

RAS

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**NUST COLLEGE OF
PAKISTAN NAVY ENGINEERING COLLEGE**

**RECRUITMENT ANALYSIS SYSTEM (RAS)
THE DSS FOR RECRUITMENT**

Full Automated Web Application to Store Recruitment Data and Provide Rich
Dashboard Reporting solutions.

**1
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BACHELORS

IN

MANAGEMENT INFORMATION SYSTEM

YEAR

JULY 2018

PROJECT SUPERVISOR

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COURSE 2012 - A

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ABSTRACT

Our project RAS (Web enabled Dashboarding and Analytics ¹ System) is a web-based solution that has no software to download or no hardware to purchase. Just a matter of seconds, user, and admin can be register and start using the web services to enter access and update user records.

No need to go through every individual form to collect data or to manage user/employee records manually, RAS is fully automated system designed to provide user with advanced features to view his information at the same time it provides management with hawk eye view of recruitments reports over major dimension and measures, most advanced BI technology of Microsoft Power BI is used to provide end user with high end analysis through various reports and graphical visuals. The Reporting Dashboard connected with live data shows up to date picture of recruitment for analysis over various perspectives.

1 TABLE OF CONTENTS

Declaration	
Copy Right Statement	
Acknowledgement	
Abstract	
Table of Contents	
1 Chapters Index	
1. Chapter ONE: Introduction	
(i) Overview	
(ii) Motivation	
(iii) Objectives of the System	
(iv) Methodology	
(v) Project Scope	
(vi) Project in Brief	
2. Chapter TWO: Literature Review	
(i) An Introduction to Scripting Languages	
what are Scripting Languages?	
(ii) Overview of different scripting languages	
C#	
ASP.net	
1 3. Chapter THREE: Methodology and Implementation	
(i) Project Planning	
(ii) Software Requirement Gathering	
(iii) Design	
Data Modeling	
(iv) High Level Design	22
- High Level Design	
Modules	

1

4. Graphical User Interface (GUI) and Software Usage

Main Page

Enter Records

View Records

Edit Records

Insert User

Analysis

1

5. Chapter FIVE: Summary and Limitation

(i) Summary

(ii) Limitations

6. Chapter SIX: Conclusion and Future Work

(i) Future Work

(ii) Conclusion

1 CHAPTERS INDEX

Chapter ONE: Introduction Overview

1 Motivation

Objectives of the System

Methodology

Project Scope

Project in Brief

High Level Project Plan

Chapter TWO: Literature Review

An Introduction to Scripting Languages

What are Scripting Languages?

Overview of Used scripting languages

- ASP.net

1 Chapter THREE: Methodology and Implementation

Project Planning

Software Requirement Gathering

High Level Design

1 Chapter Four: Graphical User Interface (GUI) and Software Usage

- Main Page
- Enter Records
- View Records
- Edit Records
- Insert User
- Analysis

1 Chapter FIVE: Summary and Limitations

- i. Summary
- ii. Limitations

Chapter SIX: Conclusion and Future Work

- (i) Future Work
- (ii) Conclusion

1 CHAPTER ONE

INTRODUCTION

1.1 Overview

Web Application is an application that is invoked in a web browser over the internet. Since the launch of internet, it has become the launching pad for many sophisticated and innovative web applications. Previously it was used mostly for accessing static websites but now dynamic applications are in common. New web technologies, standards and programming languages have enabled to create dynamic web applications that create co-operation and collaboration among large number of users. Web application development is quick to adopt the software engineering techniques. Web application development is made easy with the help of **Microsoft Platform** often termed as **frameworks**. These frameworks allow **Waterfall application development** by allowing development team to focus on the features of their application that they are providing to the user without worrying about other details such as user management. Examples of web applications are simple office applications such as word processors, spreadsheets and online presentation tools. But more advanced applications are also present such as point of sales software, picture editing and drafting tools.

The modern era has become very advanced and well-developed and the basic reason for this is the internet and the applications which have been launched with the help of internet e.g. internet banking and money transfer, e-commerce etc. The internet has totally changed the way many people accomplish their tasks turning them into modern and latest lifestyle with its developments. The modern development in internet has widened the opportunities for business and professional development. Maximum effect of internet is on an individual's life. The management system ranging from a large industry to a small sales point is getting computerized and more preferably web enabled if the access to internet is easy and economical. Systems are going from manual to computerize thus reducing the paper work because it is very difficult to search for information and to manage records manually. It needs time and extra labor but computerized management and information portals are handling the activities very efficiently and they can even be customized according to the needs of a specific user.

Few years back Chinese wanted to make Basketball team for South Asian Games. As we know that in general Chinese are not so tall. Hence, they used their national database to find which area has people above 6 ft height. They found it in Tibet Province and so they channelized their resources to develop players from there and eventually made a team that won them the Game. So this idea can be used to allow PN to channelize its efforts for different tasks especially bearing in mind the fact of its expansion w.r.t CTF, CMCP and CPEC. There is no system available to allow this kind of analysis.

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The management and information systems for a company or an institution etc. are mostly developed and installed on individual systems or they are running on local intranet which is only accessible within the institution or organization. The Internet has brought about the various communication means and the application packages over the internet which are making a clear way towards making **software as a service** over the web, considerably reducing the software development and maintenance cost which was not easy to afford for many small scale business vendors. Now with the increasing demand of data storage capabilities, different vendors are providing cloud services for efficiently storing the data for any need. This has become possible because of rapid development in communication technology and internet speed. Storage of data over internet is in fact the most reliable because it enables easy recovery of data in case of any loss or damage. Although there are security concerns over internet due to hacking techniques but the advantages of this technology outweigh some of the disadvantages.

This technology can bring revolutionary changes when applied to the Recruitment field concerning handling of Recruitment Analysis online. Although running software across internet is not a big deal, some major service providers are providing their services over a decade but use of software in recruitment process is still lacking behind especially in our country.

Our project **RAS** (Web enabled Dashboard and Analytics System) is a web-based solution that has no software to download or no hardware to purchase. Just a matter of seconds, user, and admin can be register and start using the web services to enter access and update user records.

1.2 Motivation

There is no requirement to go through each and every individual form in order to collect data or to manage user/employee records manually because RAS is a fully automated system designed to provide user with advanced features to view this information and at the same time it provides management with birds eye-view of the reports of recruitments over major dimension and measures, most advanced BI technology of Microsoft Power BI is used to provide end user with high end analysis through various reports and graphical visuals. The Reporting Dashboard connected with live data shows up to date picture of recruitment for analysis over various perspectives.

1.3 Objectives of the System

- Automated Data Entry of Employee Records.
- Paper Less storage of employee data for fast and smooth process of Recruitment.
- User can view his profile information over one click of button
- Advanced reporting solution for Management.
- Easy management of User Records with central managed data repository.
- Live connected data warehouse to retrieve live data any time.
- Live Reports and Dashboards to provide advanced analysis of recruitment.

1.4 Project Methodology

- Any software product starts with the requirement gathering from stakeholders. At first we have closely monitored current functionality in organization which needs many improvements, as all employee records are managed manually and no recruitment reports are available for management.
- As far as development is concerned, we adopted C# as server side language. Web pages were designed using HTML, CSS and ASP Master Pages technology.
- There are six main Modules. They are Home, Enter Records, View Records, Edit Records, Analysis and User Management.

1.5 Project Scope

- RAS is built to provide advanced analysis of recruitments through dashboards and reports.
- It consists maximum employee information which is stored in central database
- ¹ Data recorded by web app may use further for data mining and other statistical analysis.

1.6 Project In Brief

Project Title: RAS: The DSS for Recruitment

Project Start: 10 September 2017

Project Finish: 10 May 2018

Project Summary:

RAS is fully automated system designed to provide user with advanced features to view his information at the same time it provides management with hawk eye view of recruitments reports over major dimension and measures, most advanced BI technology of Microsoft Power BI is used to provide end user with high end analysis through various reports and graphical visuals. The Reporting Dashboard connected with live data shows up to date picture of recruitment for analysis over various perspectives.

Software Platforms/Languages:

C#, HTML, CSS, ASP Master Pages and IIS Server.¹

Integrated Development Environments:

MS SQL (For Database Modeling and Schema and to be used as Database Server) SQL Configuration Management.

Hardware:

No hardware has been used yet for development

Project Supervisor:

Lt Waqas PN

1.7 High Level Project Plan

1 Activities/Milestones	Date
Proposal Submission	September 2016
Proposal Approval	January 2017
Requirement Specification	May 2017 to July 2017
Higher Level Design	February 2018
Problem Classification Design	End of April
Development/ Prototyping	May 01, 2018 onwards

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Table 1.7 High Level Project Plan

1 CHAPTER 2

LITERATURE REVIEW

2.1 An Introduction to the Scripting Languages

2.1.1 *What is a scripting Language*

A Scripting language is a language which is used in conjunction with other programming languages like Java, C++ or HTML etc. and normally run inside a web browser. There are both client and server side scripting languages. Examples of most widely used scripting languages include Perl, Python, PHP, VBScript, ASP.net, and JavaScript.

Client side scripting languages are those in which scripts execute in browser on user side. E.g. Java Script, Visual Basic. Client side programming is almost done with Java script in addition with HTML and CSS.

Server Side Scripting languages are those in which scripts execute on server side on Application servers. E.g. PHP, C#. Server side scripts run the HTML page is loaded and not after.^[2] ^[3] ^[4]

2.2 Comparison of different Scripting Languages

1 2.2.2 *ASP.net*

As shown from name, ASP is supplied with .net framework by Microsoft and it is easy to learn scripting language. [1]

```
1. <html>
2. <head>
3. <title>ASP.NET Hello World Demo</title>
4. </head>
5. <body>
6.
7. <% Response. Write ("Hello World!") %>
9. </body>
10.   </html>
```

1 Chapter Three

METHODOLOGY AND IMPLEMENTATION

Every software Project normally contains following steps:-

1. Project Planning and Proposal Writing
2. Software Requirement Gathering
3. Design
4. Development
5. Integration and Testing
6. Installation and Deployment

These steps are simple and straight forward and there is risk in case of failure. So Waterfall Application Development architecture for software development was introduced. Schematic of this process is shown in figure below:-



Figure 2: (Waterfall Application Development Model)

It is clear from the figure that it is an incremental process of development. Rails Framework also follows this process for development.

3.1 Project Planning

Project Planning is the part of Project Management which relates to the use of schedules such as Gantt charts and timeline to demonstrate starting and ending date within the project environment. The proposed web application was intended to be launched as Software as a Service to facilitate the Employees maintaining their data.

Following diagram shows our basic planning of the project:-

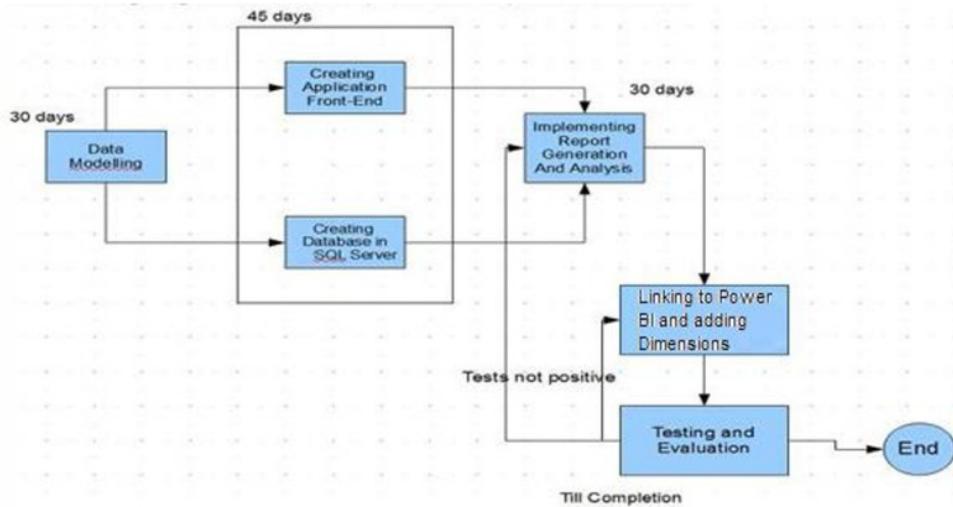


Figure 3: Project Planning

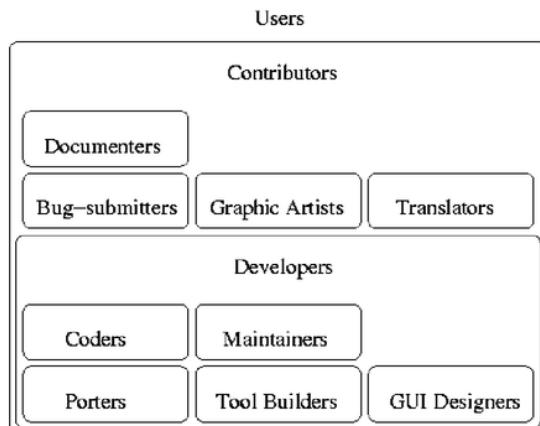
The need for software and hardware platform was determined. Plan was made for efficient communication of group members over social network or weekly meetings to synchronize the work throughout the development phase.

At the end, the following initiatives were planned and consulted with the supervisor:-

- Implementation should start with Database Modeling that will be as generic as possible
- Web Application should be developed using a modern technology new for development and good for learning purposes
- There should be weekly meeting among group members for project initiation

3.2 Software Requirements

Software requirements is the complete description of the software how the software works and its contains use cases which described how the software interact with the user. Before development of the software we collect all functional and non-functional requirements from the user because user is the best person who tells about the whole problems and requirements which are necessary in the Software. The software requirements specification document enlists all necessary requirements that are required for the project development. To derive the requirements we need to have clear and thorough understanding of the products to be developed. This is prepared after detailed communications with the project team. We decided to automate current process in the first step and then use the stored data for analysis using Power BI platform.



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Table 3.2 Roles in Software Development

Stake Holders in the Project:-

PROJECT SUPERVISOR: Lt Waqas PN

- Development Project Leader: S/Lt Muhammad Danyal Khan PN
- Requirement Analyst: S/Lt Usman Saif PN
- Front End Developer: S/Lt Danish Farhan PN
- Back End Developer: S/Lt Raja Talha PN

3.3 Design

3.3.1 Database Life Cycle

First step in designing our application was database design. It was intended to be very strong and powerful and generic because it has to maximum information of user. We have developed database model on MSSQL Database which easy to maintain and secure as compare to other databases. [4] [5] [6] [7]



1
Figure 4: Database Life Cycle Process

3.3.2 Data Modeling

The process of data modeling starts with the selection of the main entities that will play role in The organization. Thus, a basic Entity-Relationship Diagram as shown in the figure on the following page was developed.

The Blocks in the diagram represent a “Relation” or an “Entity” in the database while the lines containing connectors show relationship among them. This is the part of Conceptual Database Design used to map the structure of database for our application.

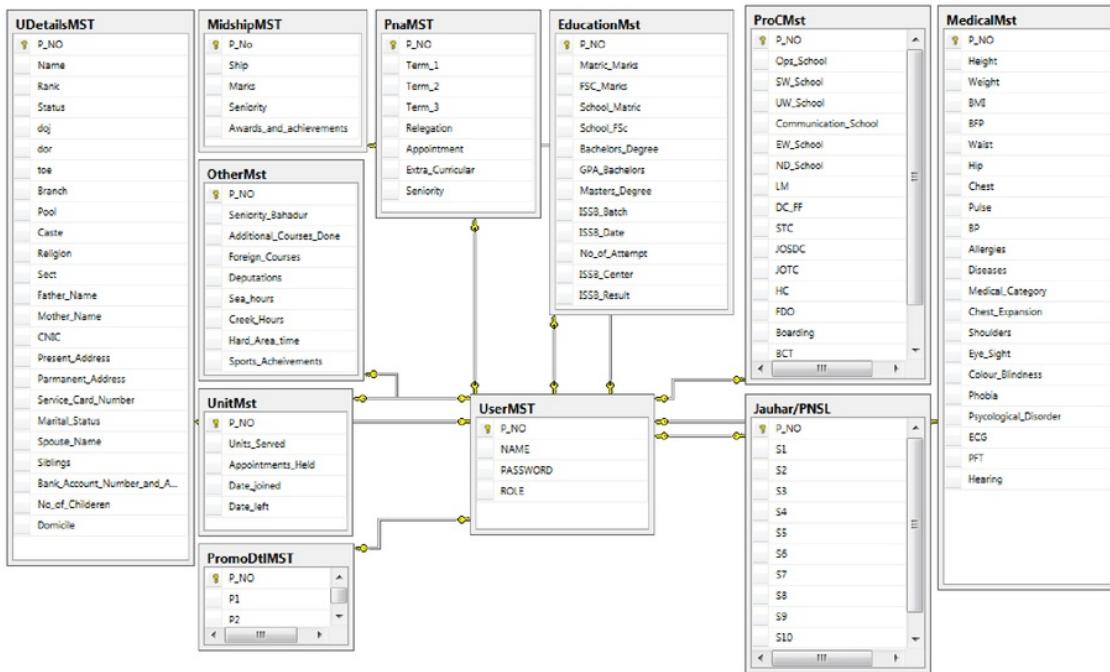


Figure 5: Data Modeling

3.4 High Level Design

The Web pages are designed in HTML, Java Script, CSS and PHP. HTML describes the basic layout of the page as girders set the layout of ceilings. Then CSS is for enhancement of color, pop-ups etc. ASP.net is used for Client side data verification and C# for the remaining back-end coding.

3.4.1 *Modules*

There are six **main** Modules of our app. They are:-

- Main Page
- Enter Records
- View Records
- Edit Records
- Insert User
- Analysis

1 Chapter Four

GRAPHICAL USER INTERFACE AND SOFTWARE USAGE

There are six Modules developed so far and we are increasing our functionality each day.

4.1 Main page:

Main page is the front view of our project RAS. On main page all the modules links are available by which a user can access his/her required Module.

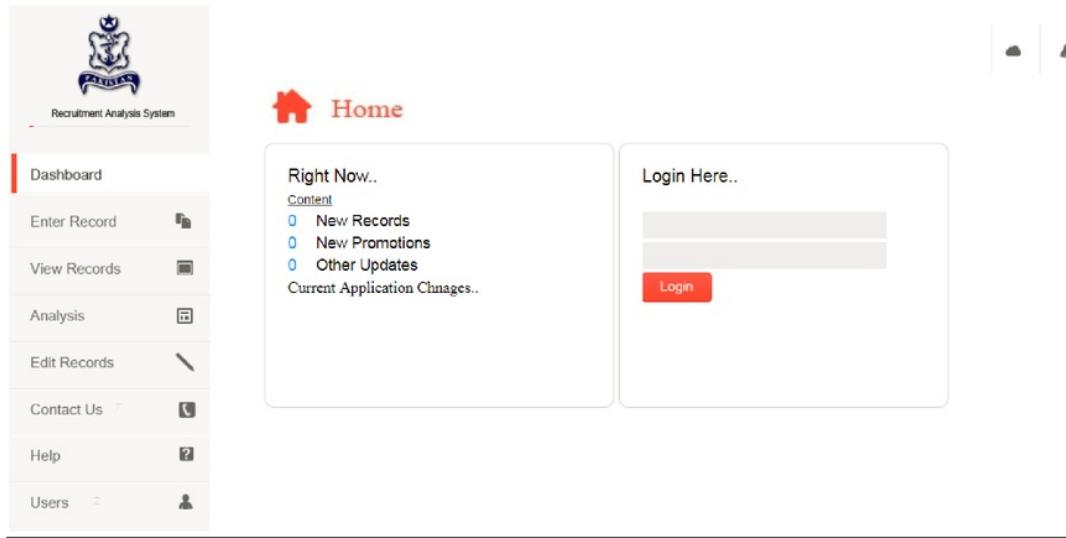


Figure 5: Main Page

Admin Module

4.2 Enter Records

Through this module admin can insert complete information of employee, this information includes Primary Details, Medical Info, Educational Info, Basic Information, Courses information, Job Role, Rank, Employee Promotion details, Location, Units and etc.

Figure 6: Enter Records Module

4.3 View Records.

Through this Module user or admin can view employee information this information include. Primary Details, Medical Info, Educational Info, Basic Information, Courses information, Job Role, Rank, Employee Promotion details, Location, Units and etc. User just have to enter PNO and press search button to retrieve all the information.

Primary Details		PROMOTIONS		Date	
Name	<input type="text"/>	Ag SLT	<input type="text"/>	SLT	<input type="text"/>
P no	<input type="text"/>	SLT	<input type="text"/>	Ag LT	<input type="text"/>
Rank	<input type="text"/>	Ag LT	<input type="text"/>	LT	<input type="text"/>
Status	Serving	LT	<input type="text"/>	LT CDR	<input type="text"/>
Date of joining	<input type="text"/>	LT CDR	<input type="text"/>	CDR	<input type="text"/>
Date of retirement	<input type="text"/>	CDR	<input type="text"/>	CAPT	<input type="text"/>
Type of Entry	SSC	CAPT	<input type="text"/>	CDRE	<input type="text"/>
Branch	<input type="text"/>	CDRE	<input type="text"/>	R/ADM	<input type="text"/>
Pool	<input type="text"/>	R/ADM	<input type="text"/>	V/ADM	<input type="text"/>
Caste	<input type="text"/>	V/ADM	<input type="text"/>	ADM	<input type="text"/>
Religion	<input type="text"/>	ADM	<input type="text"/>		
Sect	<input type="text"/>				
Father Name	<input type="text"/>				
Mother Name	<input type="text"/>				
CNIC	<input type="text"/>				
Present Address	<input type="text"/>				
Permanent Address	<input type="text"/>				
Service Card Number	<input type="text"/>				

Figure 7: View Records Module

4.4 Edit Records:

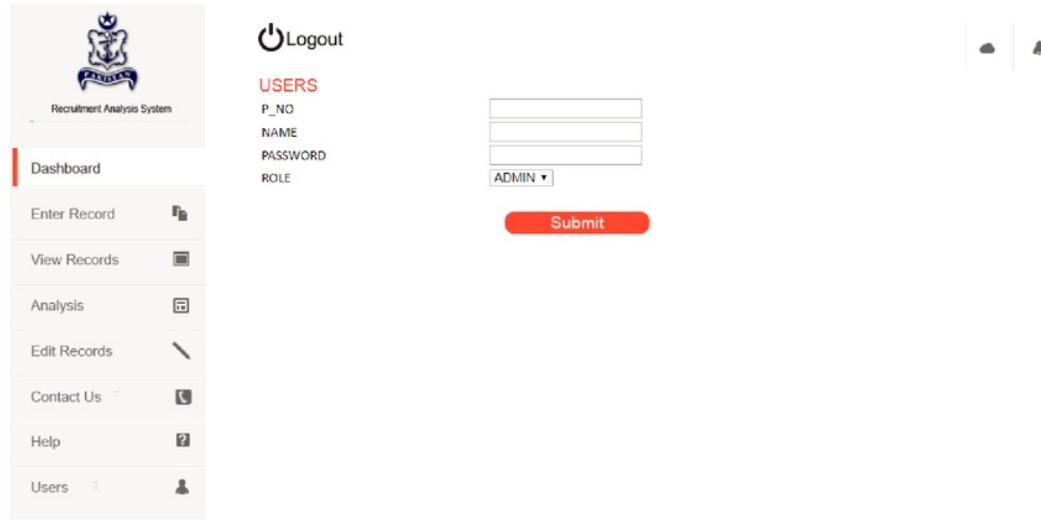
Through this Module employee information can be edited this information include. Primary Details, Medical Info, Educational Info, Basic Information, Courses information, Job Role, Rank, Employee Promotion details, Location, Units and etc. User just have to enter PNO and press search button to retrieve all the information then update it and press update button.

Primary Details		PROMOTIONS		Date
Name	<input type="text"/>	Ag SLT	<input type="text"/>	
P no	<input type="text"/>	SLT	<input type="text"/>	
Rank	<input type="text"/>	Ag LT	<input type="text"/>	
Status	Serving	LT	<input type="text"/>	
Date of joining	<input type="text"/>	LT CDR	<input type="text"/>	
Date of retirement	<input type="text"/>	CDR	<input type="text"/>	
Type of Entry	SSC	CAPT	<input type="text"/>	
Branch	<input type="text"/>	CDRE	<input type="text"/>	
Pool	<input type="text"/>	R/ADM	<input type="text"/>	
Caste	<input type="text"/>	V/ADM	<input type="text"/>	
Religion	<input type="text"/>	ADM	<input type="text"/>	
Sect	<input type="text"/>	Others	<input type="text"/>	
Father Name	<input type="text"/>	Seniority - Bahadur	<input type="text"/>	
Mother Name	<input type="text"/>	Additional Courses Done	<input type="text"/>	
CNIC	<input type="text"/>	Foreign Courses	<input type="text"/>	
Present Address	<input type="text"/>	Deputations	<input type="text"/>	
Permanent Address	<input type="text"/>	Sea hours	<input type="text"/>	
Service Card Number	<input type="text"/>	Creek Hours	<input type="text"/>	
Marital Status	<input type="text"/>			

Figure 8: Edit Records Module

4.5 Insert User:

From this page admin user can add new user, new user must be added before entering the records which is pre-defined functionality of the system.



The screenshot shows the 'Insert User' module of the 'Recruitment Analysis System'. On the left, a sidebar menu lists 'Dashboard' (selected), 'Enter Record', 'View Records', 'Analysis', 'Edit Records', 'Contact Us', 'Help', and 'Users'. The main content area is titled 'USERS' and contains fields for 'P_NO', 'NAME', 'PASSWORD', and 'ROLE'. The 'ROLE' field is set to 'ADMIN'. A 'Logout' button is in the top right, and a cloud/bell icon is in the top right corner of the main area.

Figure 9: Insert User Module

4.6 Analysis

This is the primary part of the application, i.e. the integration with Microsoft Power BI platform and provide multi-dimensional charts, graphs and bars based on live recruitment data stored by admin by entering records in order to aid in Analysis. [8]

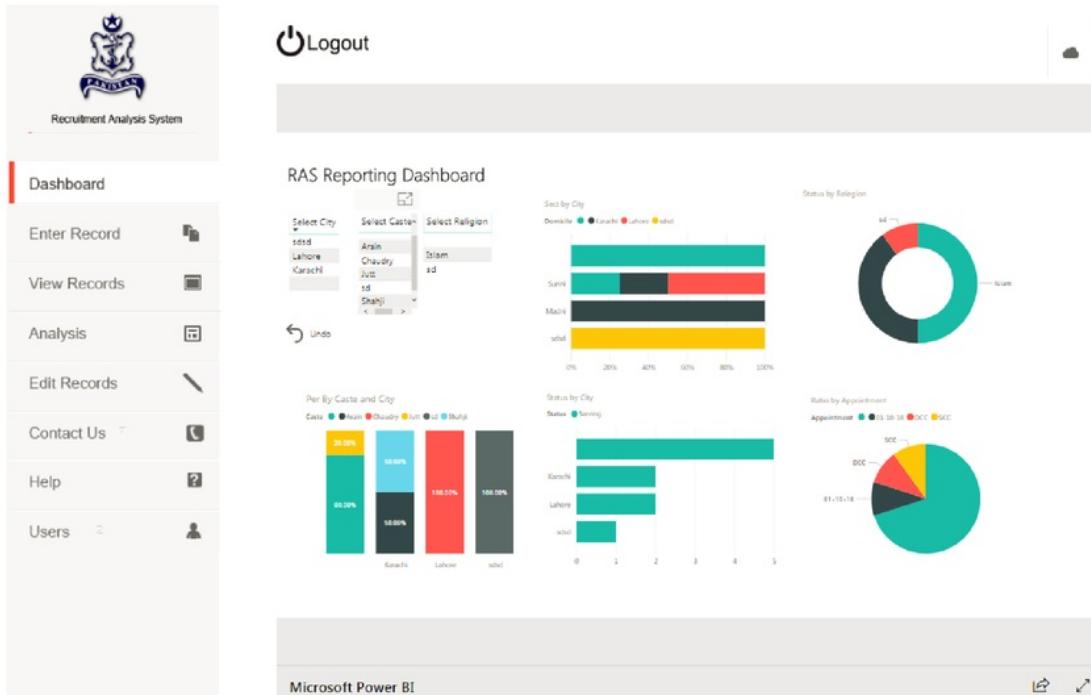


Figure 10: Analysis Module

1 Chapter Five

SUMMARY AND LIMITATIONS

5.1 Summary

Our project **RAS (Web enabled Dashboarding and Analytics System)** is a web-based solution that has no software to download or no hardware to purchase. Just a matter of seconds, user, and admin can be register and start using the web services to enter access and update user records.

No need to go through every individual form to collect data or to manage user/employee records manually, RAS is fully automated system designed to provide user with advanced features to view his information at the same time it provides management with hawk eye view of recruitments reports over major dimension and measures, most advanced BI technology of Microsoft Power BI is used to provide end user with high end analysis through various reports and graphical visuals. The Reporting Dashboard connected with live data shows up to date picture of recruitment for analysis over various perspectives.

1 The management and information systems for a company or an institution etc. are mostly developed and installed on individual systems or they are running on local intranet which is only accessible within the institution or organization. The Internet has brought about the various communication means and the application packages over the internet which are making a clear way towards making **software as a service** over the web, considerably reducing the software development and maintenance cost which was not easy to afford for many small scale business vendors. Now with the increasing demand of data storage capabilities, different vendors are providing cloud services for efficiently storing the data for any need. This has become possible because of waterfall development in communication technology and internet speed. Storage of data over internet is in fact the most reliable because it enables easy recovery of data in case of any loss or damage. Although there is security concerns over internet due to hacking techniques but the advantages of this technology outweigh some of the disadvantages.

5.2 Limitations

Every software project has some milestones and targets. Some are achieved and some remain intact due to lack of time and resources. We too had a lot of goals and milestones but we are on the way to achieve few of them although we have achieved 60% to 70% target. Only a few are left behind due to lack of time which is 4-5 months and funding which was needed to accomplish.

Some of the limitations we have faced are as below:-

- **Link to PN Intranet and HR database (of serving officers and of ISSB entries):** This is the most important limitation as the data can truly be tested for implementation with the records of PN database to actually see the work of the Analysis dashboard section. The project depends on data; more data means more dimensions to show and greater analysis available.
- **Voice Based Management:** Accessing different record fields through microphone and calling different commands detected by system thus time considerably. The task to accomplish was not so easy because there are only a few websites across the world that allows this functionality on the web as there is a no set standard for speech on the web.
- **Data Warehouse:** This functionality will prepare data ready to be used for Data Mining and other statistical analysis (as discussed in the first point).
- **Customization:** There is a requirement to customize the project, making it more general according to the need of the users as they desire.
- **Scan-able form to text integration:** We can simply scan the form and get data out of it which will save time regarding data entry (especially getting photos and signature).
- **Auto text hint and advanced drop downs:** This will allow fast process of data but will only be possible when we link it to a huge data like PN database of officers.
- **Integration AI technologies:** This is further application enhancements like making it more of an expert system to give conclusions based on the data, charts and trends.
- **Geo Json feature:** GeoJSON is an open standard format designed for representing simple geographical features, along with their non-spatial attributes. It is based on JSON, the JavaScript Object Notation. The features includes Points (therefore addresses and locations), Line strings (therefore streets, highways and boundaries), polygons (countries, provinces, tracts of land), Multi-part collections of these types. GeoJSON features need not represent entities of the physical world only; mobile routing and navigation apps, for example, might describe their service coverage using GeoJSON.

- **Data Representation:** With addition of more fields and records (after application in PN database) we can have data representation in additional dimensions like by charts by medical information or by caste, by height etc.
- **Inclusion of Interview, AER and other observations:** We can also add data from interviews e.g. of ISSB or of PNA interview or any course interview and add observation data. This will add depth to our data representation and make it less mathematical based as presently the analysis can only be made based on marks and medical data. This way we can add **Psychological Profile** as well making a more human based analysis system especially if linked with AI. AER Profiles can also be linked of serving people and the employment status of the ISSB rejected to get more upto date and in-depth data for multi-dimensional reports.
- **Adding Biometrics:** We can add thumb prints, retinal scans and other biometric data for security features.
- **Addition of Pictorial Data:** This will allow associated pictures to be stored in the profile like Passport pictures, family pictures or even intelligence related pictures for a broader picture analysis at an individual level.

1 Chapter SIX

FUTURE WORK AND CONCLUSION

6.1 Future Work

1 The scope of the project is very broad and it can be extended to several dimensions.

- **Link to PN Intranet and HR database (of serving officers and of ISSB entries):** This is the most important limitation as the data can truly be tested for implementation with the records of PN database to actually see the work of the Analysis dashboard section. The project depends on data; more data means more dimensions to show and greater analysis available.
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- **Addition of Pictorial Data:** This will allow associated pictures to be stored in the profile like Passport pictures, family pictures or even intelligence related pictures for a broader picture analysis at an individual level.

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6.2 Conclusion

We have come to the conclusion that the Project needs some more time and a lot of effort to complete in all the aspects. We tried our level best but there are a lot to do in this field. At this point we have barely scratched the surface because the field of recruitment is very broad and a huge requirement bundle. There should be a lot of customization and fast service of application to the end user. If the features mentioned in future work are completed, then, the project is a very big deal in not only military but for multi-national industries like in Private Military Contractors or even in Security Companies.

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