“GOexp” Landmark Recognition and Retrieval System

Software Requirements Specification

Project Id - 18-107

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DECLARATION

I declare that this is My own work and this SRS does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of our knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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1 INTRODUCTION

1.1 Purpose

The purpose of this SRS document is to provide detail description of the process and all the requirements for the project “Landmark Recognition and retrieval system” (GoExp). This document will explain the brief description of flow of the project, features, purpose of the system and the constraints which it will operate. This document will also covers the requirements for Landmark Recognition of images of project “Landmark Recognition and retrieval system”. The main consideration of this is to implementation of Landmark Recognition system to detect the various landmarks of the images that are given by the user and Hotel reservations. This will also contains necessary diagrams, interfaces and functional non-functional requirements of the system for provide a detailed overview of our software product, its parameters, scope and goals. The document is primarily intended for Subject coordinator, Supervisor and Co-Supervisor to serve as a reference document while developing this system, as a reference to development team to develop and as a reference to the testers or evaluators. Since there is no client for this research project, this document act as a contract between the project team and SLIIT examiners to obtain the clear understanding and description of the requirements for the system is being developed. This document will guide researchers, developers who would involve in Implementing, testing and maintaining the existing system, enhancing the system and who are interested in implementing similar kinds of applications in the future. There is a possibility that multiple versions of this document can be released. Therefore, some modifications and improvements can be done in order to satisfy the meet of adapting the changing requirements and specifications.

1.2 Scope

This document covers the preliminary requirements for release version 1.0 of the GoExp which is Landmark Recognition, retrieval and find the places person can stay nearby. It focuses on the people who like to travel across World. Mention will be made throughout this document of selected probable features of future releases. The purpose of this is to guide developers in selecting a design that will be able to accommodate the full-scale application. And also the application of the software being specified, relevant benefits, objectives, and goals have been clearly described

1.2.1 Problem statement

There are many applications which are used by the Picture recuperation is a focal issue in Computer vision: given a request picture, would you have the capacity to find similar pictures in a large database? This is especially basic for question pictures containing purposes of intrigue, which speaks to a colossal portion of what people get a similar out of the opportunity to photograph.

With the huge measure of milestone pictures in the Internet, the time has wanted Computer vision to consider historic points all around, in particular to assemble a point of interest acknowledgment system, on the size of the whole globe. This system isn't just to outwardly perceive the nearness of specific landmark points in a picture, yet in addition adds to an overall milestone database that sorts out and records historic points, regarding land areas, popularities, social esteems and social capacities, and so forth. Such an earth-scale point of interest acknowledgment motor is enormously helpful for some vision and mixed media applications.

Although there are some review system in landmark applications, they are no perfect analysing system. So the travellers are facing difficulties in choosing suitable places for their travelling. Most importantly sometime the travellers do not expect an occurrence of a natural catastrophe so they may face some difficulties. Because of these problems they are not satisfied with their visit most of the time. The GoExp has the feature of prioritizing the user reviews by using twitter account and rating according to the user levels based user contribution, suggesting suitable places to visit and providing what are the highest rating locations to users stay.

1.2.2 Objectives of the project

Provides a systematic solution to predict the landmark details of the images and a way to find images by using pixels mages containing the same landmarks to help people better understand and organize their photo collections.

Also the system predict the accommodations and dining’s suitable for the customer by his preferences and the real time update of the place they are willing to explore.

Specific objectives

- Investigate existing problems in landmark recognition and landmark retrieval in computer vision Retrieval.
- Determine the possible solution or best methods to address those challenges.
- Build a model (algorithm) to recognize the correct landmark of an image
- Build a model (algorithm) to find similar images in a large database
- Improve the user experience by user profiling
- Finding the nearest places
- Rating and giving suggestions for places.
- Provide user-friendly interfaces and easy access to the system.

1.2.3 Benefits of project.

- More user friendly.
- More accurate.
- Safest.
- Works according to user's desire.

1.3 Definitions, Acronyms, and Abbreviations

1.3.1 Definitions

Terms	**Definition**
GoExp	Name of the developing system.
Software Requirement Specification	A document that completely describes all of the functions of a proposed application and the constraints under which it must operate

Table 1: Definitions

1.3.2 Abbreviations

Abbreviations	**Description**
GHz	Giga Hertz
UML	Unified Modelling Language
GPS	Global Positioning System
LBS	Location Based Services
GUI	Graphical User Interface
API	Application Program Interface
SRS	Software Requirement Specification
RAM	Random Access Memory
HD	High Dimensional
Wi-Fi	Wireless Fidelity
HTTP	Hypertext Transfer T Protocol

Table 2: Abbreviations

1.4 Overview

The remainder of this document includes three chapters. Brief outline of the document is given below.

- Overall Description which provides an overview of the system functionality and system interaction with other systems. It also introduces different types of stakeholders and their interaction with the system. Further, the chapter mentions the system constraints and assumptions about the product. Additionally a detailed description of the different interfaces with different specification techniques are mentioned in order to specify the requirements more precisely for different audiences.
- Specific requirements of the project which defines on external user interfaces, detailed requirements classified by classes, constraints on design and software system attributes such as reliability, availability, security and maintainability.
- Supporting information includes supporting or background information like references.

. This document will gain the assistance of many standard high-level diagrams and UML diagrams including entity relationship diagram, class diagram, use case scenarios.

2 OVERALL DESCRIPTION

Information Retrieval (IR) systems are nowadays challenged with increasingly complex search tasks where information about how users interact with IR systems play a central role to adapt them to user needs and interests [13]. A lot of IR research focused on improving electiveness, by exploiting information about user system interactions recorded in the query logs of Web search engines. The number of clicks on a given query-result pair, the click-through rate, and the dwell time, are examples of actionable information to improve various aspects of IR systems. In the context of Learning to Rank (LtR), user actions recorded in query logs are used to extract several important features [1]. As an empirical evidence of the importance of user interaction features, we trained a Lambda Mart [4, 19] model on the MSLR-WEB10K LtR[2]

We are in a need of well-designed solution that would allow us to use a single standardized System for Landmark recognition and Retrieval in World. In the current available system can identify and give the location. They used Google Map by using mobile devices for this purpose. Also they divide segments in input image compare their database and show them what that landmark is. Also it needed ranking for by get the details in user twitter preference, and show what the highest ranking place in current area are.

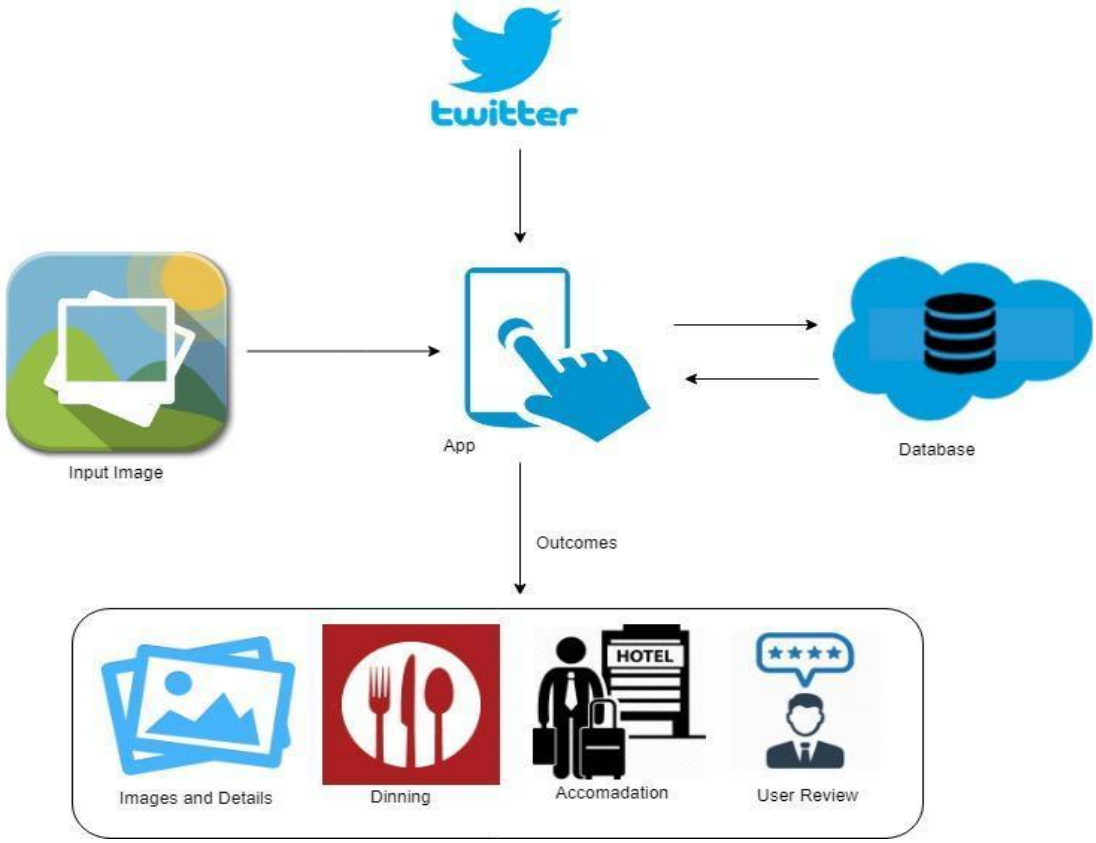

Figure 1: System Overview

2.1 Product perspective

In current system like Google Goggles – Search by taking a picture: point your mobile phone camera at a painting, a famous landmark, a barcode or QR code, a product, or a popular image. If Goggles finds it in its database, it will provide you with useful information. [5] Also TripAdvisor, Foursquare, TripCase are some of the current applications are used.

All these applications were confine the user in a virtual space. Our application goes beyond these boundaries and helps people to identify and planed there accommodations well manner.

- **TripAdvisor**

A popular tourist destination mobile software tool to plan and support the implementation of the trip is the mobile travel application ‘‘TripAdvisor’’, which contains information about the most popular tourist destinations, places of accommodation, food, entertainment, etc. Has a good travel community for users to store and share their trip stories. Some main advantage are Easy to search, Access the community forum and explore info about your next destination, Great UI, Maps, directions and even Street view. Some disadvantage are doesn’t always include off-the-beaten track spots, only the most popular tourist spots, Can’t find anything new in a city. If a person visit a city for the first time and he/she just want the highlights, this is not a best app for the first use. [3]

- **Foursquare**

“Foursquare” [6] [7] is a local search and discovery service mobile app which provides search results for its users. Foursquare provides recommendations of the places to go according to a user's current location. It has a defined list of "tastes" in particular food items, styles of cuisine or environmental aspects, which users may add to their profiles to let the service know what they like. New users are presented with a list of words and phrases describing recognized tastes and they may select the ones that appeal to them. Users can change their tastes at any time, and can add and remove items from their profile. Foursquare uses natural language processing to match a user's tastes with the tips at nearby venues that mention them. It is then able to recommend nearby places to the user that match their tastes. “Swarm Foursquare”

[8][9][10] is a mobile app that allows users to share their locations within their social network. Swarm allows users to check-in to a given location, as well as make future plans with friends and see who is nearby. Swarm supports checking in with photos or stickers attached to it, and allows broadcasting of check-ins to other networks including Facebook or Twitter. The good is free and Foursquare's extensive directory of restaurants, business, and points of interest helps you find something to do, no matter where you go. The bad is interface can be confusing and difficult to navigate. Like all apps of this type, continued use of GPS running in the background can dramatically decrease battery life.

- **TripCase**

"TripCase" [11][12] is another application which is used by the tourists. It organize all the trip details and travel plans into one streamlined itinerary. TripCase lets you manage flight itineraries, hotel bookings, and rental car reservations in one app. Get airport terminal and gate information in one glance on your phone, and receive notifications on your phone, tablet or smart watch if there is a change to your flight. Great for business travelers and frequent fliers. Before your trip you can add reservation details to your account so you can access your itinerary from anywhere and can share your trip with others and TripCase will keep them updated on your behalf. You can view flight information and receive notifications if anything changes and locate your seat on the plane or check out what's available with real time seat maps and search alternate flights when you need to make adjustments you can quickly access directions.

2.1.1 System interfaces

From GoExp an Android application installed in smart phone to upload land mark image, retrieve it, connect to the twitter account and get user profile and according to that preference retrieve what are the higher accommodation places to stay. . They are, by analysing the rating and reviews given by the friends and other users, by analysing the places mostly visited by their friends and by referring the personal likes and dislikes of the user. Android API is used to design the interface.

A proposed database is the Online the firebase data set which is intended to store, retrieve, update and handle the data input by the Keggale data set and generated by the system itself.

2.1.2 User interfaces

In mobile application

- Login and registration page
- Reset password
- View User Preferences
- User profile
- View the rating and Accommodations

2.1.3 Hardware Interfaces

System does not require any specific hardware components to function. Yet the system will be developed as a mobile application where an Android enabled mobile phone would be required for the hosting purposes.

2.1.4 Software Interfaces

While considering the software interface of GoExp, there will be several software running together in order to contribute vast functionality to obtain the optimal performances

The user will require an android device to have GoExp android application, therefore a mobile application should be installed in the user’s android device. The application GoExp will

be developed using the android studio. Data source is Keggale. The phase suggestions will utilize a database management system which is currently proposed to be MongoDB.

2.1.5 Communicational Interfaces

As the GoExp is a MOBILE base application, the connection to the internet should be established before the execution of the GoExp system. Therefore android enabled mobile phone with 3G/HSPDA/WI-Fi connection needed for high speed connectivity of internet.

2.1.6 Memory Constraints

GoExp mobile application should have at least 1GB RAM and 50 MB free space to gain better performance.

2.1.7 Operations

The system as whole is aimed towards the tourists who travels and likes the landmarks. The GoExp system will be functioning trip image identifying, retrieving, user profiling and show the ratings. It suggest places to travel. The user can upload image and see what are the places are nearby there to stay.

Main Operation- Identifying what are the places to stay in accommodations.

User Operation-type starting and final destination

Machine Operation-

i. Find places to travel.
ii. Suggesting places by analysing user's preferences in twitter account,
iii. Suggesting the highest rate place to stay by other users rating and user profiling.

2.1.8 Site Adaption Requirements

Users of the system are expected to organize the system environment in manner where the machine is connected to sever and the desired browsers are installed in a client machine. Then the system should contain the required database configured and the necessary tables created. Next concern would be the storage.

The GoExp system will be developed in a user-friendly manner with user friendly interface. System users can use the system with minimum help of a guide and get the ultimate benefit out of it.

2.2 Product Function

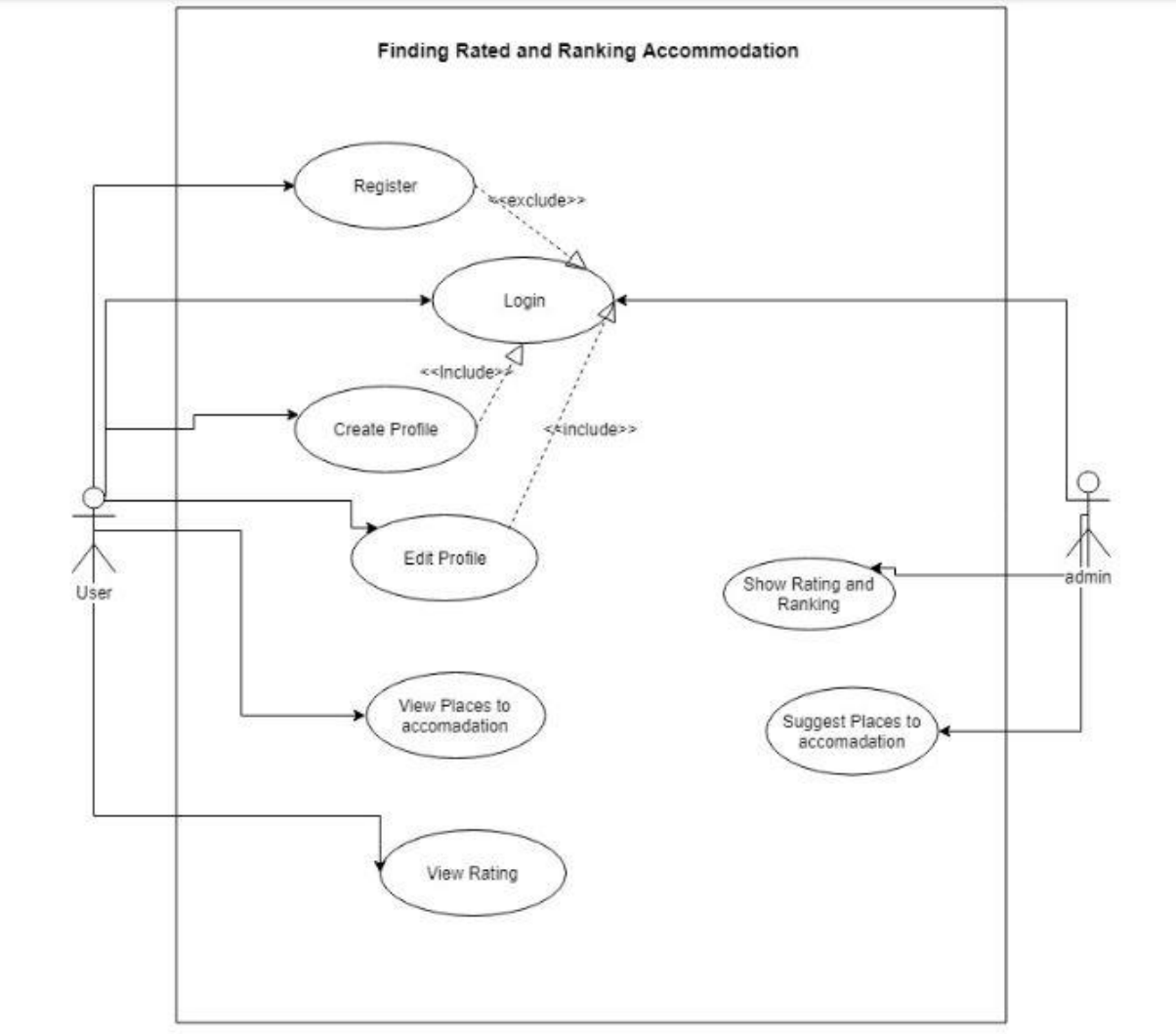

Figure 2: Finding Rated and Ranking Accommodation

Use case	Register
Preconditions	User should have an email address
Actors	User
Flow of events	1. When user launches the app for the first time. 2. System displays Sign-up interface. 3. System prompts the user to sign-up with GIIRA 4. User is navigated back to his "GIIRA" profile. 5. Use case ends.
Extensions	3. A. User clicks on sign-up with Have a GIIRA. 5. A.1. User enters email and password. 3. A.2.User clicks on sign-up. 3. A.3. User's email address is validated. 3. A.4. User is redirected to his GIIRA profile.

Table 3: Use case scenario - Register

Use case	Login
Preconditions	User must be registered in the system.
Actors	User
Flow of Events	1. Use case starts when user launches the app. 2. System displays Login interface. 3. User enters username and password. 4. User clicks on ‘Login’ button. 5. User is validated. 6. Use case ends.
Extensions	5. A. User is not validated. 5. A.1. System displays an error message.

Table 4: Use case scenario - Login

Use case	View profile
Preconditions	User should be logged into the system.
Actors	User
Flow of events	1. Use case starts when the user clicks on profile icon. 2. System lists the user's fiends' activities. 3. System suggests other users to be the user's friends. 4. User clicks on add friend icon to add other users as his friends. 5. Upload the image and view the ratings 6. Use case ends.

Table 5: Use case scenario - View profile

Use case	Rate the Review
Goal	Get the rating via user’s comments
Scope and Level	General
Primary Actors	Customer, Admin
Pre-Condition	Comment should be in English
Main success scenario steps	1. Use case starts when the user enter comment for place. 2. System analyses the comment and token the words 3.System find the keywords of comment 4. System check the keyword. 5.validate the keywords 6.Divide positive, Neutral and negative keywords 7.Add to keywords to system hierarchy 8.System retrieve the final rating 9.Use case ends
Extensions	4. A. Not available keywords 4.A.1 System ignore the comment

Table 6: Use case scenario - Rating and review

Use case	Suggesting Ranking Accommodations
Actors	Admin
Pre-Condition	User should be logged in to the system
Flow of events	1. user enters starting place 2. click search button 3. System refers user's likes and dislikes and other users' ratings 4. Display what are the higher ranked places 5. User selects places to accommodation. 6. Use case ends.

Table 7: Use case scenario - Suggesting Ranking Accommodations

2.3 User Characteristics

There are 3 types of users that will be using the "GoExp" system,

- Individuals using GoExp for travel planning.

These individuals can be new to software professionals. Therefore this proposed system is created for the individual with a least knowledge of computer literacy

- Admin

Admin who is a software professional is the person who makes updates to the system and handles issues within the system.

2.4 Constraints

This system consists of mobile applications. Therefore mobile application constraints should consider. In order to work with better level of quality bellow mentioned memory limits are needed by the application.

Mobile application

- Mobile phone should have android operating system to run the application.
- The android version should be 4.0 or above. And must have most recent version of the application.
- Mobile phone CPU should be 1GHZ or above for optimal performance. So that all the processing tasks would be done faster and user would gain the output results very faster.
- Mobile phone RAM should be 1GB or above for better performance
- Mobile phone should have camera with a resolution of 5 Mega pixels or above for optimal performance.
- Internet connection is required for the software to function properly. High bandwidth is encouraged for smooth operation.

Implementation Constraints

- Android would be needed for mobile application development.
- Firebase/MongoDB would be used for data storing purposes of mobile application.
- Android studio IDE should be used as development environment of android implementation.

2.5 Assumptions and Dependencies

Assumptions

- There should be network connection
- The user should be aware on Capture the Images.
- The entire hardware and software requirement should meet the client and server.
- The database should be secured with passwords and username from unauthorized access.
- The system is developed with the understanding of both the language grammar.

Dependencies

- GoExp system is depended on the network and GPS connection as it is a location based mobile.
- The user should provide correct details in order to get good suggestions

2.6 Apportioning of Requirements

The SRS document section 1.5 provides the overview of the supposed system requirements and the section 2 provides the detailed overall description on the system. The section 3 contains detailed requirements that should be followed while design and implementations. The system GoExp is supposed to be implemented with the preliminary and functional specifications in the section 3. There may be few changes in the final product due to time constraint but will be fulfilled in future release. SPECIFIC REQUIREMENTS

2.7 External interface requirements

2.7.1 User interfaces

Below UI sketches shows how the GoExp application illustrate the ratings, reviews and details of the places.

Figure 3: Interface for finding nearby places

Figure 4: Interface for Reviews for places

2.7.2 Hardware interfaces

Since the mobile application don't have any designated hardware, it does not have any direct hardware interfaces. The physical GPS is managed by the GPS application in the mobile phone and the hardware connection to the database server is managed by the underlying operating system on the mobile phone.

2.7.3 Software interfaces

- Android Studio
- Firebase/MongoDB

2.7.4 Communication interfaces

As GoExp system is a mobile based application, it's heavily depended on the network and GPS connection. The client applications are connected to the server through several communication devices and internet.

2.8 Performance requirements

The successful output is the ultimate desire of the GoExp system. If the system is performing properly without delaying replies then the performance of the system is more than the moderate level.

The system is totally depended on the service provided by the server. This means the client and the server must have a consistent connection between each other. So the performance of the network is the next unit that affect to the application performance or responsiveness. Proper network connections and the high end server machine as well as the performance of the client machine have to be considered. If the client machine is a low end machine and takes lot of time execute the output so the performance of the application degrades. Therefore all three major components are massively affects to the application performance

2.9 Design constraints

GoExp is a mobile application. Therefore while developing the mobile application main constraint is the display real state. Designer should follow a very consistence design throughout the application and should choose a very promotional and a state of art design. Navigation should be user friendly and should be able to find wanted information in few clicks

2.10 Software System Attributes

2.10.1 Availability

Whenever the users need to access the system (Mobile application) it should be available for the users. And also monitoring and detecting should happen in real time in desktop application. So detecting and monitoring system should available all the time while the internet connectivity and GPS are available.

2.10.2 Maintainability

Maintainability is defined as the probability of performing a successful repair action within a given time. In other words, maintainability measures the ease and speed with which a system can be restored to operational status after a failure occurs. The code is commented wherever it is necessary, especially in critical and complex code segments. This will help the developers or the maintaining team for further modifications in future.

2.10.3 Security

Security means the protection given to the sensible data input by the users to the system. When user is logged in to the mobile application, each and every one will give a username and a password to access so that data should not be accessed by some other irrelevant user. Therefore the system should provide complete security mode to maintain the security of the system. In order to avoid hackers' interaction GoExp system has different storage Medias. Database of system and maintain panel will be stored outside the server. Software is illegal to use and may contain harmful code to expose confidential data. Antivirus software should be used in the system development computers to prevent any harmful activities. It should ensure that this system will not lead the users to make incorrect decisions.

2.10.4 Reliability

Reliability of a system is the ability to perform its normal operations with a minimum failure over a specified time in a given environment. The reliability of GoExp is considered to be moderate as when upload the image and retrieve the correct data. Also the system provides smooth and simple operations. If an incorrect operation is performed in a particular module, the system will inform the user with proper error messages. When user wants a suggestion for the places to visit, the system should correctly deliver services as expected by the user without any mistake and user friendly. The reliability of the system shall be good if it delivers the services as specified.

2.11 Other requirements

- The system should not crash
- It should not make the user frustrated, angry or terrified while using the system
- System should run perfectly without any feature limitations
- Functionality should be suitable to all end users
- Extensibility & Modifiability
- Adaptability

3 SUPPORTING INFORMATION

3.1 Appendix

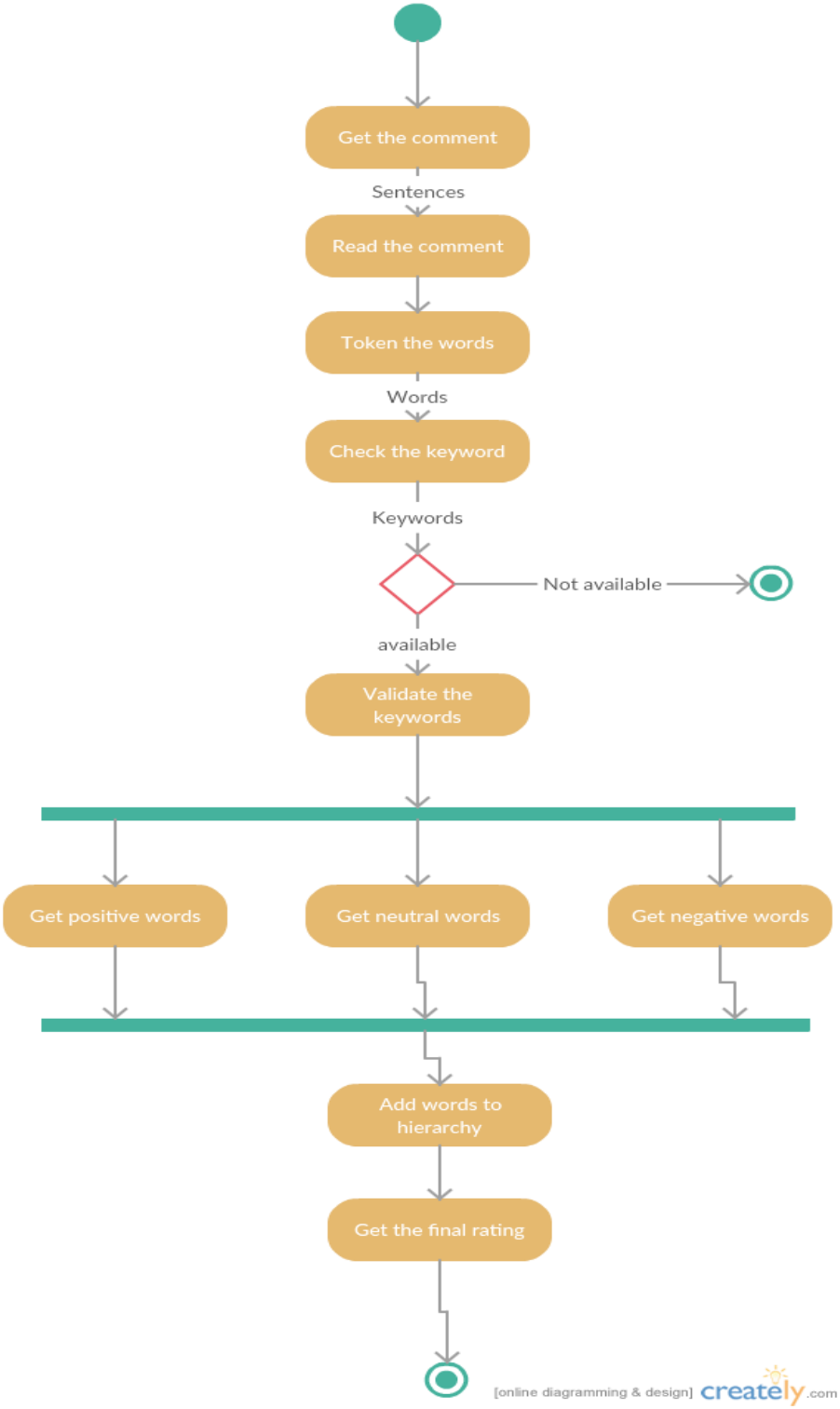

Figure 5: Activity diagram for rating system

4 References

[1] E. Agichtein, E. Brill, and S. Dumais. Improving Web Search Ranking by Incorporating User Behavior Information. In SIGIR, pages 19–26, ACM, 2006.

[2] http://www.dei.unipd.it/~maistro/papers/SIGIR2017-flmp.pdf

[3] “"City Guides Catalog",” [Online]. Available: https://play.google.com/store/apps/details?id=com.tripadvisor.android.apps.cityguide.catalog.

[4] C. J. C. Burges. From RankNet to LambdaRank to LambdaMART: An Overview. Technical Report, 2010.

[5] D. Petrou *et al.*, “Search by sight: Google™goggles,” *2010 IEEE Hot Chips 22 Symp. HCS 2010*, 2016.

[6] “Foursquare — Best City Guide,” [Online]. Available: https://play.google.com/store/apps/details?id=com.joelapenna.foursquared&hl=en.

[7] “Foursquare,” [Online]. Available: https://en.wikipedia.org/wiki/Foursquare.

[8] [Online]. Available: https://en.wikipedia.org/wiki/Swarm_(app).

[9] “Swarm App review,” [Online]. Available: http://www.apppicker.com/reviews/23493/swarm-app-review.

[10] “Swarm App review by foursquare,” [Online]. Available: http://appadvice.com/review/swarm-by-foursquare.

[11] P. S. M. Tracy Edes, “Getting started with TripCase Connect,” 2013 april 29. [Online]. Available: http://www.sabretravelnetwork.com/files/ttx/TTX%20presentation%20-%20Getting%20started%20with%20TripCase%20Connect.pdf.

[12] “TripCase – Travel Organizer,” [Online]. Available: https://play.google.com/store/apps/details?id=com.sabre.tripcase.android&hl=en.

[13] C. Lucchese, S. Orlando, R. Perego, F. Silvestri and G. Tolomei. Discovering tasks from search engine query logs. In TOIS, 31(3):14:1–14:43, 2013.