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MECHANIC TRACKING AND ALLOCATION IN BREAKDOWN SCENARIO USING LBS AND KNN ALGORITHM

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ABSTRACT:

Customer preferred service provider who provide services within the customer time and with good quality of service. Location based services utilize location informa-tion to achieve their goals. In this project, we present location based service which al-locate mechanics on the basis of customer requirement in the breakdown scenario of the vehicle. Each mechanic uses mobile devices to share their location and working status, which later synchronize with cloud. We use k-nearest neighbour algorithm as dispatcher with Google API to provide nearest mechanic to customer. Customer queries location based service on basis of his current location and compares with existing location based services with dispatcher which is more efficient.

Index Terms: ***LBS (Location Based Service), Geo-coding, ID (Identification), J2ME (Platform Micro Edition), Technician Dispatching, Technician Dispatching and Allocation, K Nearest Neighbor, GPS.***

1. INTRODUCTION

There is no current system available for finding appropriate technician to solve prob-lem of our vehicle so this application will be useful for both technician and users. As sometimes technicians are not having work to do and they are free and users are in trouble at unknown location. Our system will help user to find technician by using their GPS location and technicians GPS location and user will get accurate information of technician location. Also user can send description of their problem to technician. If the problem is solvable by technician then he will accept the request and visit at user's location. On the bases of service provided user can get bills of that service. Users are allowed to give rating and feedback regarding the technician and also complaint about technician to admin.

This system can be used as it is the real time application used for daily use by the needy user who have problem in their daily routine. It will be very helpful during the troublesome conditions where there is no one is available to help you. As everyone is having smart phone that will be beneficial for us. In our project we are making classes of information that will provide meaningful information according to the request/point of interest of user.

1.1MOBILE COMPUTING:

Mobile computing is human-computer interaction by which a computer is expected to be transported during normal usage, which allows for transmission of data, voice and video. Mobile computing involves mobile communication, mobile hardware, and mobile software. Communication issues include ad hoc networks and infras-tructure networks as well as communication properties, protocols, data formats and concrete technologies. Hardware includes mobile devices or device components. Mobile software deals with the characteristics and requirements of mobile applications. Many commercial and government field forces deploy a rugged portable com-puter with their fleet of vehicles. This requires the units to be anchored to the vehicle for driver safety, device security, and ergonomics. Rugged computers are rated for severe vibration associated with large service vehicles and off-road driving and the harsh environmental conditions of constant professional use such as in emergency medical services, fire, and public safety.

1.2 LITERATURE SURVEY

Paper Name	Author Name	Strategy
Location-Based Services for Mobile Telephony: a study of users' privacy concerns	Louise Barkhuus&AnindDey	We have presented two types of location-based location-tracking and position-aware services.
Secure Nearest Neighbour Revisited	Bin Yao, Feifei Li, Xiaokui Xiao	This work revisits the secure nearest neighbour problem. We show the insecurity of existing solutions, and the hardness of the SNN problem.
The New Casper: Query Processing for Location Services without Compromising Privacy ∗	Mohamed F. Mokbel, Chi-Yin Chow, Walid G. Aref	This paper introduces Casper; a novel framework in which mobile users can entertain location-based services without the need to disclose their private location information

When Location-Based Services Meet Databases	Dik Lun Lee Manli Zhu Haibo Hu	This paper has reviewed some of our research on location modelling, location updates, caching of location-dependent data, and batch processing of spatial queries

2. GOALS AND OBJECTIVES

- Speed of recovering breakdown vehicles.
- Quality of service given by mechanic.
- Effortless service in vehicle breakdown scenario. So that will be easier for accessing information.

3. RELEVANT MATHEMATICS ASSOCIATED WITH THE PROJECT

3.1 System Description:

Haversine is an algorithm used to calculate the Distance between user and technician. Haversine Formula Calculate geographic distance on earth. If you have two different latitude longitude values of two different point on earth, then with the help of Haversine Formula, you can easily compute the great-circle dis-tance (The shortest distance between two points on the surface of a Sphere). The term Haversine was coined by Prof. James Inman in 1835. Haversine is very popular and frequently used formula when developing a GIS (Geographic Information System) application or analyzing path and fields.

Central angle Haversine can be computed, between two points with r as radius of earth, d as the distance between two points, is latitude of two points and is longitude of two points respectively.

4. REVIEW OF CONFERENCE/JOURNAL PAPERS SUPPORTING PROJECTIDEA

1. Location-Based Services for Mobile Telephony: a study of users privacy concerns :

Location-tracking and position-aware services. We then presented a case study that examines peoples concern for privacy in relation to location-based ser-vices and compared people's perceived usefulness of the two types of services. Development emphasis should initially be on the more acceptable position-aware services. Future research should focus on studies involving imple-mented technology. Because our study is based on hypothetical services, the findings do not necessarily reflect users behaviour in a real setting.

2. A Secure Nearest Neighbor Revisited:

Work revisits the secure nearest neighbor problem. We show the insecurity of existing solutions, and the hardness of the SNN problem. We then design a new partition-based secure Voronoi diagram (SVD) method. The SVD method is as secure as the encryption function it uses, and any standard secure encryp-tion schemes can be employed by the SVD method.

3. The New Casper: Query Processing for Location Services without Com-promising Privacy:

A novel framework in which mobile users can entertain location-based ser-vices without the need to disclose their private location information. Mobile users register with Casper by a user-specied privacy prole. requirements from the location anonymizer are outlined, namely, accuracy, quality, eciency, and exibility. private queries over public data, public queries over private data, and private queries over private data. We have provided a framework for dealing with these queries that returns a candidate list of answers rather than an exact answer. We have proved that the returned candidate list contains the exact an-swer and is of minimal size. Extensive experimental evaluation studies all the components of Casper and shows its eciency, accuracy, and scalability with large number of mobile users and various privacy requirements.

4. When Location-Based Services Meet Databases:

A couple of prototypes were briefly described to illus-trate where the research may be applied in real-life applications. LBSs draw from many different research areas, ranging from systems to applications to user modeling. Research in these different areas must cope with the location aspects of LBSs. Regarding the system architecture, while most traditional research is based on the client-server architecture, the mobility and limited communication ranges of the clients make it natural to consider LBSs on peer-to-peer and mobile ad-hoc architectures.

5. PROBLEM DEFINITION AND SCOPE

PROBLEM STATEMENT:

1. To find and track the technician based on user location.
2. To achieve on time service delivery to user by technician.
3. To achieve the business growth by customer review and comments as we solve their problem

STATEMENT OF SCOPE

This application will be helpful for users who have the trouble with their vehi-cles and at unknown location.
As there will be admin part, so admin can monitor all the complaints and feedback regarding service by each other user and technician.
Rating and feedback will help other user to select technician next time.
Easy bill generation and sending will be possible.
Live tracking of technician to get distance information.

6. GOALS AND OBJECTIVES

- To achieve easiest process for solving problems.
- To achieve surety of service.
- To increase employability.

7. MATHEMATICAL MODEL FOR PROPOSED SYSTEM

SYSTEM DESCRIPTION:

1. The input will Problem Request and location.
2. Identify output as O

S = I,O,

O= The output will be acceptance of request.

3. Identify the processes as P S=I,O,P,..

P=E,D

E= Give feedback,requestlog,comment,Paymentdetails,technicianinforma-tion., D=GPS Position,Tracking

3. 5.Identify failure cases as F

S=I,O,P,F,.

F= Failure occurs when the system fails or GPS is OFF.

1. Identify success as s. S=I,O,P,F,s,

s=When system is capable of identify request and tracking of technician who acccept request and process it

S=I,O,P,F,s,Ic,

Ic=User Should create a Comment, feedback, Tracking System details.

8. ALGORITHM

Haversine is an algorithm used to Calculate the Distance between user and technician. Haversine Formula Calculate geographic distance on earth. If you have two different latitude longitude values of two different point on earth, then with the help of Haversine Formula, you can easily compute the great-circle dis-tance (The shortest distance between two points on the surface of a Sphere). The term Haversine was coined by Prof. James Inman in 1835. Haversine is very popular and frequently used formula when developing a GIS (Geographic Information System) application or analyzing path and fields.

Central angle Haversine can be computed, between two points with r as radius of earth, d as the distance between two points, is latitude of two points and is longitude of two points respectively.

9. EFFICIENCY ISSUES

There is very rear case of failure is if any error occurs first time in team, no one faces this error and couldn't resolve it, Then system will fail for this fresh error.

10. OUTCOME

1. This application will help users to get on time service in critical situation where they want. Also it is best option for all technician to get work faster, normally they have to wait for cars to come for repairing.

11. APPLICATIONS

As it is the real time application used for daily use by the needy user who have problem in their daily routine. It will be very helpful during the troublesome conditions where there is no one is available to help you. As everyone is having smart phone that will be beneficial for us.

12. TECHNOLOGIES USED

12.1 Android:

Android is a mobile operating system developed by Google, based on the Linux ker-nel and designed primarily for touchscreen mobile devices such as smartphones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to real-world actions, such as swiping, tapping and pinching, to manipulate on-screen objects, along with a virtual keyboard for text in-put. In addition to touchscreen devices, Google has further developed Android TV for televisions, Android Auto for cars, and Android Wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics.

Android has the largest installed base of all operating systems (OS) of any kind. Android has been the best selling OS on tablets since 2013, and on smartphones it is dominant by any metric.

Initially developed by Android, Inc., which Google bought in 2005, Android was unveiled in 2007 along with the founding of the Open Handset Alliance a con-sortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices. As of July 2013, the Google Play store has had over one million Android applications (”apps”) published including many ”business-class apps” that rival competing mobile platforms and over 50 billion applications downloaded. An AprilMay 2013 survey of mobile application develop-ers found that 71 of developers create applications for Android, and a 2015 survey found that 40 of full-time professional developers see Android as their priority target platform, which is comparable to Apple's iOS on 37 with both platforms far above others. In September 2015, Android had 1.4 billion monthly active devices.

12.2 Platform used:

1. Android Studio
2. Sql server 2012
3. Visual studio 2015
4. Eclipse/Android Studio
5. JDBC/ODBC using mySQL

13. RISK ANALYSIS

The risks for the Project can be analyzed within the constraints of time and quality

Risks	Category	Probability	Impact
Computer Crash	TI	70%	1
Late Delivery	BU	30%	1
Technology Will not Meet Exception	TE	25%	1
End Users Resist System	BU	20%	1
Changes In Requirements	PS	20%	2
Lack Of Development Experience	TI	20%	2
Lack Of Database Stability	TI	40%	2
Poor Quality Documentation	BU	35%	2
Deviation From Software Engineering Standards	PI	10%	3
Poor Comments In Code	TI	20%	4

- Impact Values:

1. Catastrophic
2. Critical
3. Marginal
4. Negligible

14. USAGE SCENARIO

This section provides various usage scenarios for the system to be developed.

14.1 User profiles

- Client

14.2 Use-cases

All use-cases for the software are presented. Description of all main Use cases using use case template is to be provided.

14.3 Use Case View

Use Case Diagram. Example is given below

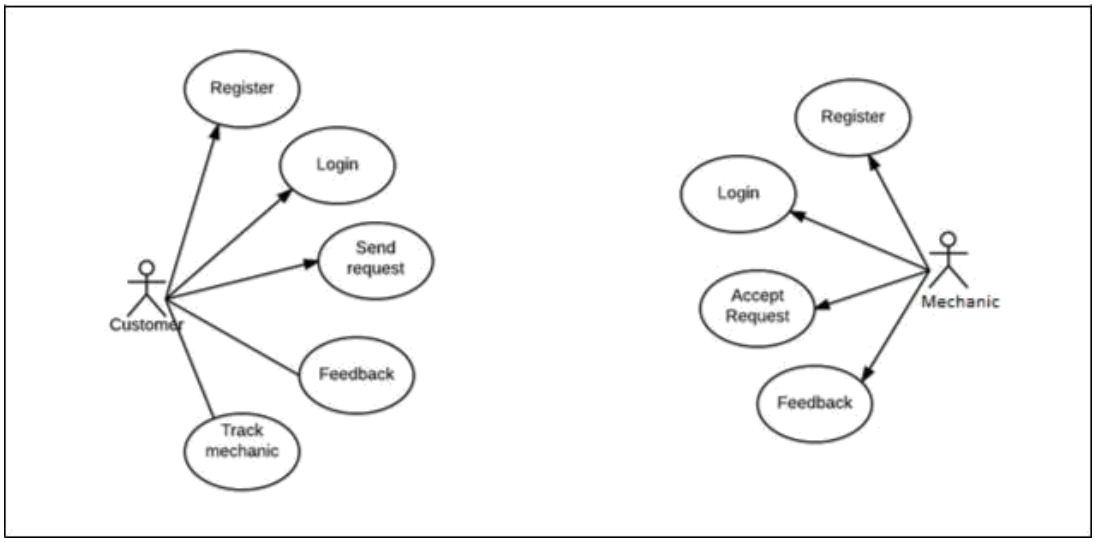

Fig: Use Case Diagram

15. FUNCTIONAL MODEL AND DESCRIPTION

A description of each major software function, along with data flow (structured anal-ysis) or class hierarchy (Analysis Class diagram with class description for object oriented system) is presented.

15.1 Sequence Diagram:

Sequence Diagram is as follows -

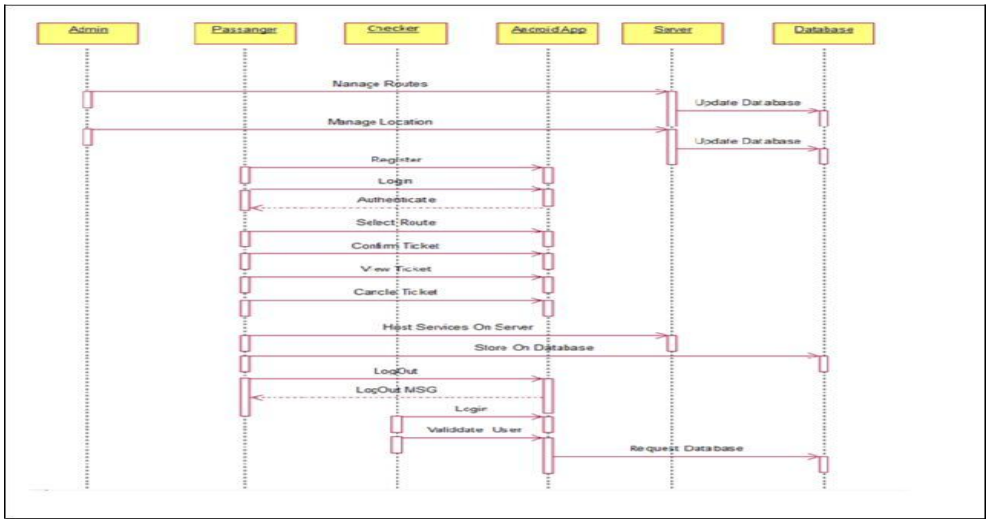

Figure 6.3: Sequence diagram

15.2 Activity diagrams

Activity diagrams are graphical representations of work flows of stepwise activities and actions with support for choice, iteration and concurrency. An activity diagram shows the overall flow of control. Activity diagrams are constructed from a lim-ited number of shapes, connected with arrows. The most important shape types: Rounded rectangles represent activities; Diamonds represent decisions; Bars repre-sent the start (split) or end (join) of concurrent activities. Figure 6.4 represents the activity diagram of the system.

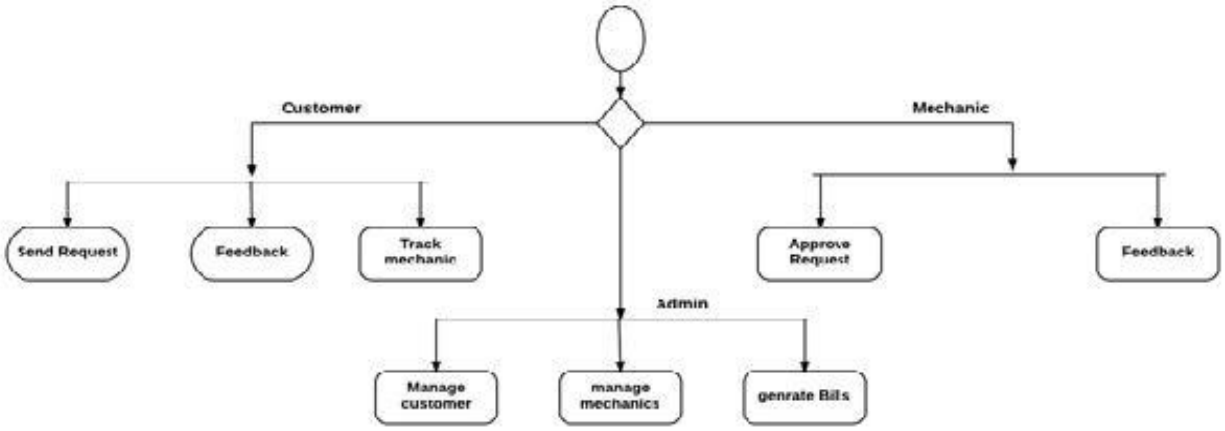

Figure: Activity diagram

16. SOFTWARE ARCHITECTURE

Software architecture refers to the high level structures of a software system, the discipline of creating such structures, and the documentation of these structures. It is the set of structures needed to reason about the software system. Each structure comprises software elements, relations among them, and properties of both elements and relations.

16.1 ARCHITECTURAL DESIGN

Client By using this system Clients can creates their account and take information regarding the nearest appropriate Mechanic/Technician and send him an appointment request.

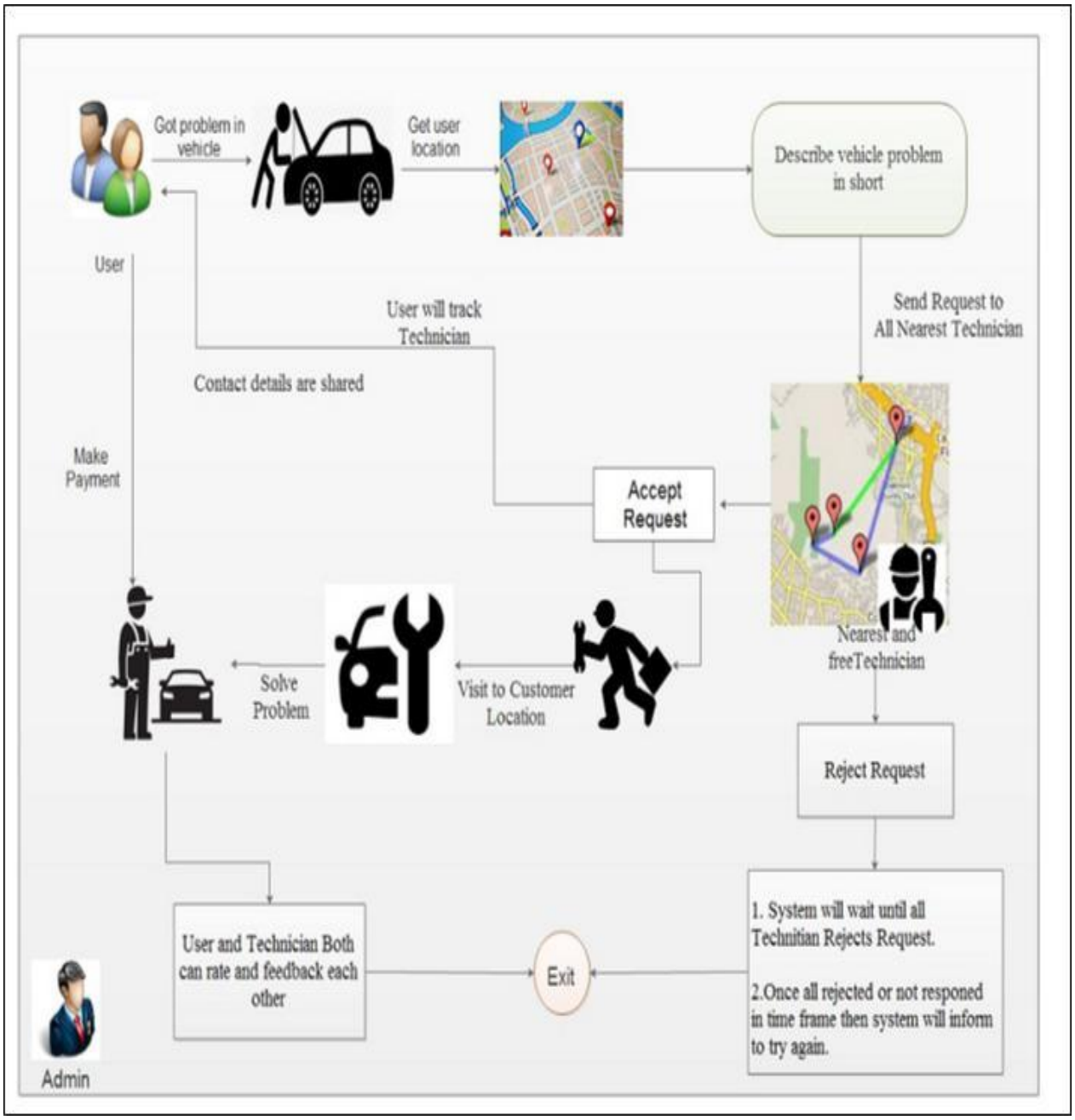

Figure : Architecture diagram

17. COMPONENT DESIGN

17.1 Class Diagram

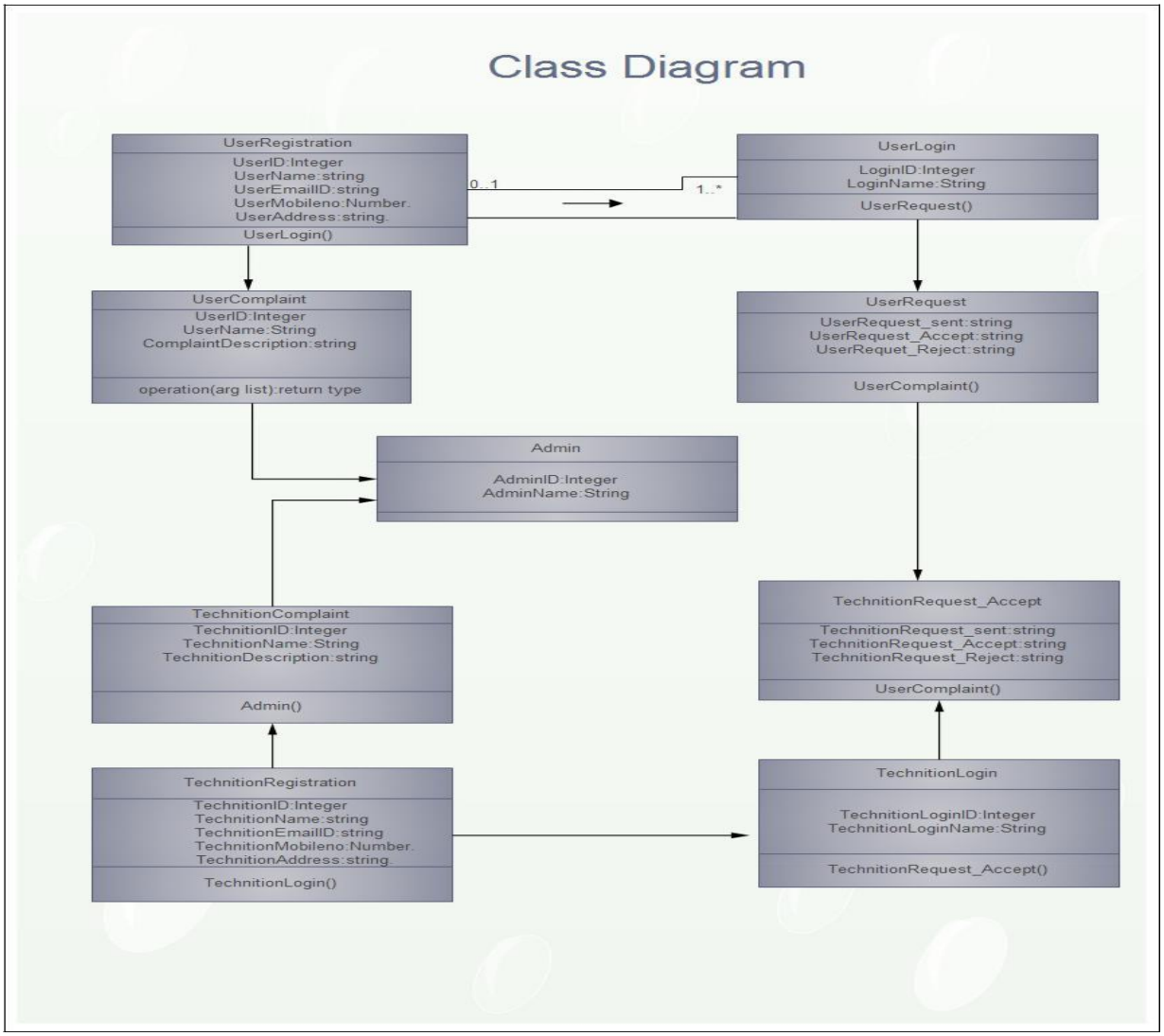

Figure: Class Diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by show-ing the systems classes, their attributes, operations (or methods) and the relationships among the classes. The class diagram is the main building block of object oriented modeling. It is used both for general conceptual modeling of the systematic of the application, and for detailed modeling translating the models. Into programming code.

17.2 Component Diagram

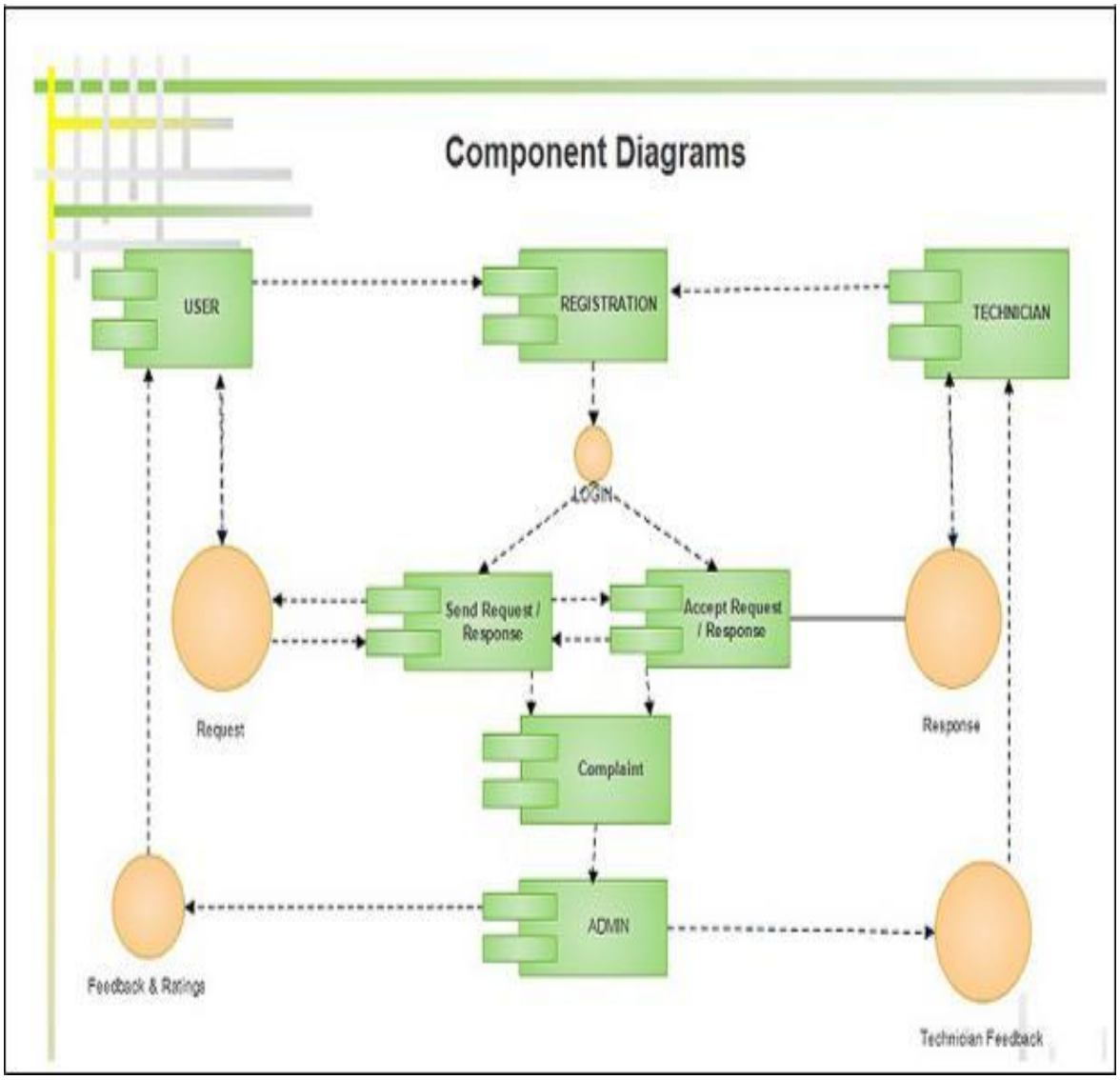

Figure: component Diagram

A Component diagram in the Unified Modeling Language models the physical de-ployment of artifacts on nodes. To describe a web site, for example, a component diagram would show what hardware components (nodes) exist (e.g., a web server, an application server, and a database server), what software components (artifacts)run on each node (e.g., web application, database).

17.3 Object Diagram

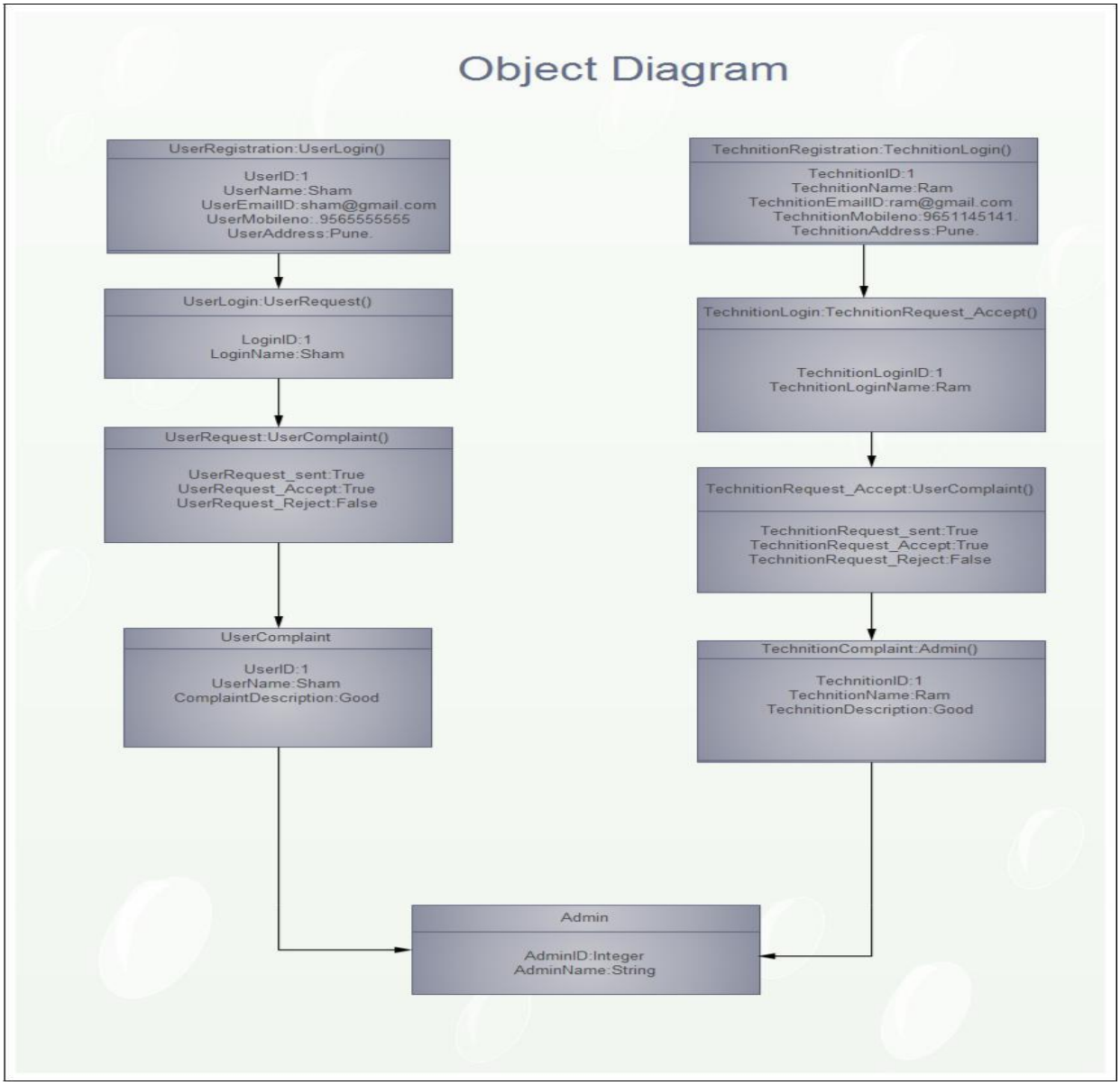

Figure : Object Diagram

An object diagram displaying instance of classes (objects).Object diagram are more concrete than class diagram here. Which is used to provide example or test case shown for class diagram provided above.

18. CONCLUSION:

Our System have shown different technologies that are used in LBSs and ways of choosing a suitable technology to use, given a particular situation. We developed both mobile and web base application and incorporated location based services in both applications. Also, we have included maps in the mobile application that is used by

technicians and to get callers location automatically using the call information, like caller ID. This will eliminate the request for meter numbers from the customer. The product of this research can play a big role in any service delivery organization in the future by improving or minimizing the time to deliver a service.

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