ID	9
Use Case Name	Update personal profile
Use Case Description	A registered user should be able to update his personal details in his profile that he created during registration. A registration is required either to give an advice or seek an advice on travel. Update profile will include changing password.
Requirement Reference	Update personal profile [USR-4]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	When the user logs in and clicks “edit”. A new window with his personal details in editable form should appear and the user should be able to edit and save.
Alternate flow	No alternative flow exists except for system error.

Use Case Element	Description
Use Case ID	10
Use Case Name	Update not preferred areas
Use Case Description	A registered user may wish to avoid certain areas for safety reasons. This may be at all time of the day or specific hours of the day. Requires that the entire region is flagable.
Requirement Reference	Add advice profile based on their experience [USR-7]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The registered user login in and clicks update either on the map or search geographical area and flag the area as not safe with setting some properties of the flag. The advice entered is validated before entering into database.
Alternate flow	<ol style="list-style-type: none"> 1. A client side validation throws error for basic errors. 2. No such area exists

Use Case Element	Description
Use Case ID	11
Use Case Name	Update public transport problem
Use Case Description	A registered user may wish to avoid a bus route. E.g. because it is difficult to get on or off quickly enough. Requires that the public routes be flagable.
Requirement Reference	Add advice profile based on their experience [USR-7]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The registered user login in and clicks update either on the map or search bus route and flag the route as congested with setting some properties of the flag. The advice entered is validated before entering into database.

Alternate flow	<ol style="list-style-type: none"> 1. A client side validation throws error for basic errors. 2. No such public transport point exists
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Use Case Element	Description
Use Case ID	12
Use Case Name	Filter advice
Use Case Description	A user will be provided check boxes to filter the advices based on his requirement. This may be “show stairs” for example.
Requirement Reference	Filter advice [USR-6]
Primary Actor	User
Precondition	No precondition exists
Basic Flow	A user friendly radio button depicting the filter criteria will be provided to the user and based on this selection the display of advices will be filtered on the client side.
Alternate flow	A client side validation throws error for basic errors.

Use Case Element	Description
Use Case ID	13
Use Case Name	Update shelter info for stops
Use Case Description	Certain transit stops may not have adequate protection from the weather. Requires that the individual stops are flagable
Requirement Reference	Add advice profile based on their experience [USR-7]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The registered user updates the information of the dynamic objects created by him.
Alternate flow	The information entered may be radically incorrect and error is thrown

Use Case Element	Description
Use Case ID	14
Use Case Name	Register
Use Case Description	All activities have to be performed after login. A registration form will be provided for new users which will create an account or profile for the user.
Requirement Reference	Register and login [USR-3]
Primary Actor	User
Precondition	No precondition
Basic Flow	A new user is allowed to register through a simple sign up.
Alternate flow	The information entered may be radically incorrect and error thrown

Use Case Element	Description
Use Case ID	15
Use Case Name	Add advice template
Use Case Description	This is a dynamic feature where the user can create their own template of advice and set its properties.
Requirement Reference	Add new advice template [USR-8]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The user creates a template of advice and set few properties.
Alternate flow	No alternative flow exists

Use Case Element	Description
Use Case ID	16
Use Case Name	Save filter setting
Use Case Description	A filter setting can be saved by the user so that whenever he login, the same filter setting can be retrieved to save the time of the user.
Requirement Reference	Save their filter settings to save time [USR-5]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The user will be able to save his filter selection.
Alternate flow	No alternative flow exists

Use Case Element	Description
Use Case ID	17
Use Case Name	Refute or accept previous comments
Use Case Description	The user will be allowed to accept or refute the previous comments so that another user can have a comparison of comments by different users
Requirement Reference	Refute or approve previous comments [USR-10]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The user refutes or accepts previous comments
Alternate flow	No alternative flow exists

Use Case Element	Description
Use Case ID	18
Use Case Name	Add comments
Use Case Description	The users are allowed to add comments along with the properties of the object that they create.

Requirement Reference	Add comments in web log of a location in map [USR- 9]
Primary Actor	User
Precondition	The user should be logged in
Basic Flow	The user comments in web log
Alternate flow	No alternative flow exists

4. Requirements Definition

4.1 Requirement Group Definitions

Identification	Requirement Group	Rem.
SADM	System Administration	
PATHM	Manager of PATH	
USR	User	

4.2 Requirement Sources

Source	Description	Rem.
Ctm	Customer 1 (or group: example: human resources department) defined requirement	
Sys	Required as a consequence of system design (contractor's requirement)	

4.3 Requirements definitions

Identity	Sta Tus	Prio rity	Description	Source
			User	
USR-1	I	1	Find route from point A to point B	Ctm
USR-2	I	1	Seek advice on the map to travel	
USR-3	I	1	Register and login	Ctm
USR-4	I	1	Update personal profile	Ctm
USR-5	I	1	Save their filter settings to save time	Ctm
USR-6	I	1	Filter advice	Ctm
USR-7	I	1	Add advice profile based on their experience	Ctm
USR-8	I	2	Add new advice template	Ctm
USR-9	I	2	Add comments in web log of a location in map	Ctm
USR10	I	2	Refute or approve previous comments	Ctm
			Manager of PATH	
PATHM-1	I	1	Manage conflicts	Ctm
PATHM-	I	1	Manage comments	Ctm

2				
PATHM-3	I	2	Set effects of dynamic features	Ctm
			System administrator	
SADM	I	1	Manage managers	Sys

Requirement status:

- I = initial* (this requirement has been identified at the beginning of the project),
- D = dropped* (this requirement has been deleted from the requirement definitions),
- H = on hold* (decision to be implemented or dropped will be made later),
- A = additional* (this requirement was introduced during the project course).

4.3.1 Change Log

Identity	Action	Date	Comments

Requirement status:

- D = dropped* (this requirement has been deleted from the requirement definitions),
- H = on hold* (decision to be implemented or dropped will be made later),
- A = added* (this requirement was introduced during the project course).
- R = resurrected* (dropped or on hold requirement was reactivated)

5. Future Development

5.1 General Overview

The project has good future in commercial world of growing GIS system. The system currently developed from an academic perspective with no much concentration on non functional aspects of the system like reliability, performance, database caching etc.

The architecture is scalable with lot of dynamicity included while designing and hence a complete advantage of the this dynamic architecture can be made while scaling as the system is developed as versatile as possible.