Bilkent University

Department of Computer Engineering

CS 491 - Senior Design Project I

Project short-name: recroute

Project Specifications Report

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1. Introduction

Due to the digitalization of today's world and the pandemic process that has dominated the world for a while, most things have started to be done through online platforms. For these reasons, many transactions such as job interviews and tests measuring technical skills were conducted face-to-face in the past, now carried out through various digital platforms. However, there is no platform to handle all aspects of this process such as meetings between company and the applicant or tests that the applicant must complete before being accepted by the companies.

Normally, recruiters use different platforms at different stages in this process. First, they examine the resumes of job applicants and pass them to a filtering process. Afterwards, they manually send tests to candidates who pass the first stage through another platform such as Hackerrank and Codility to test their technical proficiency. By examining the results of the test, they decide which candidates should go to the next stage. For the candidates who are in the last stage(interview stage), personal interview times are determined and the meetings are arranged via the Zoom platform. The details of the Zoom meeting were sent to the candidates via email manually.

The fact that all these stages are carried out on different platforms and regulated manually creates a serious workload in terms of recruiters. In order to reduce this problem and help companies, we aim to make all these stages easier and faster on a single platform.

This report consists of the brief description of the project, constraints that would be enforced on such a project and both the functional and non-functional requirements of the project.

1.1 Project Description

recroute is an online recruitment platform that facilitates the stages in the recruitment process. This platform allows recruiters to test and evaluate job applicants on a single system. We aim to automate the arrangement of these stages via our recruitment flow.

Our recruitment flow consists of creating application forms, creating tests to measure technical proficiency and interviewing the applicants. Companies can create application forms and they can either send this form to possible employees that the company finds through searching on our platform for specific attributes or they can create a job advert and those who apply to this advert can reach the form and fill it. At this point, our platform provides two alternatives to fill the application form. First alternative is that applicants can apply with a resume. Our platform will use NLP to get the necessary information from the resume and then use this information to fill the application form. If there would be any missing fields after this process, the platform will ask the applicant to fill it herself. The second alternative is that applicants can apply with their LinkedIn account. At this point, our platform will get the necessary information from LinkedIn. Again if there are missing fields after this, the platform will ask applicants to fill the missing fields. If an applicant has no resume or LinkedIn account to fill the form, he/she can manually fill fields in the form. After that, the company can filter the applicants according to their attributes such as graduated university or GPA.

In our platform, companies can test the applicants according to the company's needs. If the company wants, the remaining applicants of the filtering process of the previous part can be directed to tests. These tests can be created by the company or the company can use another test which is already present in the system. These tests may include open-ended, single choice and coding questions which will measure the technical skills of the applicant. Coding questions will be answered through an integrated code editor that supports a wide range of programming languages. Code snippets then will be executed in a sandbox development service on a server. After the candidates complete the test, their results will be shared with the company and those who have the necessary qualifications will be transferred to

the next stage. At this point, our platform will predict the source code quality with machine learning techniques and static analysis. [1]

After tests are done, companies can create online meetings via the Zoom platform with the applicants and finalize the recruitment process. Again the online meeting is not mandatory and in addition to that companies can specify the orders of this process such as first creating an online meeting and then creating the test.

1.2 Constraints

1.2.1 Economic Constraints

The economic constraints on this project will be imposed by the cost associated with the server costing, libraries and APIs. Datasets that will be used to train our code analyzer are free. Our platform is a web application so, it is needed to get domain and hosting which will cost about $7 per month.

1.2.2 Social Constraints

Our platform will be accessible to everyone with access to a browser. We will improve the accessibility of the website so that screen readers can be used to help visually impaired people.

1.2.3 Political Constraints

Since we are an intermediary between companies and workers, there will be no political constraints for us. Any political restrictions that may occur will be the responsibility of users and companies.

1.2.4 Ethical Constraints

Privacy of the personal data will be maintained and the data obtained from the applicants will not be shared with third party libraries. “Code of Ethics” by the National Society of Professional Engineers will be used to constitute the ethical boundaries of the application. [2]

1.2.5 Health and Safety Constraints

Our platform will ease the whole recruitment process by providing online solutions to every stage of it. So, recruiters and applicants can be involved in the process safely while staying at home, which will prevent the spread of coronavirus.

1.2.6 Manufacturability Constraints

Required libraries and APIs (for code execution etc.) for the implementation of the project should be available for us.

1.2.7 Sustainability Constraints

In order to sustain the product, we will develop and maintain it according to the feedback coming from our users, especially companies.

1.3 Professional and Ethical Issues

Privacy of the users is important. Since our application forms need users data, permission of the users will be taken before sending the application form. The collected data will not be used other than the purposes of the platform and the data will not be shared on any other platform. User rights will not be violated while using their data.

2. Requirements

2.1 Functional Requirements

- Recruiters will be able to create application forms by combining necessary questions (experience, skills etc.)
- Recruiters will be able to generate URL links for their application forms and share it with potential applicants via a communication channel.
- Recruiters will be able to search people by applying necessary filters. After listing the results, they will be able to send an invitation email to the application form they created.
- Recruiters will be able to create proficiency tests by combining open-ended, single choice and coding questions. There will be a question pool where recruiters can choose necessary questions among them to create tests.
- Recruiters will be able to create Zoom meetings for interviews with the applicant.
- Recruiters will be able to create recruitment flows for their job advert. These flows will consist of an application form, proficiency tests and interviews.
- Recruitment flows can be automated like rejecting all applicants without proper experience or passing all applicants with a specific skill to the next process.
- Recruiters will be able to see all applicants in a tabular format.
- Recruiters will be able to filter and search by any attribute in tables.
- There will be an action button whose purpose is passing selected applicants to the next process in the recruitment flow. If the next process is a proficiency test, it will send mail to the applicant with a link to the test. If the next process is an interview, the application will create a Zoom meeting and send it to the applicant via mail.
- Applicants will be able to fill application forms on their own, or they can apply with their LinkedIn accounts or resumes to prepopulate possible fields of the form.

- Recruiters will be able to see applicants' performance on coding tests such as code quality, run time, memory usage etc.
- Recruiters will be able to see which applicants are rejected or passed in which process.

2.2 Non-functional Requirements

2.2.1 Performance

- Application should be quick and responsive in order to provide a user friendly experience. Clients should be able to access and send data to the server in less than 1 second response time.

2.2.2 Scalability

- Application should be able to handle 1000 users simultaneously without delays as the platform is designed to be a social platform that will be heavily used by clients.
- Number of application servers should be able to increase if there is a heavy load on a server.

2.2.3 Availability

- Application should be available to use %98 of the time in a month because it will handle most of the recruitment process of a company.

2.2.4 Extensibility

- Main idea behind the application is to improve user experience over the recruitment process, thus, the application should be open to upgrades and changes according to the user feedback.

2.2.5 Privacy and Security

- Application should provide an information of applicant to a recruiter only if applicant applies for an advert created by that recruiter.
- Application should keep sensitive data encrypted.

- Application should use TLS v1.1 or higher version to provide a secure communication between client and server.
- Sandbox development environment (Coding question processor service) should be safe in order to block incoming attacks from applicants. Sandbox environment should not have administrative permissions and it needs to run on another physical machine than the main application server for any incoming attacks.

3. References

[1] “Predicting Source Code Quality with Static Analysis and Machine Learning”, [Online] Available: https://core.ac.uk/download/pdf/327107614.pdf [Accessed Oct 10, 2021]

[2] “Code of Ethics | National Society of Professional Engineers” Nspe.org, 2019, [Online] Available: https://www.nspe.org/resources/ethics/code-ethics [Accessed Oct 10, 2021]