

CUSTOMER RELATIONSHIP MANAGEMENT USING ANDROID AND WEB APPLICATION

Enrollment No. – 9913103553

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Bachelor of Technology

In

Computer Science Engineering

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

JAYPEE INSTITUTE OF INFORMATION TECHNOLOGY, NOIDA

(I)

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DECLARATION

I/We hereby declare that this submission is my own work and that, to the best of knowledge and belief, it contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other Institute of higher learning, except where due acknowledgement has been made in text.

Place: IIIT sector- 128, Noida

Signature:

Date: 14.5.2017

Name: ARNAV BHARDWAJ

Enrollment No.: 9913103553

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CERTIFICATE

This is to certify that the work titled “**Customer Relationship Management using Android Application**” submitted by “**Arnav Bhardwaj**” in partial fulfillment for the award of degree of B.Tech of Jaypee Institute of Information Technology University, Noida has been carried out under my supervision. This work has not been submitted partially or wholly to any other University or Institute for the award of this or any other degree or diploma.

Signature of the Supervisor:

Name of the Supervisor: Mr. SUDHANSHU KULSHERSTHA

Date: 14.5.2017

(IV)

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to our supervisor **Mr. SUDHANSHU KULSHRESTHA** whose insightful leadership and knowledge benefited us to steer out the project titled “**Customer Relationship Management using Android Application**” successfully. Thank You for your continuing support for our important work in this field and giving us the golden opportunity to do this wonderful project, which also helped us in doing a lot of Research and we came to know about so many new things we are really thankful to.

We would also like to underscore our dynamic efforts of the teamwork and their expert advice and contributions to the preparations of this project.

Signature of the Student:

Name of the Student: ARNAV BHARDWAJ

Enrollment No.: 9913103553

Date: 14.5.2017

(V)

SUMMARY

“Customer Relationship Management” (CRM) is both Web based and Android based application. Using this technology, employees of the company can organize, automate and synchronize sales. Since manually it is not possible to keep track of current and future customers, therefore with the help of this project, employees will be able to keep record of all the leads. CRM system will help to keep track of number of leads converted by the employee. This system will help to manage sales. In web based application, a website has been designed which will be functioned by the admin/boss of the company. Using website, admin/boss of the company after login can insert details of the employee and the company (customers) and can also view the progress report of the employee i.e. how many leads have been converted successfully or unsuccessfully by each employee. Using Android application, each employee can sign in through the app using the unique login Id and password provided to them by the admin. After sign in, employee can view the details of the company and can fix meeting/appointment using them. The employee can also view the leads he is working on and once converted successfully or if fails, he/she can view his/her progress report. CRM application is basically to ease the management of records of current and future customers by the employees technologically.

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Signature of the Students

Name: ARNAV BHARDWAJ

Date: 14.5.2017

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Signature of the Supervisor

Name: SUDHANSHU KULSHRESTHA

Date: 14.5.2017

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LIST OF ACRONYMS

S.NO.	ABBREVIATION	FULL FORM
1.	CRM	Customer Relationship Management
2.	App	Application
3.	Phno	Phone number
4.	No.	Number

1. INTRODUCTION

1.1 General Introduction

The topic of our project is ‘Customer Relationship Management System’. As the name suggests, the project is made with the aim of managing a company’s interactions with the current and future customers. Customer Relationship Management (CRM) will be a system for managing a company’s interactions with current and future customers. Using this technology one can organize, automate and synchronize sales. Since manually it is not possible to keep track of current and future customers, therefore with the help of this project, employees will be able to keep record of all the leads. CRM system will help to keep track of number of leads converted by the employee. This system will help to manage sales.

1.2 List some relevant current/open problems

- Manually maintaining records using pen-paper makes it difficult to manage and synchronize
- Maintaining records using excel sheet, business cards or outlook results in multiple versions of the data collection which makes data access at one go impossible
- Keeping track of records which is both secured and easy to use is difficult
- Since marketing has transferred from sale to customer focus, so to maintain records which are accessible from anywhere, any device makes entire business from in office staff to remote workers unmanageable

1.3 Problem Statement

After manufacturing of any product or development of any software, marketing comes into the role. Marketing is one of the most essential part for any product’s success. With the growing rate of marketing, the growth rate of sales is increasing and therefore it becomes difficult to keep records of it manually. Companies are required to keep track of their interactions with current and future customers and also to maintain the records of the number of leads converted successfully by each employee which is difficult to manage manually.

1.4 Overview of proposed solution approach and Novelty/benefit

“Customer Relationship Management” (CRM) is both Web based and Android based application. Using this technology, employees of the company can organize, automate and synchronize sales. CRM system will

help to keep track of number of leads converted by the employee. This system will help to manage sales. In web based application, a website has been designed which will be functioned by the admin/boss of the company. Using website, admin/boss of the company after login can insert details of the employee and the company (customers) and can also view the progress report of the employee i.e. how many leads have been converted successfully or unsuccessfully by each employee. Using Android application, each employee can sign in through the app using the unique login Id and password provided to them by the admin. After sign in, employee can view the details of the company and can fix meeting/appointment using them. The employee can also view the leads he is working on and once converted successfully or if fails, he/she can view his/her progress report. CRM is highly secure, easy to use and affordable solutions for small and medium size businesses. It empowers the sales team with a tools they need to manage the entire sales pipeline and ensures that nothing falls through the cracks. It is accessible from anywhere, any device, which makes it easy to manage the entire business from in office staff to remote workers and to anything in between. CRM provides the following benefits:-

- Improve the data you have: It manages the data and improve the quality of the data by making it accessible in real-time.
- Take action on data: Can set up activities to activate stagnant accounts.
- Manage sales team activity: A sales leader can give teams direction to best meet business goals.
- Grow sales: can help grow sales by better managing the sales teams.
- More informed decision making: While it can't help to make better decisions, but it can help access the data to make more informed decisions.

1.5 Redefined Problem statement

With the growing rate of frauds and malicious activities in software and database there is a major need to secure the application and data. Moreover a application user wants as much as features in his app , so by integrating the useful feature in app will make the work easier for the user.

1.6 Tabular comparison of other existing approaches/solution to the problem framed

S.No	PROBLEM	SOLUTION
1.	Maintaining data integrity , access control authentication, and security of database	Admin given unique password to operate database. Encrypt the password and import data of user
2.	Android application security is the major Issue.	Provide validation to text fields. Access control the application
3.	Users wants extra and useful features to be Accessed fast.	Providing features such as note maker, camera Contact to the app.

2. Literature Survey

2.1 Sources

2.2 Study of the literature studied

Case study 1

Title of paper	Security In Database System
Authors	Abdulrahman Hamed Almutairi & Abdulrahman Helal Alruwaili
Year Of Publication	2012
Publishing details	Global Journals Inc. (USA)
Summary	The paper focuses on security issues that are associated with the database system that are often used by many firms in their

	<p>operations. These are malicious people who target their data and compromise its integrity. This is occasioned by unauthorized access, which makes data lose its integrity and lastly operations of the business are affected negatively. This paper tackle various issues in database security such as the goals of the security measures, threats to database security and the process of database security maintenance.</p> <p>Threats to database security</p> <ul style="list-style-type: none"> • loss of availability i.e data cannot be accessed by users. • excessive privilege abuse i.e when users are given too much privilege that they can use it for malicious purpose. • weak audit trail : when an organization exposes itself to risk of various types due to weaknesses in its internal system. • weak system and procedures for performing authentication • Loss of data integrity <p>Various techniques for database security</p> <ul style="list-style-type: none"> • Database encryption
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	<ul style="list-style-type: none"> • authorization • Views • Audit trials • Back-up • Flow control • Access control • integrity constraints
Web link	

Case study 2

Title of paper	A STUDY ON CUSTOMER RELATIONSHIP MANAGEMENT IN BANKS
Authors	Dr.P. Anbuoli, T.R.Thiruvengktraj
Year Of Publication	2013
Publishing details	International Research Journal of Business and Management – IRJBM
Summary	The research paper was based on the role of CRM in banking sector. The methods used were data mining and data warehouse. Data was collected keeping customer the centre of focus. The CRM group analysed results obtained and designs action plans, such as campaigns, promotions, special marketing initiatives, etc. CRM analysts used OLAP (On Line

	Application Programming) to issue complex SQL queries on the Data Warehouse or on the Analytical Data mart and carry out mono and bivariate statistics on the whole customers' population or on selected groups
Web link	www.irjbm.org

2.3 Integrated summary of Literature studied

As per our understanding from research papers studied above, that it all starts with customer. Not just one but many customers as firm becomes larger. But before each became a customer, they were a lead or a contact with some information about them such as a name, phone number or any information that might influence the sales of the product. There are several types of activities that take place in gathering such information such as meetings, phone calls or e-mails with the person or with the organization. This contact is associated with the company. An employee will not gather information only at the contact level but also at the company level like gathering various documents, valuable to that company. For this an employee has to collaborate with other employees too. To store such information, an employee may use business cards, maintain an excel sheet, in their smart phones or outlook. When an employee uses an outlook, one is tracking an email as well as setting up appointments. But company will still have multiple versions of the data and there still be information during pre-sales or post-sales that may not have been tracked. So, taking customer as a centre of focus, to evaluate the effectiveness of the process. Most important factor which comes up is the security of the data stored in database. Database security is the crucial point in any of the software. There are various threats to the database which if not sorted may lead to destruction of data. Mitigation strategies to be followed in order to application work efficiently. Ensuring the security of customer data leads to happy customer. Happy customer means repeated business which is the most efficient kind of sales. Now not only each working department is

working efficiently, but also working together with one centralized view of the customer. CRM system helps in managing a company's interactions, organising sales, keeping record of the leads and the number of leads converted.

3. Analysis, Design and Modeling

3.1 Requirements Specification

- Laptop or computer for website
- Smart phone for Android app
- Internet Connection
- Sufficient Internet Speed

3.2 Functional and Non-Functional Requirements

Functional:

- this software will run on android phones
- software is designed to keep track of company employees
- Android studio is required to build app
- A secure database will be designed to store the data where only the administrator can add, remove or update. Only the administrator will have the right to create or delete any user.
- Software will be able to upload multimedia files

Non-Functional:

- Availability: 99.9% uptime
- Scalability: Easily scalable to over 5,000 users and over 1,000,000 records
- Backups: We should be able to download full database backups on a daily basis
- Disaster Recovery: Redundant data centres with less than one hour failover time
- Cost: the cost of the project should be minimal.
- Performance: enriched resources with low response time
- Reliability: error detection, strategy for correction
- Usability: easy to learn and operate

3.3 Overall architecture with component description and dependency details

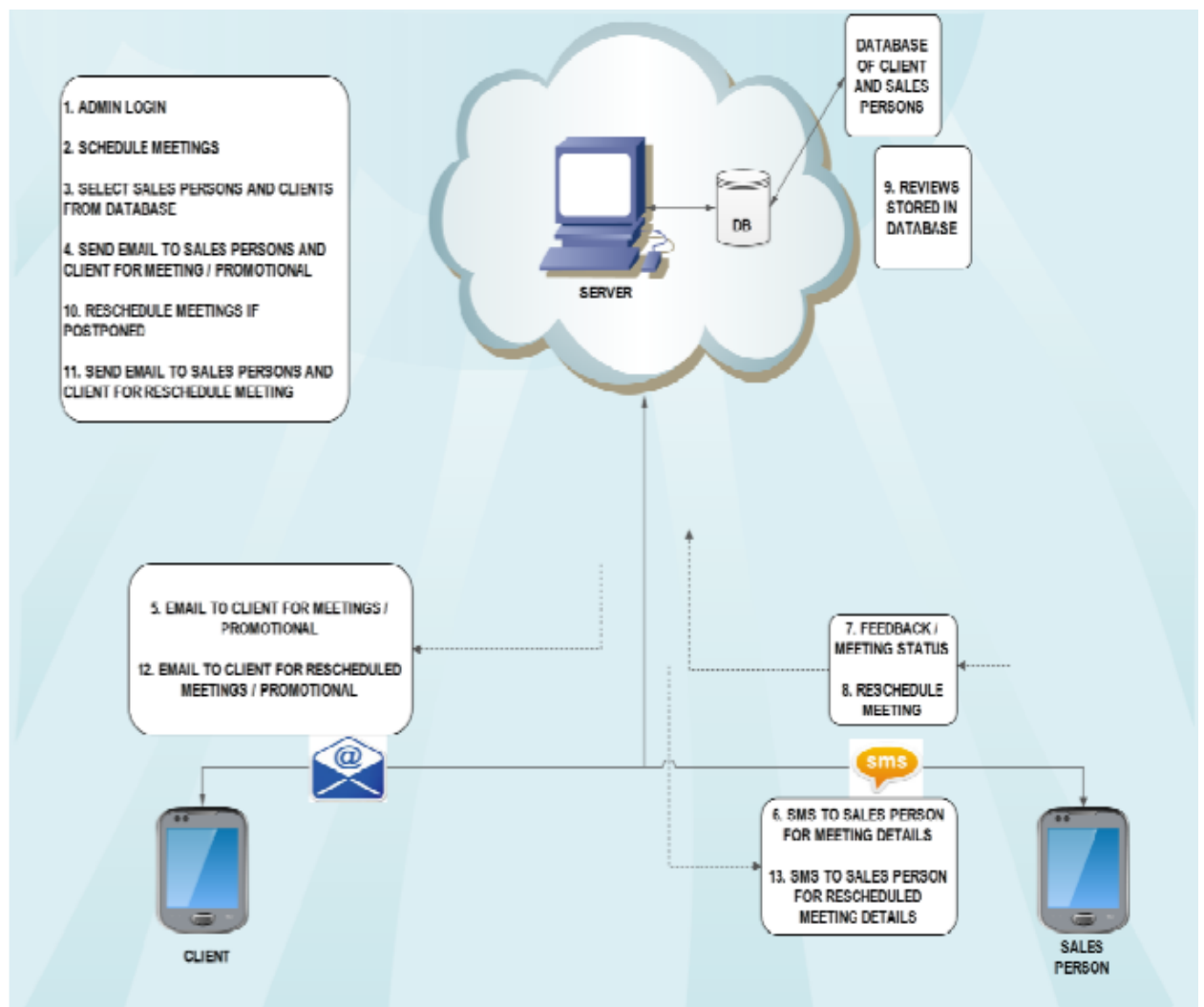
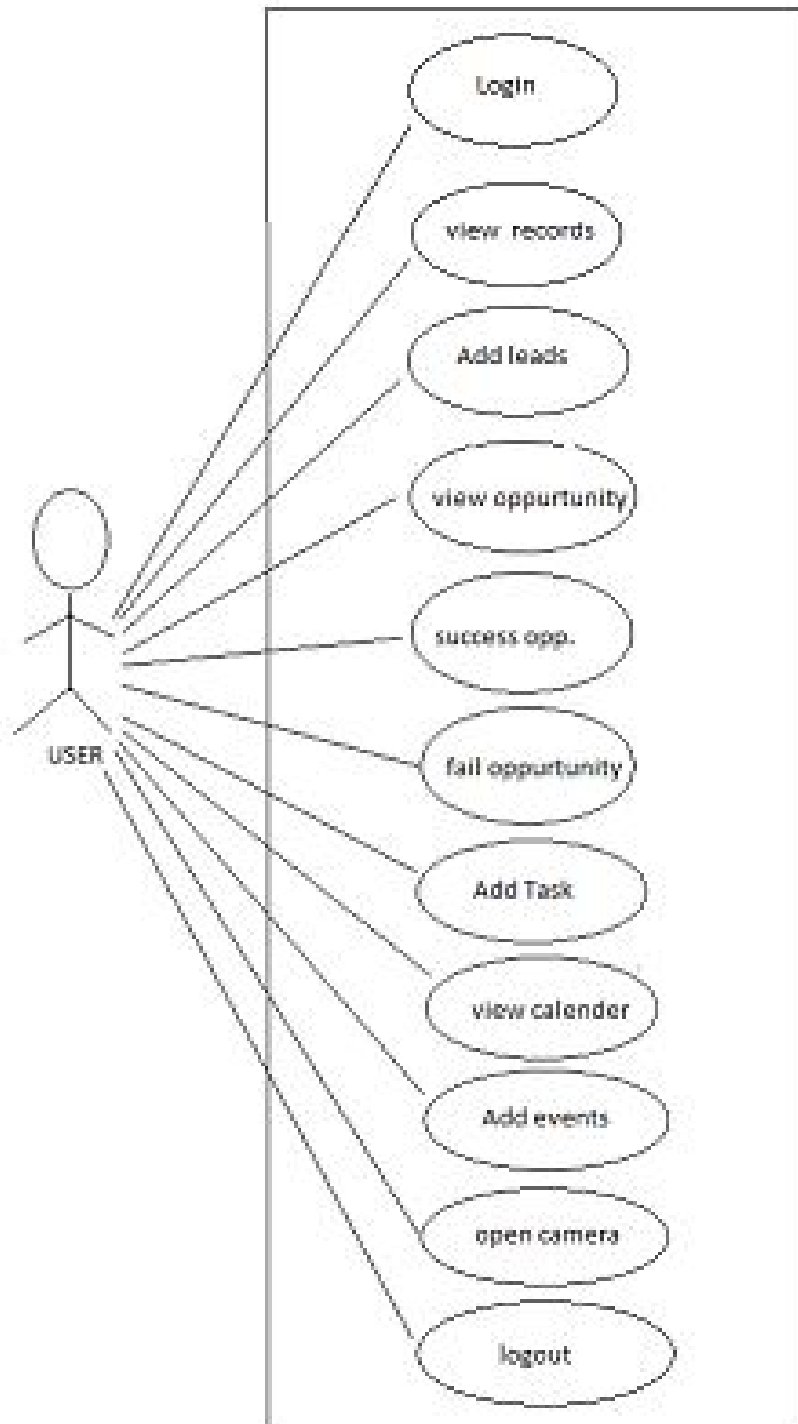


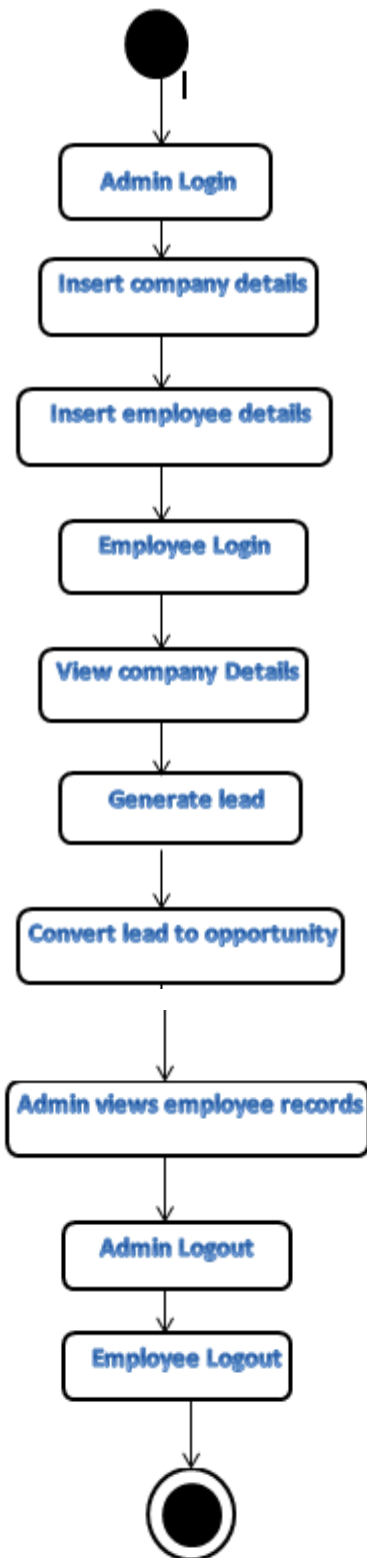
Figure - 1

Research paper- Customer Relationship Management Using Android Phone in Tourism

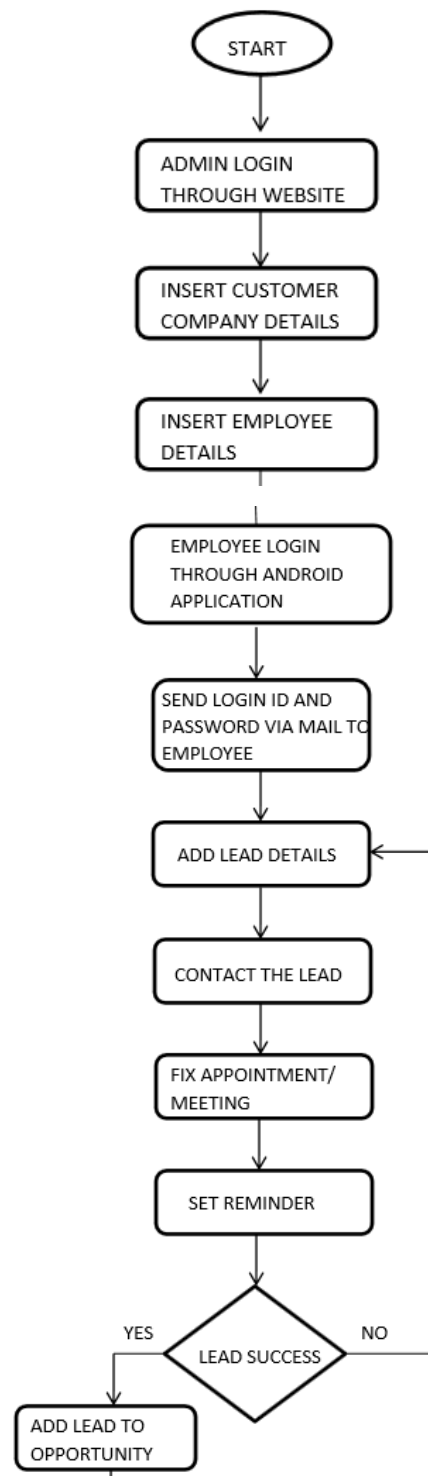
Use case Diagram

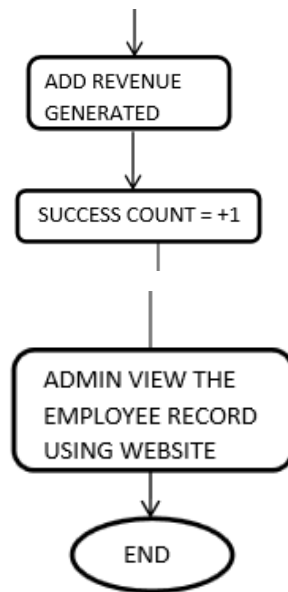


State Diagram



Activity diagram





4. Implementation Details and Issues

The android based application will be for the employees of the company. Initially one has to Login using ID and Password that was mailed to them by the admin using web based application. Once Login, the employee views the “My Record” activity. He/she can also access “Lead Contacts”, “Leads”, “Leads Converted”, “Search Lead”, “Communication”, “Meeting Reminder”, “Edit Contacts”, “Logout” sections in the menu of the application. Under the sections-:

- a) My Record- Employee can view the number of leads converted/not converted by him, the total amount earned by converting the leads successfully and the details of the upcoming meetings scheduled by him/her with the customers.
- b) Contacts- Employee can add leads by entering the details of the customer such as Company name, its phone number, email id etc. and the lead Id which will be unique.
- c) Leads- Employee can view all the leads entered by him/her. There will be two buttons– “Submit” and “Cancel”. On clicking Submit, the lead will be converted and the details of that particular lead will be added to ‘Lead Converted’ section and also the count of the number of leads converted increases to one on the ‘My Record’ activity. On clicking Cancel, the count of the number of leads not converted increases to one on the ‘My Record’ activity.

- d) Opportunity- Employee can view the details of the leads converted and can add the amount earned which will be displayed on the 'My Record' activity.
- e) Notes- Employee can add task which is need to be performed or can make the notes for the future work.
- f) Camera- Employee can have excess to the camera for the need of capturing the knowledge or any document.
- g) Phone and mail- Employee can fix up the meetings through phone call or by a e-mail.
- h) Calendar/Set Reminder- Employee can view the calendar and can set reminder for the day.

4.2 Risk Analysis and Mitigation Plan

- **Risk Analysis**

Risk ID	Description of Risk	Risk Area	Probability (P)	Impact (I)	RE (P*I)
1.	Project scope might change along the time due to supervisor demand. Hence it may disorder our schedule.	Project scope	Medium (3)	Medium (3)	Medium (9)
2.	Android-based application is new to us, we have to learn from start	User interface	Medium (3)	High (5)	High (15)
3.	Data fragmented in various existing applications and difficult to integrate and consolidate in the CRM. Data integrity issues in the migrated data	Process	Low (1)	Medium (3)	Low (3)
4.	Platform fragmentation, including its SDK and tools, is being developed so fast that new platform updates	Algorithm	Medium (3)	Low (1)	Low (3)

	come out almost too frequently.				
5.	Connections between android, and database	Algorithm	Medium (3)	Medium (3)	Medium (9)

Table – 7 (Risk Analysis)

- **Mitigation Plan**

Risk Id	Description of Risk	Risk selected For mitigation (Y/N)	Mitigation Plan If 8 is “Y”	Continge- ncy Plan (if any)
1.	Project scope might change along the time due to supervisor demand. Hence it may disorder our schedule.	Y	Proper discussion with supervisor before changing schedule and project scope	-
2.	Android-based application is new to us, we have to learn from start	Y	We will schedule detailed learning process to gain necessary knowledge for completing application	-
3.	Data fragmented in various existing applications and difficult to integrate and consolidate in the CRM. Data	Y	Having clarity about data in terms of how much, how good and when	-

	integrity issues in the migrated data		mandatory	
4.	Platform fragmentation, including its SDK and tools, is being developed so fast that new platform updates come out almost too frequently.	N	-	-
5.	Connections between android, and database	Y	Process should be completed step-by-step , ensuring small connection first than establishing connection	-

Table – 8 (Mitigation Plan)

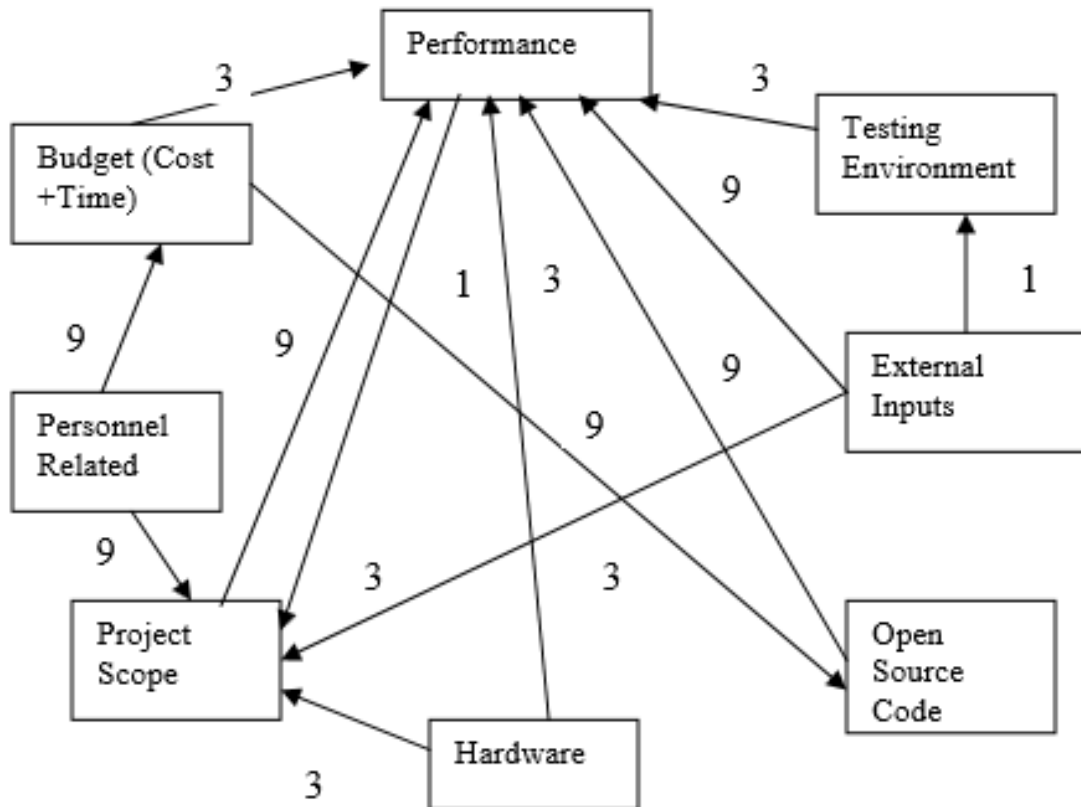


Figure – 7 (Weighted Interrelation Graph)

S.NO	Risk Area	#of Risk statements	Weight(IN+ OUT)	Total Weight	priority
1.	Performance	8	3+3+9+9+3+1	28	1
2.	Personal related	5	9+9+9	27	2
3.	External input	3	9+9	18	3
4.	Open source code	3	9+9	18	4
5.	Project scope	4	9+1+3+3	16	5
6.	Hardware	2	3+3	6	6
7.	Budget	3	3+1	4	7
8.	Testing environment	4	3+1	4	8

Table – 4 (Risk Area Wise Total Weighting factor)

5. Testing

5.1 Testing Plan

TYPE OF TEST	WILL TEST BE PERFORMED?	COMMENTS/EXPLANATION	SOFTWARE COMPONENT
Requirements Testing	Yes	Required for project to function Well	Android app Internet connection
Unit	Yes	Required as per the project	Android app
Integration	Yes	Required as per the project	Android app
Performance	Yes	Required as per the project	Android app
Stress	No	Not Required	None
Compliance	No	Not Required	None
Security	Yes	Required as per the project	Android app
Load	Yes	Required as per the project	Android app
Volume	No	Not Required	None

Table – 1 (Testing)

ROLE	NAME	SPECIFIC RESPONSIBILITY / COMMENTS
Performance Tester	Arnav Bhardwaj	Run Android app to test their Functioning
Integration Tester	Arnav Bhardwaj	Test if Database Android app is Linked together and working as per the

		Requirement
Requirements Tester	Arnav Bhardwaj	Test the requirement specifications
Security Tester	Arnav Bhardwaj	Test the Login sessions of Android app. Password inserted is encrypted

Table – 2 (Test Team Details)

ACTIVITY	START DATE	END DATE	HOURS	COMMENTS
Requirements Testing	23-3-2017	23-3-2017	2	Successful
Performance Testing	23-3-2017	23-3-2017	3	Successful
Integration Testing	24-3-2017	24-4-2017	5	Not Successful
Security Testing	24-3-2017	24-4-2017	2	Successful

Table – 3 (Test Schedule)

TESTING ENVIRONMENT
SOFTWARE ITEMS
<ul style="list-style-type: none"> Windows 7 Android Studio Xampp Control Panel
HARDWARE ITEMS
<ul style="list-style-type: none"> Laptop/Computer Smart Phone

Table – 4 (Testing Environment)

5.2 Component decomposition and type of testing required

S.NO.	LIST VARIOUS COMPONENTS THAT REQUIRE TESTING	TYPES OF TESTING REQUIRED	TECHNIQUE FOR WRITING TEST CASES
1.	Data encryption	Security	Black Box
2.	Database Access	Security	Black Box
3.	Login page of Android	Security	Black Box
4.	Company details retrieval	Integration	Black Box
5.	Generating Lead	Performance	White Box
6.	Converting Lead to Opportunity	Performance	White Box
7.	Adding task/notes	Performance	White Box
8.	Adding contact details	Performance/Integration	White Box
9.	Accessing camera	Integration	White Box
10.	Calling	Performance/Integration	White Box
11.	Mail	Performance/Integration	White Box
12.	View calendar and Add reminder	Performance/Integration	White Box

Table – 5 (Component decomposition and type of testing required)

5.3 List all test cases in prescribed format

TEST CASE ID	INPUT	EXPECTED OUTPUT	STATUS
101	Enter username “admin” and password “admin”	Login successful	Pass
102	Enter username “admin123” and Password “admin”	Login unsuccessful	Fail
103	Enter username “admin” and password “admin123”	Login unsuccessful	Fail
201	Enter valid name, phno, address, email, Loginid and password	Data Inserted successfully	Pass
202	Submit blank	Name, phno, address, Email, loginid or	Fail

		Password is wrong	
301	Enter valid name, phno, address, email And description	Data Inserted successfully	Pass
302	Submit blank	Name. phno, address, Email or description is wrong	Fail
401	View employee Records	Records Retrieved successfully	Fail
501	Enter valid username and password	Login successful	Pass
502	Enter invalid username and password	Login unsuccessful	Pass
601	View Company Records	Records Retrieved successfully	Fail
701	Add details of the company to generate Lead	Data Inserted Successfully	Pass
801	Add details of the lead company to Opportunity	Data Inserted Successfully and success Count +1	Pass
802	Add details of the lead company to not Opportunity	Data Inserted Successfully and fail Count +1	Pass
901	View my records	Updated successfully	Pass
1001	Call to company	Calling successfull	Pass
1002	Mail to company	Mail successfull	Pass
1003	Add contacts to phone directory; entering invalid number and email	Data not inserted and fail	Fail
1004	Enter valid number and email	Data inserted successfully	Pass

Table – 6 (Test cases performed)

5.4 Limitation of the Solution

- Requires Internet connection
- Requires Laptop/Computer
- Requires Smart phone
- Requires Android OS in the phone

6. FINDINGS AND CONCLUSION

6.1 Findings

- Learnt to host a website
- Operating Android studio
- Language requirements to work on Android Studio
- Selection of emulator to increase efficiency.
- Debugging the android code.
- Requirement of CRM software to help in making marketing more customer focused rather than sales focused.
- Existing CRM tools and survey performed for the project.
- Resolving error problem techniques to benefit customers.

6.2 Conclusion

As per our understanding from research papers studied above, that it all starts with customer. Not just one but many customers as firm becomes larger. But before each became a customer, they were a lead or a contact with some information about them such as a name, phone number or any information that might influence the sales of the product. There are several types of activities that take place in gathering such information such as meetings, phone calls or e-mails with the person or with the organization. This contact is associated with the company. An employee will not gather information only at the contact level but also at the company level like gathering various documents, valuable to that company. For this an employee has to collaborate with other employees too. To store such information, an employee may use business cards, maintain an excel sheet, in their smart phones or outlook. When an employee uses an outlook, one is tracking an email as well as setting up appointments. But company will still have multiple versions of

the data and there still be information during pre-sales or post-sales that may not have been tracked. So, taking customer as a centre of focus, to evaluate the effectiveness of the process. CRM is about attracting and retaining the customers. Marketing activities are to generate prospects or lead and then ultimately customers. CRM implementation helps in organizing and maintaining the leads in a centralized manner. It also helps in automating the sales process. A sales stage go through to manager approvals, to login all communication between reps and customers. CRM enables the customer service reps to have all that info available wen bringing new customers on board. Happy customers means repeated business which is the most efficient kind of sales. Now not only each working department is working efficiently, but also working together with one centralized view of the customer. CRM system helps in managing a company's interactions, organising sales, keeping record of the leads and the number of leads converted.

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APPENDICES

APPENDIX – A

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