

# Online Recruitment System and Personality Prediction

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**Abstract:** As far as employment is concerned, selecting the right candidate from a vast pool of candidates is essential not only for the recruitment process but also for the organization as to whether a particular candidates' skills align with the requirements of the company. In order to determine that, a candidate has to go through various rounds such as technical round, interviews, and group discussions etc. which comes under traditional methods. Aptitude round followed by interview rounds is a traditional practice for any recruitment process. Now, these traditional practices are no doubt time-consuming, hectic which may sometimes lead to unfair choices of the candidate. If we go for an online selection process instead of a traditional recruitment process, then a fair selection of the candidate is possible and the time consumed would also be less comparatively. Personality is an important factor because it determines whether the candidate is fit to work in a particular work culture or not. So, the secondary objective of our project is that once the candidate has successfully gone through the online recruitment procedure then he/she will also have to give a personality quiz in order to determine the personality of the candidate. By doing so, the recruiter will have a clear picture about the overall personality of the candidate.

**Keywords** —employment, recruitment, personality, online test

## I. INTRODUCTION

We all know that a job seeker applies for a job position in a company, now, in order to work in that company, he/she will have to go through several rounds of interview namely, aptitude round, group discussion, HR round and so on. Most of the companies follow Aptitude round and the shortlisted candidates will have to give an interview. Now, these traditional practices are no doubt time-consuming, hectic which may sometimes lead to unfair choices of the candidate. If we go for an online selection process instead of a traditional recruitment process, then a fair selection of the candidate is possible and the time consumed would also be less comparatively. Apart from ingenuity, personality of the candidate, that is, his/her mindset when it comes to approaching certain things or situation is what drives the interviewer in most of the cases. So, the secondary objective of our project is that once the candidate has successfully gone through the online recruitment procedure then he/she will also have to give a personality quiz in order to determine the personality of the candidate. By doing so, the recruiter will have a clear idea as to whether the particular candidate is a good fit for the job or not.

## II. NEED OF PROJECT

In times like Pandemic where everyone is stuck at home, where the nation is in a lockdown, so there is no chance of

going out in search for jobs. If we go for an online selection process instead of a traditional recruitment process, this would broaden up the chances of job seekers. Then there can be a fair selection of the candidate and the time consumed would also be less comparatively because with only having a limited amount of time in an interview, candidate skills and abilities can often be overlooked on a CV in a traditional method. If we follow these methods, then a candidate might have to face some disadvantages such as biased selection of a candidate, differences in the opinions, may not be a highly transparent procedure. Also, a personality test offers a deeper insight as to whether a candidate can adapt himself/herself into a company's work culture or not. With the help of machine learning algorithm, Personality evaluation test can be conducted, which can in turn help the HR department to select the right candidate for a particular job profile.

## III. LITERATURE REVIEW

[1] In this paper, Allan Robey, Kaushik Shukla, Kashish Agarwal have presented a system where in the candidates' are supposed to upload their CV, through this the system analyzes the eligibility based on their CV. This system also uses TF-IDF machine learning algorithm so that there is a better evaluation of the scores, personality test obtained by the candidate. The provided system is such that the recruitment process is automated there by being fair in the

decision.

[2] In this paper, Kosinski, Michal, Pushmeet Kohli have examined users' behaviour on online environment, such as, their website choices, Facebook profile features and how it resonates to their personality in the offline world. This is measured by the standard Five Factor Model personality questionnaire. And the results show psychologically meaningful links between users' personalities, their website preferences, profile features etc. So, basically this system emphasizes on how users behaviour on online platforms can reflect their personality.

[3] In this paper, Aseel Kmail, Mohammed Maree, Mohammed Belkhatir have stated that although there have been a number of automatic recruitment system in the market and have been doing really well but sometimes it misses out relevant information especially the ones which uses keyword matching pattern. Hence, the authors have presented an automatic recruitment system which highlights the relevant content concepts that were not initially recognized by semantic resources.

[4] Here, the authors purpose was to develop an online recruitment software such that the system is effective in terms cost effectiveness, security, reliability and 4 performance. The proposed system was developed using modified waterfall model. This software was also evaluated by six groups of respondents to determine the above mentioned factors. And there were no differences in the six groups of respondents because they had the same rating on the effectiveness of the software.

[5] In this paper, Rozy Rani, Talwandi sabo basically provided an overview of the topic and analysis of the system such as how everything in this world is getting transformed into digitalization. So, in this internet era, this system provides an insight for job seekers to find employment by using internet as a job search tool.

#### IV. OBJECTIVE

The system is two sided: first one being candidate oriented and the second one is organization oriented. In the first, we are enabling the candidates to appear for various tests of various companies. In the second scenario, the recruiter would publish the specifications and requirements of available job positions and the candidates can apply for the same.

A series of online tests would be conducted and the best suited candidate would be shortlisted.

In this system, machine Learning will be used to detect the personality. Personality analysis using machine learning algorithm to predict personality of a person using psychometric questions which would judge a candidate based on his/her overall personality, IQ and academic performance. This system provides a holistic perspective to the organization.

The functions which the admin and user can perform are:

a. Admin Module:

Following are the tasks of the admin module:-

- Authority to login.
- Conduct aptitude and personality tests.
- Add questions and options for the test to be conducted.
- Add the correct option for the questions.
- Add, modify or delete the questions and the options as per requirement.
- Add, delete or modify stipulated time for the test for a given company.
- View candidate results in order of maximum to minimum.

b. Candidate Module:

Following are the tasks of the candidate module:-

- Register to the system.
- Login with username and password.
- Select the company as per the candidate's interest.
- Attend the test.
- View the test score for all the previous tests that the candidate has appeared.

#### V. METHODOLOGY

The system has two modules, one being candidate oriented and the other module is organization oriented. In the first case the system would enable the candidate to give the test for a particular company and also view the results of their previous tests which would help them to improve their performance. In the second scenario, the specifications and requirements of available job positions would be posted by the recruiter and the candidates can apply for the same by appearing for the required test.

A series of online tests would be conducted and the best suited candidate would be shortlisted. We have used HTML, CSS for designing the frontend, Ajax for designing the timer and php to implement the backend of the project. In the backend 5 tables are created namely :

- Registration which contains registration details of the candidates.
- Admin\_login which contains the admin credentials.
- Companies which contain the company name and the total timing for which the test for the company is to be conducted.
- Questions which contains the questions, options for the question and its answer.
- Exam\_results which contains the candidate details and marks secured by them.

Also in this system, machine Learning will be used to detect the personality of the candidate. Here we would classify the personality of the candidate based on the Big Five Personality Model (also known as Five Factor Model).

Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism are the five personalities based on which we would predict the personality of the candidate.

- Neuroticism : Anxiety, Impulsivity
- Extraversion : Energy, stimulation through company of others
- Openness (to experience): Academic curiosity, highly correlated with liberal political leaning.
- Agreeableness: Compassion, desire for social cohesiveness
- Conscientiousness: Discipline, organization, motivation

Here the candidate would be given 5 questions to answer where each question belongs to one category. The candidate would need to rate himself/herself between 1 to 10 for each question where 1 representing strongly disagree and 10 representing strongly agree.

Based on the outcome of psychometric test, psychometric analysis is performed to choose the right candidate as per the need of an organization.

To implement the system, we have used the logistic regression algorithm to predict the personality (extraverted, serious, dependable, lively, responsible). We have used the big five personality dataset and performed analysis and predicted the personality using multinomial logistic regression algorithm. The dataset has 710 observations and 8 columns.

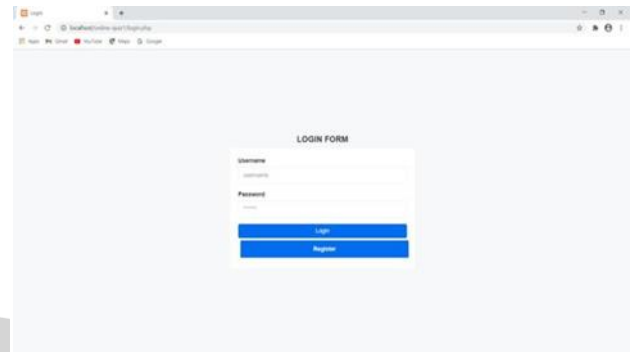
	Gender	Age	openness	neuroticis	conscienti	agreeabler	extraversi	Personality (Class label)
1								
2	Male	17	7	4	7	3	2	extraverted
3	Male	19	4	5	4	6	6	serious
4	Female	18	7	6	4	5	5	dependable
5	Female	22	5	6	7	4	3	extraverted
6	Female	19	7	4	6	5	4	lively
7	Male	18	5	7	7	6	4	lively
8	Female	17	5	6	5	7	4	extraverted
9	Female	19	6	6	7	5	4	extraverted
10	Male	18	5	7	5	6	7	dependable
11	Female	19	5	5	7	4	5	lively
12	Male	19	6	7	5	6	3	serious
13	Male	19	7	6	7	7	6	extraverted
14	Male	19	7	6	6	5	6	lively
15	Female	19	6	7	5	5	5	dependable
16	Female	19	5	5	4	5	4	responsible
17	Male	19	5	6	4	6	3	extraverted
18	Female	19	7	7	2	6	5	serious
19	Female	18	6	7	4	4	2	dependable
20	Female	19	6	6	6	4	3	responsible
21	Female	19	5	6	3	3	3	extraverted
22	Female	19	6	4	6	3	4	responsible
23	Male	18	4	5	4	3	6	extraverted
24	Female	19	5	4	5	5	3	responsible
25	Male	20	5	3	3	4	4	serious
26	Female	19	6	7	5	5	4	serious
27	Female	19	7	5	6	6	5	dependable

(Fig 5.1:Dataset snapshot)

Logistic regression is a predictive modelling machine learning algorithm. Here we convert all non-numerical data into numerical data. In the gender column Male is mapped as 1 and Female as 0. In the personality column we need to map extraverted as 0, serious as 1, dependable as 2, lively as 3 and responsible as 4. We would then consider gender, age, openness score, neuroticism score, conscientiousness score, agreeableness score, extraversion score as the parameters to predict the personality. These are considered as independent variables and personality is considered as the dependent

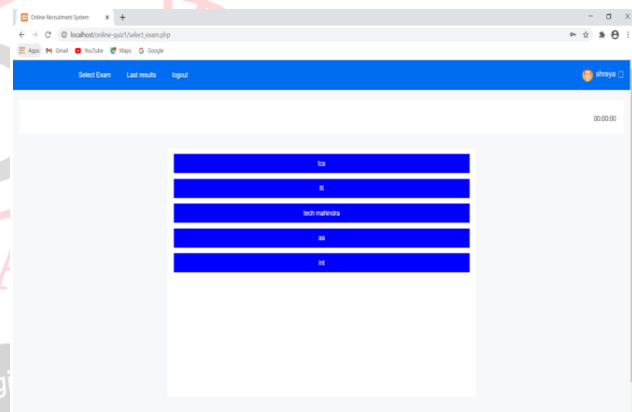
variable. In this project, we have configured multinomial logistic regression for logistic regression class by assigning multinomial to the multi\_class argument and newton-cg (It is a newton method. Newton methods use an exact Hessian matrix. It computes the second derivatives.) for solver argument that supports multinomial logistic regression. We then fit the dependable and independent variables into the logistic regression model which is imported from the sklearn library. The predicted personality is then calculated and displayed in the output.

## VI. RESULTS



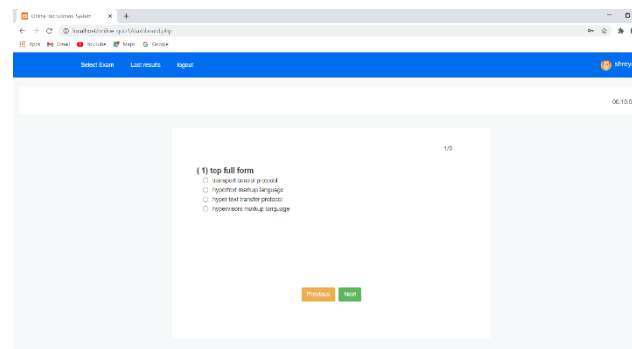
(Fig.6.1: Login page)

The candidate has to first login with the credentials that they have registered with. The registration page does not allow duplication of username or email address.



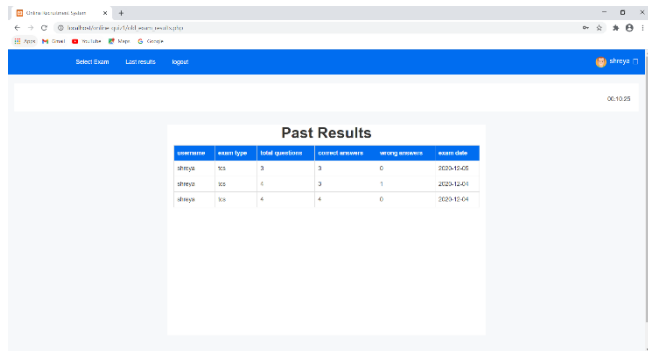
(Fig 6.2: List of companies)

Once the candidate logs in, they will be able to view the list of companies and they would have to select the company for which they want to appear for.



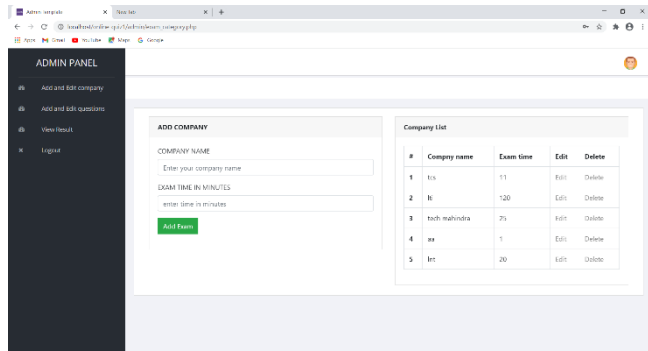
(Fig 6.3: Test Page)

On selecting the company, the candidate would be directed to the test page. As soon as the company is clicked the count down timer begins. The test would automatically end when the time is completed. The candidate can submit the test once they finish the test.



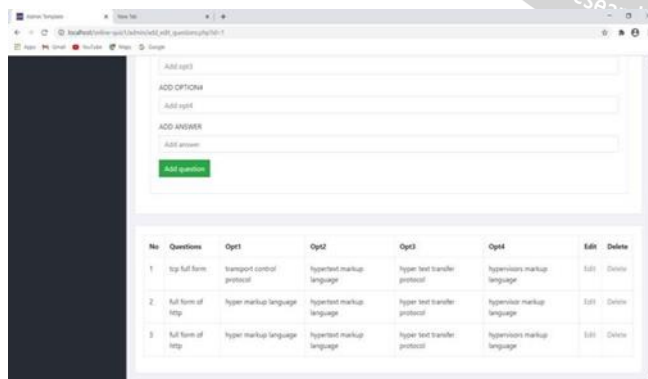
(Fig 6.4: Candidate's past results)

Once the test is submitted, the candidate can view their total score and also view their past results for the companies they might have appeared so as to see their progress and improvement from the previous test.



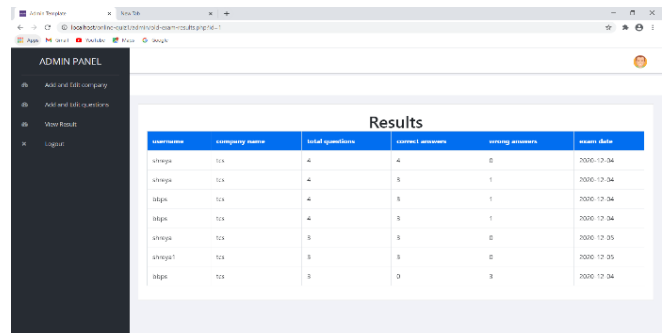
(Fig 6.5: Admin module: add companies)

In the admin module, the admin has to login with pre assigned login details. Here the admin can add the company name as well as assign the total time for which the test is to be conducted.



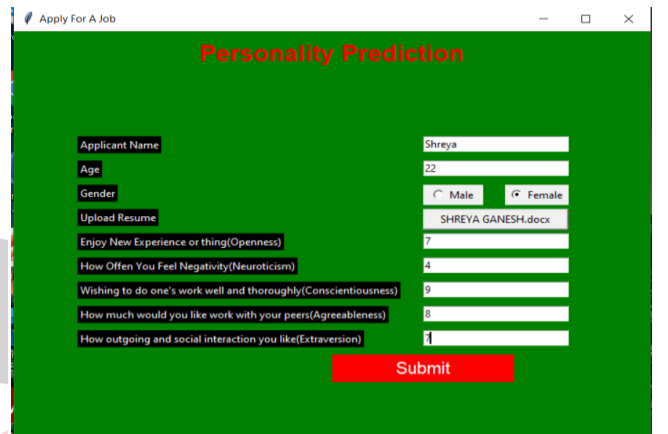
(Fig 6.6: Admin module: add options)

After creating a company, the admin can add questions along with four options and also mention the correct choice amongst the four options. The admin can also modify existing questions and options and can also delete any question.



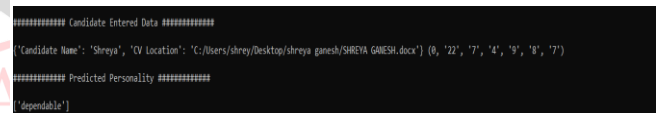
(Fig 6.7: Admin module: view results)

The admin can view the results of all the candidates that have applied for the test in descending order of score with maximum scorer being at the top.



(Fig 6.8: Personality Prediction module)

The candidate has to enter their credentials and rate themselves from 1 to 10. With 1 being strongly disagree to the question and 10 being strongly agree to the question.



(Fig 6.9: Personality predicted)

The employer can see the candidate's personality being predicted.

## VII. CONCLUSION

The system that we have implemented is an unbiased and a highly transparent system that selects a near perfect candidate.

Since we are also analyzing the personality of the candidate, the employer would get an insight of the overall personality and the candidate would be selected according to the job requirement. Therefore, if we opt for an online selection process, then a fair selection of the candidate is possible as compared to the traditional recruitment process. The traditional practices take up a lot of time and effort, which can sometimes result in unfair choices of the candidate. So, if we go for an Online Recruitment System, the time consumed would be less as there is no manual work required. We have also implemented a personality prediction system using multinomial logistic regression.

This can be used for career counseling, employment

testing, criminal mind analysis etc. Thus, the implemented system can be used for recruiting employees in an unbiased and transparent manner by companies.

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