Automated Resume Screening

CSE3001 – Software Engineering

PROJECT BASED COMPONENT REPORT

by

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VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Winter Semester 2018-2019

DECLARATION

I hereby declare that the report entitled "Automated Resume Screening" submitted by me, for the CSE3001 Software Engineering (EPJ) to VIT is a record of bonafide work carried out by me under the supervision of Dr.Narayanan Prasanth.

I further declare that the work reported in this report has not been submitted and will not be submitted, either in part or in full, for any other courses in this institute or any other institute or university.

Place : Vellore

Date :

Signature of the Candidate

ACKNOWLEDGEMENT

I would like to extend my sincere and heartfelt gratitude to my faculty Dr. Narayanan Prasanth who has helped me in this endeavour and has always been very cooperative and without his help, cooperation, guidance and encouragement, the project couldn't have been what it evolved to be.

I would also like to thanks my teammates who worked together with me to made this project successful.

At last but not least, gratitude to all my friends who helped me (directly or indirectly) to complete this project within a limited time frame.

Kumar Abhishek

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EXECUTIVE SUMMARY

Overview and project aim	This project involved the design and construction of Automated Resume Screening - a software to ease the recruitment process. The primary aim of the system is to make a web application which accepts all the data of the candidates, process the data and gives the resume of best candidates.
Outline of Process and Planning stage	Initially, individual components of the each web page were designed separately. Team members brainstormed and integrated ideas for components. Sketches were created and discussions were held regarding the proposed function of the components and the overall device.
Outline of initial design stage and prototype testing	Following development of these designs, some components were constructed and tested both individually and in combination with other components.
Outline of evolution of the software and modifications	After testing of prototypes, the software was modified to improve efficiency and overall functionality. Some components were removed and replaced by more efficient processes. In order to meet the time criterion additional components were added during early testing of the prototype device, such as the inclusion of dominos and a spiral ramp.
Outline of construction and testing of final device	In construction of the final software, some changes were made to improve stability, reliability and effectiveness.

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1. Introduction:

1.1 Objective

In this project we are trying to develop a system which will ease the process of recruitment in a company. We are designing a software which will generate a resume template which will be filled by the candidates. Later these resumes will go through the screening process which will examine the resume on the basis of criteria set by the company and allow the selected candidates to choose the interview dates according to their comfort among the various dates issued by the company for the interview.

1.2 Motivation

Present time is the era of technology and software. Almost everything around is run by some software. In this era of software, we are still using old method for selecting someone for a job. The whole process of recruiting someone for the job which starts from resume submission and ends with interview of the candidate is done manually. It uses a lot of time and resources. In this era of fast work where we want to save both time and resources, this process use them a lot.

From the candidate point of view, writing a resume is a very difficult task. A single mistake in resume can cost the job. So, if the company themselves provide a software where candidate only needs to fill the details without thinking about any grammatical mistakes, then it would be very good for candidates and it also helps the best candidate to get the job which may earlier they lose because of few grammatical mistakes.

From a company point of view, it is very difficult to go through the thousands of resumes manually and to select the best candidates for interview. There is a very high chance that they may reject the resume of top candidates by mistake which will not be good for their company development. So, if there is a software which will do the whole screening process itself on the basis of criteria selected by the company and shows the results of only those candidates who passed the screening test, then it will save both time and resources of the company.

On keeping the above problems in account, we are trying to develop a software which will fulfil all the problems stated above.

2. Literature Survey:

[1] There are many peoples who think that only purpose of resume is to get a job which is not entirely correct. It provides a summary of experiences, abilities, skills, as well as the accomplishment made by a person in his life. But still, resume plays a very important role in getting a job. It allows us to convey our intent to apply for a job to the prospective employers. [2] Warren Buffet, CEO of the Berkshire said that "it takes 20 years to build a reputation and five minutes to ruin it. If you think about that, you will do it differently". So, resume is the mirror of the abilities possessed by a person. It is the first impression made by the candidates on the employer. A great businessman once said that the challenge of life, I have found, is to build a resume that doesn't simply tell a story about what you want to be, but it's a story about who you want to be. [3] Key elements in a resume consists of personal information, objective, education details, work and related experience, awards, honours, skills as well as activities and hobbies which should be mentioned in correct manner without explaining and making it in decorative way.

[4] With the advancement in technology, now company are using ATS software for resume screening. ATS stands for Applicant tracking system. It acts as an electronic gatekeeper for an employer. The ATS parses a resume's content into categories and then scans it for specific keywords to determine if the job

application should be passed along the recruiter. [5] Since ATS select resume on the basis of keywords, so a resume with correct keywords can easily pass the test. Some of the ways are by keeping format simple, using advanced keywords, ditching the carrier objective section and writing all the words correctly. [6] There are many cons of using ATS which makes it unfit like it sometimes misread the resume in PDF format, missing out on potential great hires and great pipeline talent when resumes are eliminated. In other words, the ATS is apt to toss the *least-qualified* candidates, rather than identify the applicants who are the *best fit*.

3. Technical Specification:

It is a web-based application. It is divided into two parts:

- **Front-end**:
  It uses **Html-5** to design the outline of interface, **CSS** is used to provide attributes to the interface and make it attractive and **JavaScript** to make the connection between front-end and back-end.

- **Back-end**:
  MongoDB are used to store all the data related to the candidates, company and system.

4. Design:

The Overview of the system is:

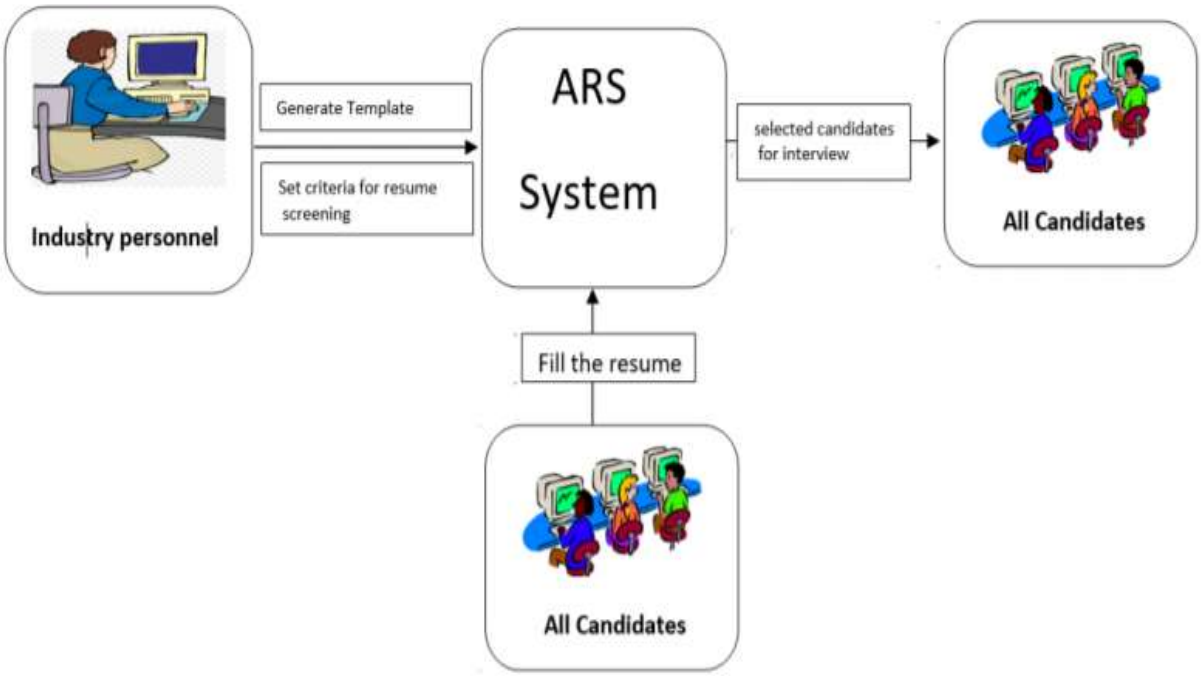

Fig. 1: Overview of the project

Here we can see that the there are three important components of the project. They are: **industry personnel, candidates and ARS System.** Here, the ARS system will do the whole process from the generation of template to the selection of date for the interview.

The Automated Resume System is supposed to have following features.

- Common resume template generated by the industry
- Selection of resume on industries' criteria.
- List of selected candidates for the interviews.
- Candidates allowed choosing any day to give interview from given days.
- Selecting interview date is based on given first come first serve system.

Now, let us see the system design on different levels.

The view of the system at LEVEL – 0:

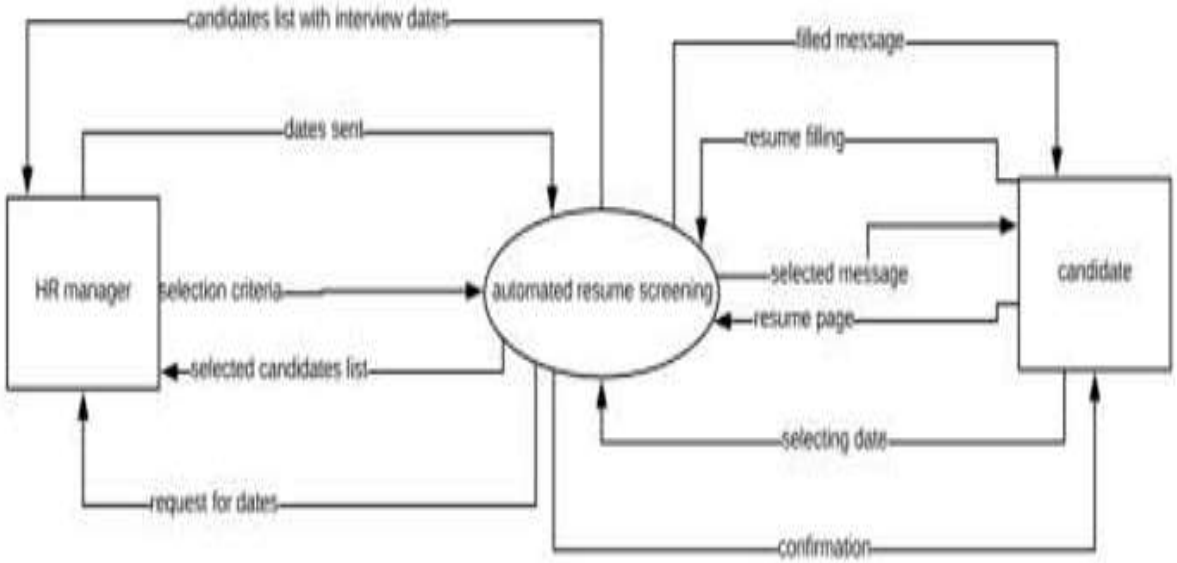

Fig. 2: DFD – 0

When we look deeper inside the Software, it looks like this:

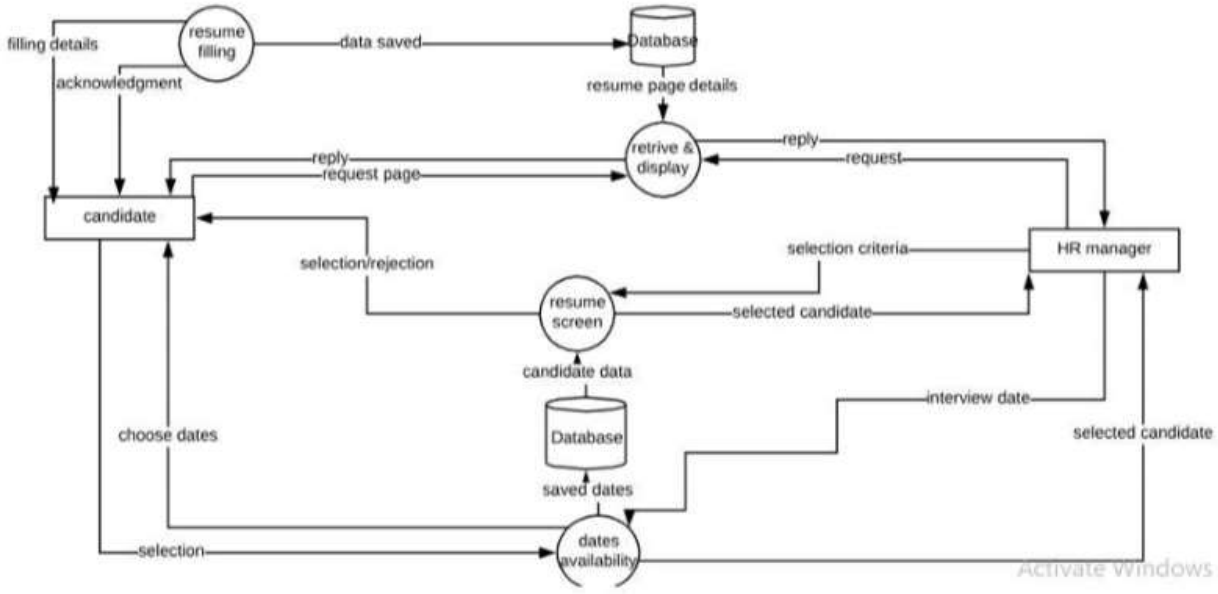

Fig. 3: DFD-1

On further expanding each process, it looks like this:

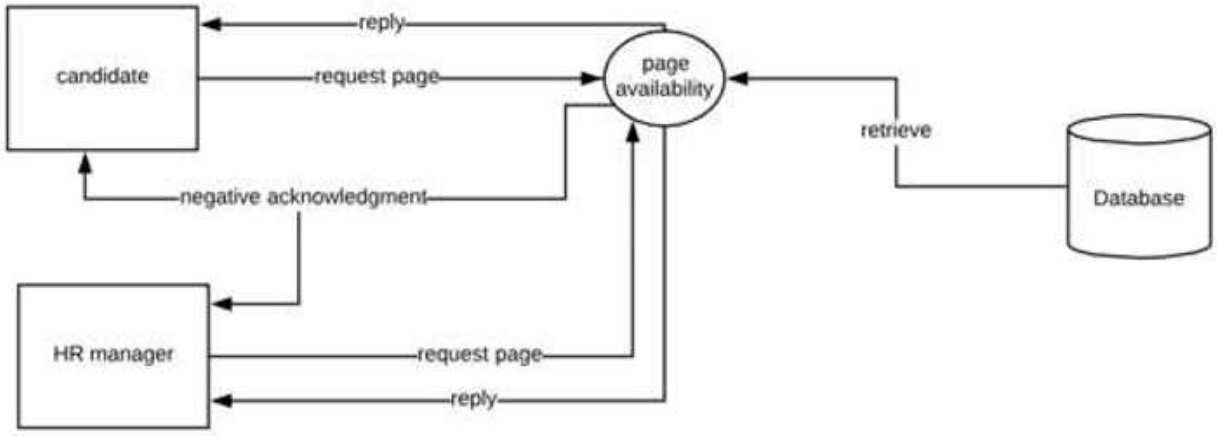

Fig. 4.1: Retrieve and Display

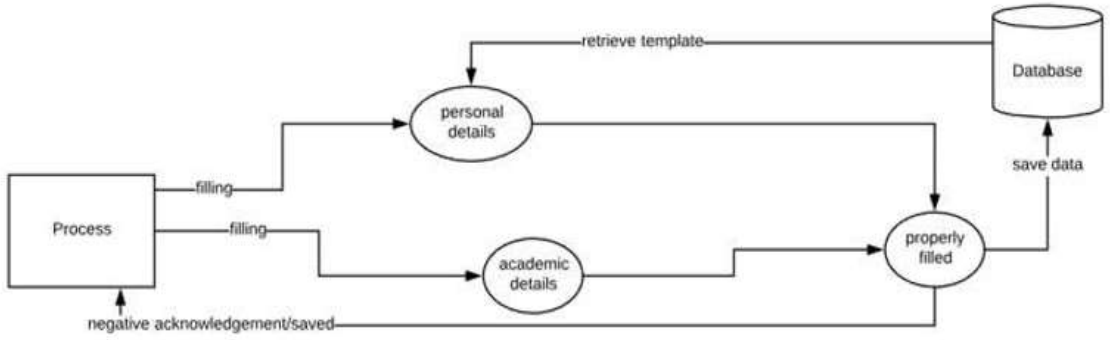

Fig. 4.2: Resume Filling

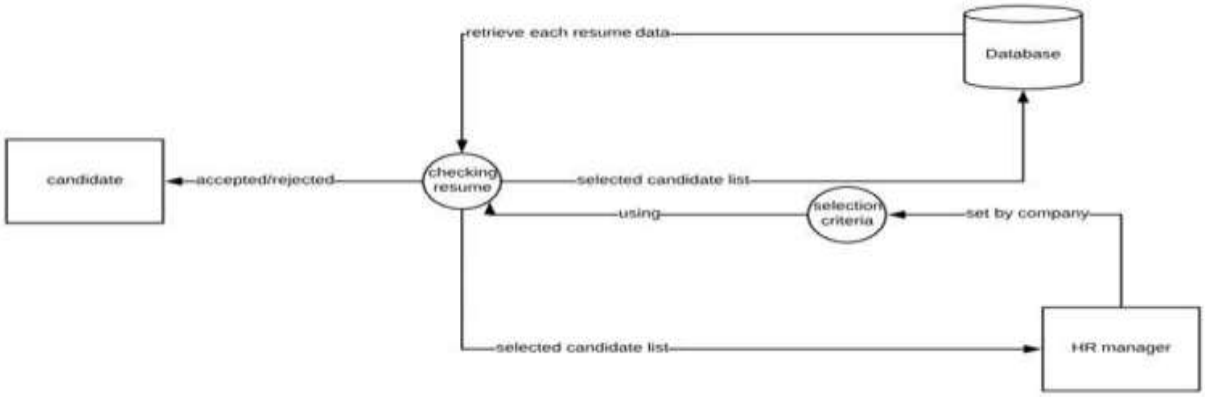

Fig. 4.3: Resume Screening

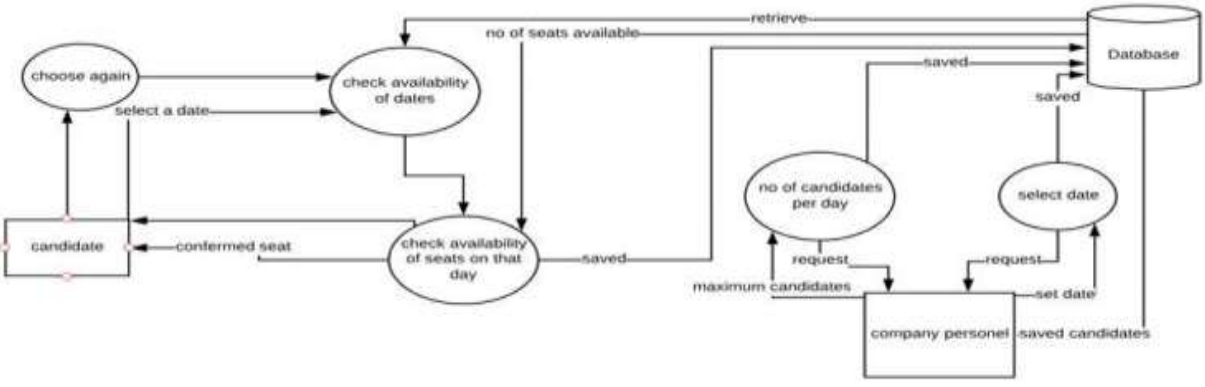

Fig. 4.4: Date Availability

UML DIAGRAMS:

a. USE CASE

It is used to show the relation between the different entities. Here, we have three different entities: Manager, System and Candidate

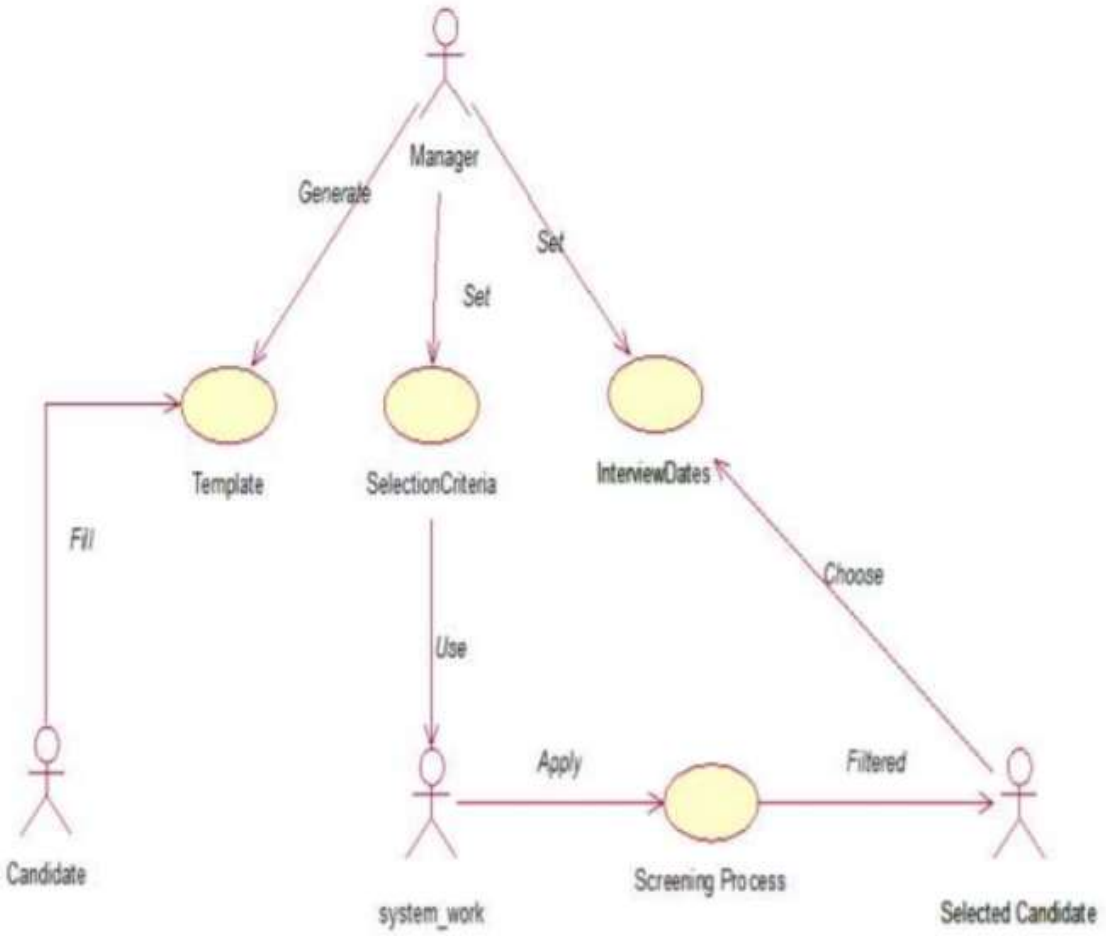

Fig. 5. Use Case

b. Activity Diagram:

This diagram is used to show the whole process of the system step-by-step:

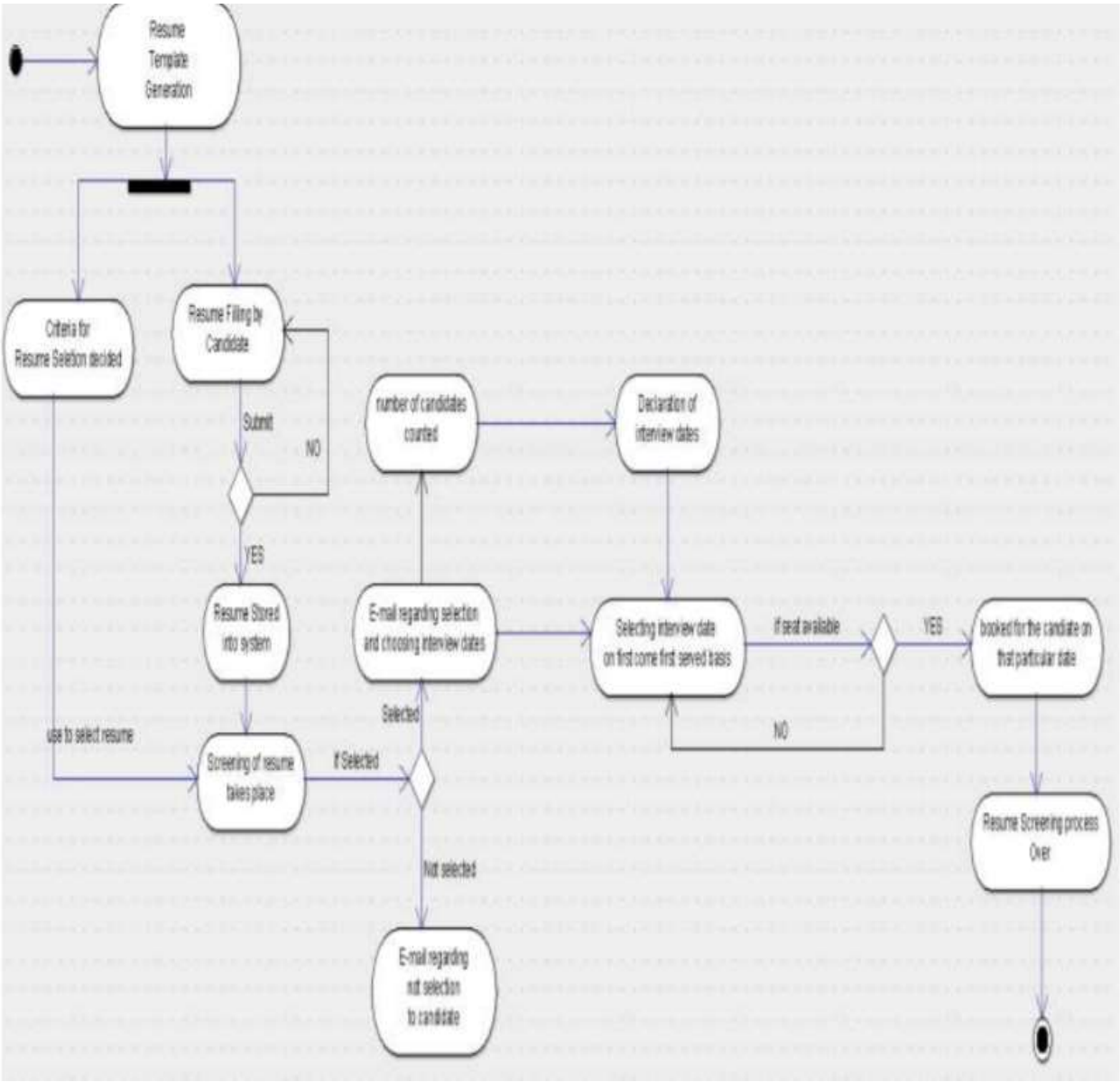

Fig. 6 Activity Diagram

c. Sequence Diagram:

It is used to show the relation between the different components of the system with respect to the data flow.

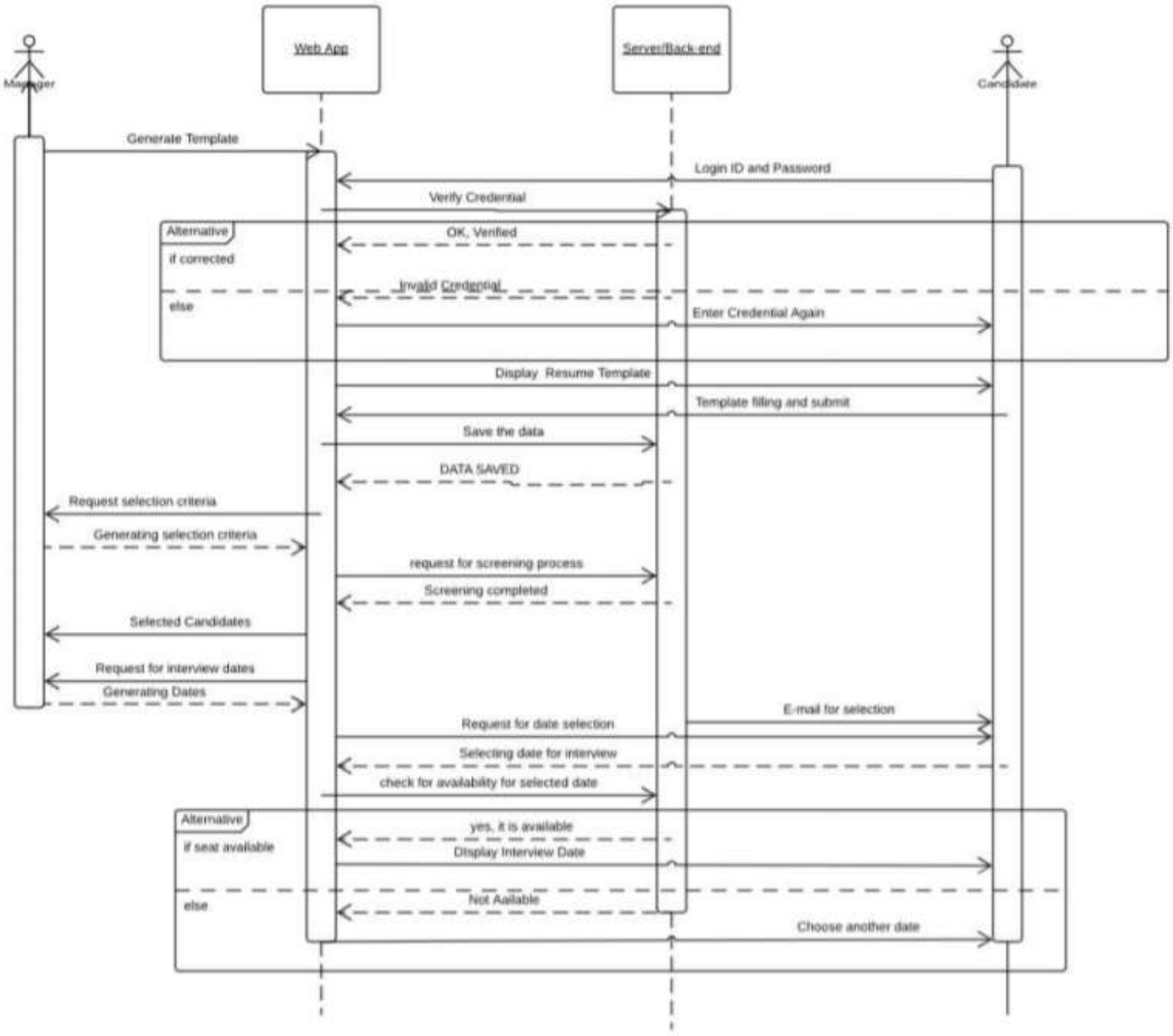

Fig. 7: Sequence Diagram

5. PROPOSED SYSTEM:

Before going for the mechanism behind the system, there are assumptions and constraints that needs to be considered.

Assumptions

- Everyone has access to internet.
- Every has the knowledge to operate on system.
- Everyone knows basic English to fill out the templates.
- Selection criteria will be decided by the organization and must fulfill the requirements of the job.

Constraints:

- Mobile first design makes the designing process quite difficult.
- Hardware or software environment
- End-user environment
- Availability or volatility of resources
- Memory and other capacity limitations
- Performance requirements

The whole system is divided into three parts:

1. Generation of template and Resume Filling by the Candidates.
2. Setting the screening criteria and screening of the resume on the basis of the set criteria.
3. Generation of the interview dates by the company and selection of dates by the candidates on the basis of first come first served basis.

1st section:

a. Generation of the template:

The first most important thing in the process of recruitment is resume. The company will generate the template according to the job offered by the them. The template will contain all the details required by the company for hiring a employee.

The basic template of resume contains two components: **Personal Details and Qualifications**.

Personal Details section of the template contains the basic information of the candidates like name, age, date of birth, address (contains: street no, city, state, country and pin code), email id, languages known by the candidate, etc.

Qualification section contains the academic details as well as the details required by the company like current C.G.P.A, number of internships, number of backlogs, skills, knowledge in particular domain, etc.

Above mentioned details varies according to the requirement of the companies and jobs.

A sample resume template is:

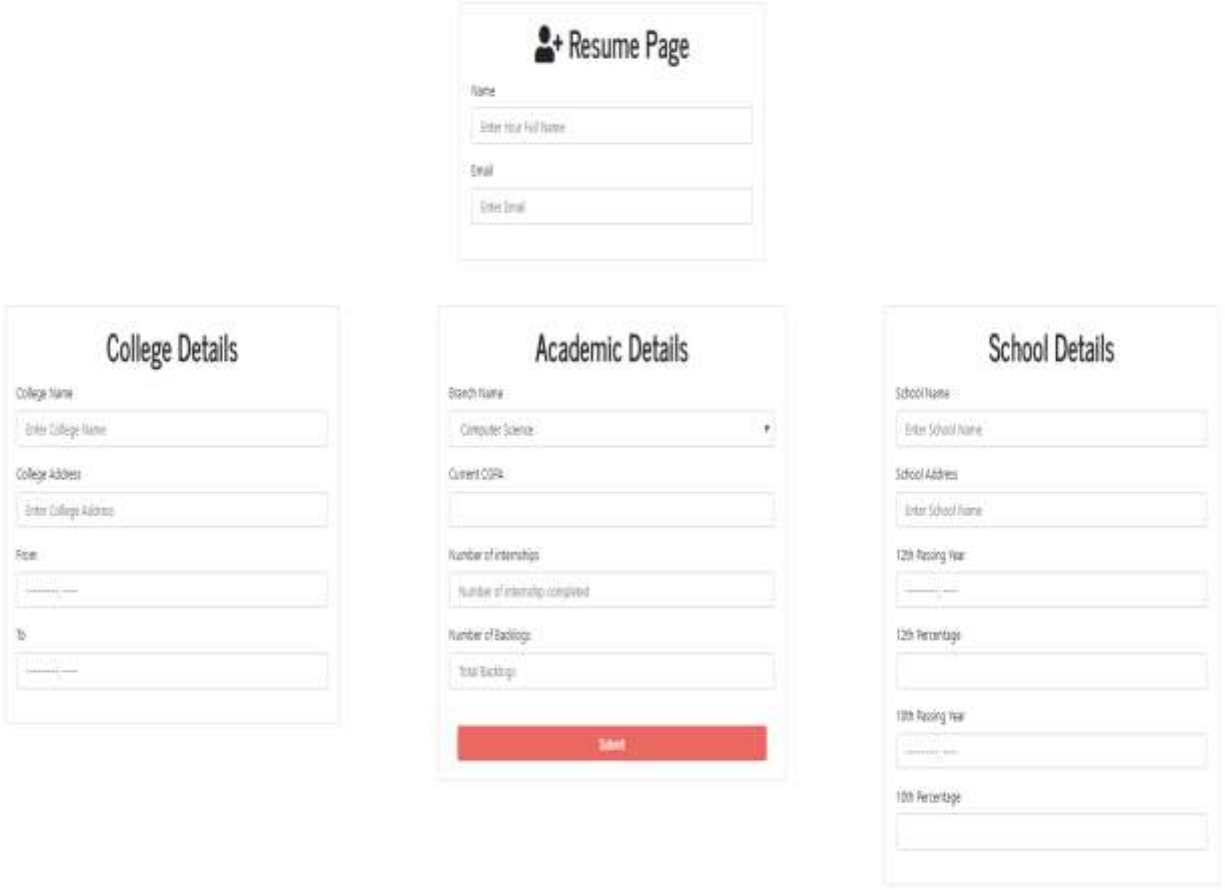

Fig. 8: Resume Page

The above mention resume is taking the Academic details of the candidates like College Details, Schools Details, their performance in the schools and college.

A database is created at the back-end of the software which will save the details of the candidates.

b. Resume Filling by the candidates:

To fill the resume page, candidates do not need to log in into the account. As they visit the company's website a link will be there to redirect them to the resume page.

After landing on resume page, candidates will fill all the details. Software is designed in such a way that candidates cannot proceed further without filling the complete form.

To keep the process of recruitment transparent, one can fill the resume template only one time. To achieve this function, email-id is kept as a primary key. With one email-id, one can fill only one resume. This helps in getting rid of the redundancy of the data.

All the data submitted by the candidates will be saved in the database owned by the company.

name	email	collegename	collegeaddress	start	end	branchname	cgpa	internship	backlogs	schoolname	schooladdress
Abhishek	abhishek@gmail.com	Vit	Vellore, Tamil Nadu	2019	2019	Computer Science	9.43	2	2	B.D PUBLIC SCHOOl	PATNA
Achal	achal.goyal98@gmail.com	Vit	Vellore, Tamil Nadu	2019	2019	Computer Science	9.50	3	1	B.D. PUBLIC SCHOOl	MATHURA
Anil	anil@gmail.com	Vit	Vellore, Tamil Nadu	2018	2022	Electrical and Electronic	8.53	2	0	B PUBLIC SCHOOl	MATHURA
Atulya Alok	atulya@gmail.com	Vit	Vellore, Tamil Nadu	2019	2019	Electrical and Electronic	9.30	4	0	B PUBLIC SCHOOl	Kanpur
Shubham	shubham@gmail.com	Vit	Vellore, Tamil Nadu	2017	2021	Computer Science	8.34	3	3	Kendriya Vidyalaya	VARANASI
Failure	failure@gmail.com	Vit	Vellore, Tamil Nadu	2017	2021	Computer Science	5.60	0	5	new school	new place

Fig. 9: Resume Database

2nd section:

a. **Resume screening criteria:**

After all submission all the resume by the candidate, resume screening process takes place. For resume screening, software requires screening criteria. Once again, company personnel will set the screening criteria.

For setting the screening criteria, company has logged in into the account.

The login page looks like this:

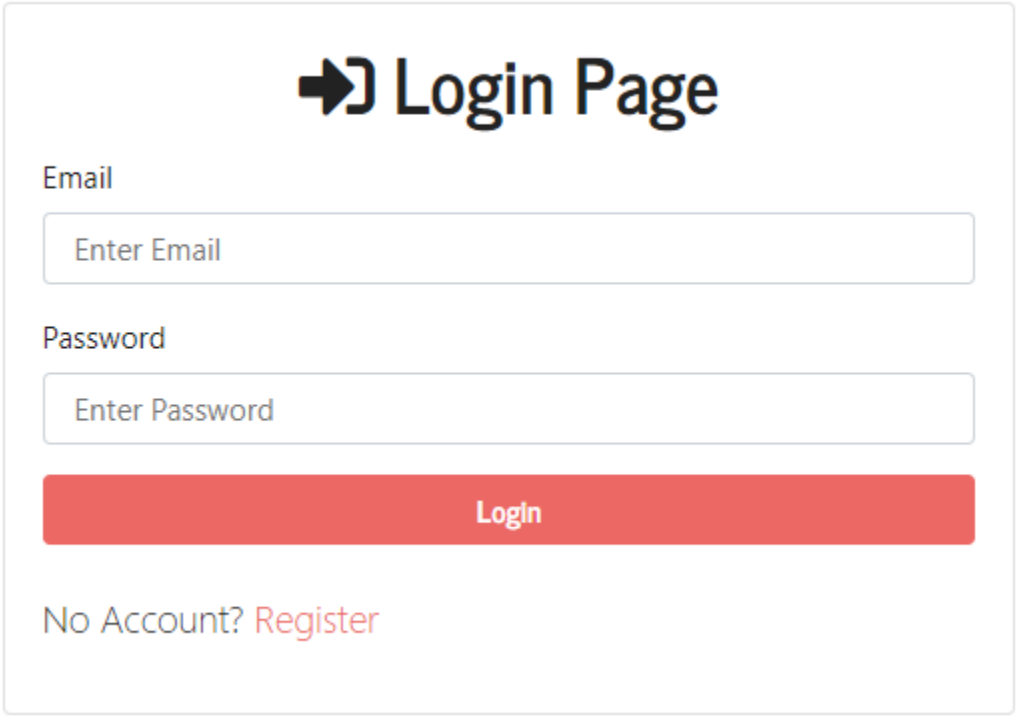

Fig. 10: Login Page

After logged into the account, company will fill the criteria for the screening all the resume. These criteria will be saved to select the resume from the database.

A sample screening page:

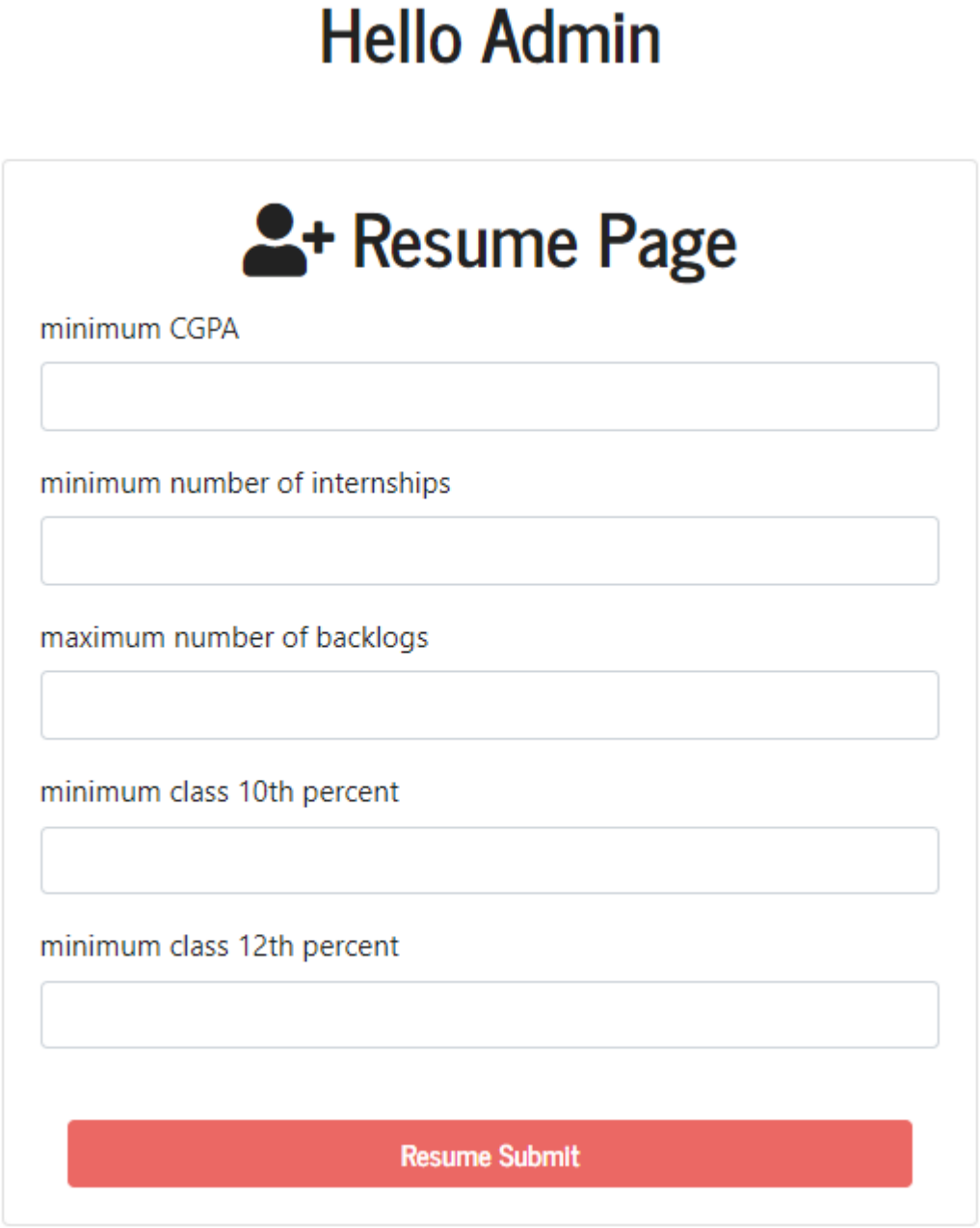

Fig. 11: Screening Criteria Page

b. Screening of the Resume by the system

On the basis of criteria set by the company, the software will extract each resume from the database and will check that whether the resume is fulfilling all the details or not. If it fulfils all the criteria then it will be accepted otherwise system will reject the resume. The accepted resume will be displayed on the Company logged in page.

The sample of the dashboard of the company after screening process is:

Selected Candidate No: 1	Name: Abhishek Email: abhishek@gmail.com College Name: Vit Current CGPA: 9.43 No. of internships: 2 No. of backlogs: 2
Selected Candidate No: 2	Name: Achal Email: achal.goyal98@gmail.com College Name: Vit Current CGPA: 9.50 No. of internships: 3 No. of backlogs: 1
Selected Candidate No: 3	Name: Atulya Alok Email: atulya@gmail.com College Name: Vit Current CGPA: 9.30 No. of internships: 4 No. of backlogs: 0

Fig. 12 Selected Candidate Details

3rd Section:

a. Generation of Interview dates by the company

After the screening of all the resume. The next stage is interview process. Through our system, company can select multiple dates and for each date, company can select the maximum number of interviews taken by them. A new database is maintained for dates and number of candidates.

A sample page of date generation:

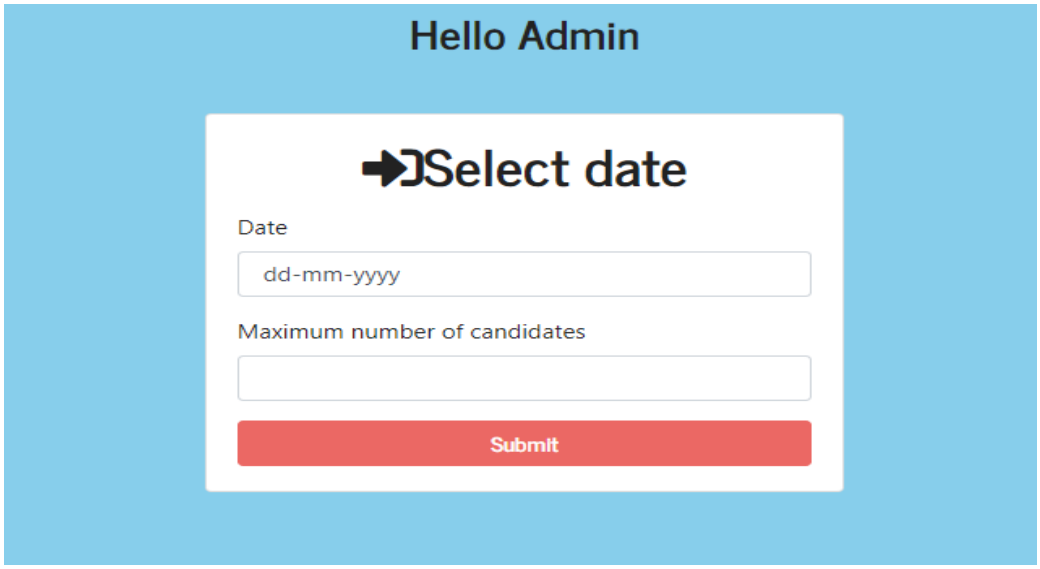

Fig. 13 Date generation page

day	candidatenumber
2019-04-02	0
2019-04-04	6
2019-04-11	6

Fig. 14 Generated Date Database

b. Date selection by the Candidates

Candidates are given privilege to select date for the interview according to their comfort from the set of dates approved by the company. To make the system unbiased, a new process is adopted.

After the announcement of selection dates, an email is sent to all the selected candidates. A link is provided in the email which will be directed to date selection page. Date selection for interview by candidates is based on first come first served. Whoever opt a date first will get the chance to give the interview on that particular date.
Date selection page will continuously display the available dates.

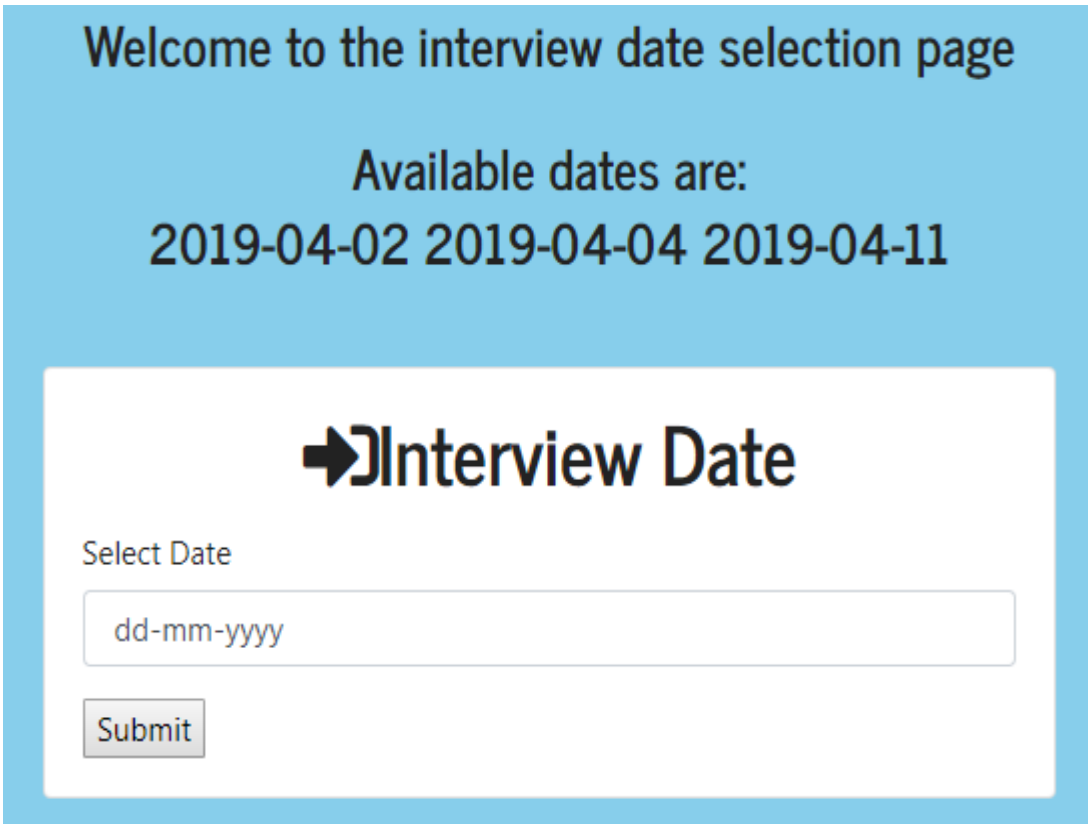

Fig. 15 Date Selection Page

Once candidate selects the date, an email will be sent regarding the documents needed during the interview.
Thus, the work of the system completes.

This is the whole process performed by the system.

6. RESULT AND DISCUSSION

The performance of the project on the basis of various criteria:

Load and Security:

The server can handle many users at a time. More optimized the code, more easily the request can be handled by the server. Only requirement is a good internet connection.

We are using **mongoDB** which provides real time database and at the same time very **high level of security**. Only admin can access the database. Thus, data is protected. MongoDB uses nosql which gives faster response in comparison to other databases.

Deployment:

The whole project is made with assumption that today most of the people across the globe uses **Google Chrome** and **Mozilla Firefox** as their search engine. This web application runs very smoothly on all the versions of the Google Chrome and newer version of Mozilla Firefox which comes after 2010.

Usability:

Every component of this project is designed in such a way that even a person with minimal knowledge of english can easily operate the system. The layout of the webpage is made very simple and at the same time very attractive so that user will not feel boring while surfing through the website.

The resume filling page is made at such that if user misses any field then system will generate alert message regarding that field.

7. Conclusion:

The Automated Resume Screening software is a very helpful and reliable software which will ease the process of recruitment and helps in saving the time and resources of the company. It will help the company in finding the best candidates among the pool of candidates. It is helpful for both the candidates as well as the company.

In future with the help of Machine Learning, we can upgrade this software in such a way that it can be able to assign position to the candidates on the basis of the data provided by the company as well as Candidates.

References:

1. https://theundercoverrecruiter.com/purpose-resume/
2. https://www.business.com/articles/52-inspirational-quotes-about-success-by-ceos-youll-want-to-remember/
3. https://www.washington.edu/doit/key-elements-resume
4. https://www.topresume.com/career-advice/what-is-an-ats-resume
5. https://www.themuse.com/advice/beat-the-robots-how-to-get-your-resume-past-the-system-into-human-hands
6. https://www.pandologic.com/employers/applicant-tracking-system-072016/

APPENDIX:

Code for Login Page (in HTML)

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
     <link rel="stylesheet"
href="https://use.fontawesome.com/releases/v5.6.3/css/all.css" integrity="sha384-
UHRtZLI+pbxtHCWp1t77Bi1L4ZtiqrqD80Kn4Z8NTSRyMA2Fd33n5dQ8lWUE00s/"
crossorigin="anonymous">
    <link
      rel="stylesheet"
      href="https://bootswatch.com/4/journal/bootstrap.min.css"
    />
    <title>LoginPage</title>
  </head>
  <body>
    <div class="container">
    <div class="row mt-5">
  <div class="col-md-6 m-auto">
    <div class="card card-body">
      <h1 class="text-center mb-3"><i class="fas fa-sign-in-alt"></i>  Login
Page</h1>
      <form action="includes/login_inc.php" method="POST">
        <div class="form-group">
          <label for="email">Email</label>
          <input
            type="email"
            id="email"
            name="email"
            class="form-control"
            placeholder="Enter Email"
          />
        </div>
        <div class="form-group">
          <label for="password">Password</label>
          <input
            type="password"
            id="password"
            name="password"
            class="form-control"
```

```
            placeholder="Enter Password"
          />
        </div>
        <button type="submit" name = "loginsubmit"class="btn btn-primary btn-
block">Login</button>
      </form>
      <p class="lead mt-4">
        No Account? <a href="registerpage.php">Register</a>
      </p>
    </div>
  </div>
</div>
    </div>

    <script
      src="https://code.jquery.com/jquery-3.3.1.slim.min.js"
      integrity="sha384-
q8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo"
      crossorigin="anonymous"
    ></script>
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      crossorigin="anonymous"
    ></script>
    <script

src="https://stackpath.bootstrapcdn.com/bootstrap/4.2.1/js/bootstrap.min.js"
      integrity="sha384-
B0UglyR+jN6CkvvICOB2joaf5I4l3gm9GU6Hc1og6Ls7i6U/mkkaduKaBhlAXv9k"
      crossorigin="anonymous"
    ></script>
  </body>
</html>
```

CODE FOR DATE SELECTION:

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <meta http-equiv="X-UA-Compatible" content="ie=edge" />
     <link rel="stylesheet"
href="https://use.fontawesome.com/releases/v5.6.3/css/all.css" integrity="sha384-
UHRtZLI+pbxtHCWp1t77Bi1L4ZtiqrqD80Kn4Z8NTSRyMA2Fd33n5dQ8lWUE00s/"
crossorigin="anonymous">
    <link
      rel="stylesheet"
      href="https://bootswatch.com/4/journal/bootstrap.min.css"
    />
    <title>Select Date</title>
    <style>
    .container{
      margin-top: 40px;
      background-color: skyblue;
      height: 700px;
      padding-top: 100px;
    }
    h3{
      text-align: center;
    }
    .hell{
      text-align: center;
      font-size: 1.3em;
      color: red;
    }
    </style>
  </head>
  <body>

    <div class="container">
    <h3>Welcome to the interview date selection page</h3><br>
    <?php
    echo "<h3>Available dates are:</h3> ";
    include 'includes/interview_inc.php';

    $sql = "select * from interview ;";
    $result = mysqli_query($interviewconnection,$sql);
    $datas = array();
```

```
    if(mysqli_num_rows($result)>0){
        while($row = mysqli_fetch_assoc($result)){
            $datas[]=$row;
        }
        $i = 1;
        echo "<h3>";
        foreach($datas as $data){
            $input1 = $data['day'];
            echo "$input1  ";
            $i++;
        }
        echo "</h3>";
    }



 echo "<div>
 <div class='row mt-5'>
<div class='col-md-6 m-auto'>
 <div class='card card-body'>
   <h1 class='text-center mb-3'><i class='fas fa-sign-in-alt'></i>Interview
Date</h1>
   <form method='POST'>
     <div class='form-group'>
       <label>Select Date</label>
       <input type='date' name='selectdate' class='form-control' >
     </div>
     <button type='submit' name='candidatesubmit'>Submit</button>
   </form>
 </div>
</div>
</div>
 </div>";
    if(isset($_POST['candidatesubmit'])){
        $selectdate = $_POST['selectdate'];
        $sql = "select * from interview where day='$selectdate';";
        $result = mysqli_query($interviewconnection,$sql);
        $datas = mysqli_fetch_assoc($result);
        $data = $datas['candidatenumber'];
        if($data == 0 || $data < 0 )
        {
            echo "Seat not available. Choose another";
        }
        else{
            $sql = "update interview set candidatenumber = candidatenumber - 1
where day='$selectdate';";
```

```
            mysqli_query($interviewconnection, $sql);
            echo "Your interview is on $selectdate";
        }
    }
    ?>
    </div>




    <script
      src="https://code.jquery.com/jquery-3.3.1.slim.min.js"
      integrity="sha384-
q8i/X+965DzO0rT7abK41JStQIAqVgRVzpbzo5smXKp4YfRvH+8abtTE1Pi6jizo"
      crossorigin="anonymous"
    ></script>
    <script

src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.6/umd/popper.min.js"
      integrity="sha384-
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      crossorigin="anonymous"
    ></script>
    <script

src="https://stackpath.bootstrapcdn.com/bootstrap/4.2.1/js/bootstrap.min.js"
      integrity="sha384-
B0UglyR+jN6CkvvICOB2joaf5I4l3gm9GU6Hc1og6Ls7i6U/mkkaduKaBhlAXv9k"
      crossorigin="anonymous"
    ></script>
  </body>
</html>
```