

**OUTERVIEW A TECHNICAL RECRUITMENT PROCESS**<sup>1</sup>Anitha V, <sup>2</sup>SandeepVignesh S, <sup>3</sup>Prathingara R K<sup>1</sup>Assistant Professor, Sri Sairam Engineering College, Tambaram,<sup>2,3</sup>Department of MBA, Sri Sai Ram Engineering College, Chennai, India[anitha.mba@sairam.edu.in](mailto:anitha.mba@sairam.edu.in) , [sec23mb045@sairamtap.edu.in](mailto:sec23mb045@sairamtap.edu.in) , [sec23mb034@sairamtap.edu.in](mailto:sec23mb034@sairamtap.edu.in)**Abstract—**

The present interview system is biased over a candidate's performance in a '3-hour interview' but then it does not take into account other factors that prove beneficial such as the candidates competitive coding skills, real-time project capabilities, contribution to the open source development community and so on. Here, with the help of OUTERview, a software application that gets access of the candidate's publicly available resources such as GITHUB, STACK OVERFLOW, HACKEARTH, etc. Furthermore, it scrapes the data available and generates a scoresheet that gives an overall assertion about their technical abilities, coding skills and the kind of languages used to prototype. On the other hand, a model is trained to predict the churn rate and the satisfaction rate of the employee in the company post getting hired while another model is trained with a genetic algorithm that assigns the candidate to the rightful and respected team.

**Keywords—***OUTerview, Interview, Candidates, Genetic algorithm.*

**I. INTRODUCTION**

Technical interviews are common amongst employers recruiting for engineering, science or I.T (Information Technology) roles. Essentially, it's an interview to assess your technical ability, usually related to the technical knowledge required for the role and the organization you wish to work for. Some questions might focus less on technical knowledge, more on how you think. Such questions are looking to test your problem solving or your numerical reasoning abilities. This might involve being asked a few brainteasers or undertaking a numerical reasoning test. The prospect of a technical interview can leave the best of us trembling with nerves. How many times have you gone through a technical interview where you feel you're acing it, and then a question comes that leaves you stumped? And from there the entire interview goes downhill because now you have lost confidence and the recruiter has lost interest. But is it fair to judge the technical capabilities of a candidate based entirely on a 3-hour interview? This is a loss at both ends because now the company has lost a potential candidate and the candidate has lost an opportunity. If only there was a way through which the recruiter can get the gist about the technical capabilities of the candidate outside the interview hall. A scoring system of sorts — that would give an ideal score to gauge the

technical knowledge of the candidate, and thereby help the recruiter to make an informed, unbiased decision. Sounds like a dream scenario, right? So, we decided to solve a real-world problem which most of us have faced in our professional careers. The technical round in an interview! Henceforth, we decided to come up with a proposal called "OUTERview" that aims to crack this challenge.

**II. RELATED WORK**

Many researchers are working to automate the interview process and trying to implement completely virtual interview system using different techniques and different datasets. The following papers focus on interview automation.

In 2019, Michael R. Neece, Sharon A. Wulf presented their model that defines a practical data-driven process that solves these challenges. Using this framework, hiring teams can easily organize position-specific selection criteria that align critical interviewing activities and fuels data rich hiring decision-making. This process has been deployed at small and large organizations, resulting in a data-driven process with more effective decision-making faster hiring, increased quality-of-hire, reduced costs, and lower risks.

In 2019, Xinpei Jin, Yulong Bian, et al. presented a system that includes three main

contents: three virtual agents with different types of personality, three kinds of interview training contents and a multidimensional evaluation method, so that it is able to meet common demands of preparing for interviews.

In 2019, Iftekhar Naim , Md. Iftekhar Tanveer ,et al presented a Natural Language Processing based Jaro-The Interviewing Chatbot system that accelerates the interview process towards an unbiased decision-making process by proposing a chatbot that would conduct interviews by analyzing the candidates Curriculum Vitae (CV), based on which, it then prepares a set of questions to be asked to the candidate. The system will consist of features like resume analysis and automatic interview processes.

In 2019, Sarah S. Alduayj ,Phillip Smith presented their work “Sentiment Classification and Prediction of Job Interview Performance” that uses machine learning and neural network models, such as support vector machines, logistic regression, Naïve Bayes, and long short-term memory (LSTM), were trained to predict the candidates' sentiments after a job interview.

In 2018, Saundry Rajesh, Umasanker Kandaswamy, Anju Rakesh presented their work “The impact of Artificial Intelligence in Talent Acquisition Lifecycle” that play a large role in reducing biases in candidate assessments, improving relationships with employees, improving metrics, improving workplace environment, so on and so forth.

In 2018, Iftekhar Naim ; Md. Iftekhar Tanveer et al. presented a frame work “Automated Analysis and Prediction of Job Interview Performance” which is trained by analyzing the videos of 138 interview sessions with 69 internship-seeking undergraduates at the Massachusetts Institute of Technology (MIT). Our automated analysis includes facial expressions (e.g., smiles, head gestures, facial tracking points), language (e.g., word counts, topic modeling), and prosodic information (e.g., pitch, intonation, and pauses) of the interviewees.

In 2018, Geetha R, Bhanu Sree Reddy D, presented their work “Recruitment Through Artificial Intelligence” by using Artificial intelligence and machine learning for job search would reduce the time and cost for both company

and the candidate. New technology on recruitment will lead to use more timing on selecting prospective aspirants and less on resume scrutiny.

In 2018, Iulia Stanica ; Maria-Iuliana Dascalu et al. presented a VR Job Interview Simulator which proposes an innovative way of training for an interview. By combining the advantages of various technologies, such as virtual reality and chatbots, our application creates an interactive way of helping software engineers train for their interviews. Emotion recognition techniques are also included, helping provide accurate feedback for the user.

In 2018, Glenn Maura-Ayquipa ,Alex Ramirez-Lázaro et al. presented a Human Resources Management Model based on Business Intelligence in which it is said that BI solutions support in deciding in different types of areas, especially in personnel management, which have to consider the analysis of human talent, skills acquired, and the necessary budget to provide a new specialty referring to the work that financial, personnel management, organization chart and finally the organizational culture components.

### III. EXISTING SYSTEM

The existing system has been designed in such a way that the evaluation of the candidate is completely based on how they are going to present themselves in front of the interviewer. The candidate is completely analyzed based on his performance during the interview. If the candidate does not perform well, the interviewer gets unsatisfied and thus the interviewer comes to a wrong assumption that the candidate is not fit for the job profile and the candidate is rejected. Many existing models tries to resolve the problems in the conventional model of human recruitment. They came up with automizing the recruitment process by introducing chatbots (artificial intelligence), virtualizing the interview environment using virtual and augmented reality, system that enables the candidate to overcome shyness, fear, nervousness. The system also provides feedback to the candidates for their improvisation. This software is unable to provide proper information for a jobseekers and job giving companies. The expert system-based software is for the jobseeker and as well as job given companies to minimize their administration stress.

#### IV. PROPOSED SYSTEM

The proposed system “OUTERview” tries to solve this problem by aggregating publicly available data from various websites, such as: Github, StackOverflow, CodeChef, Codebuddy, Codeforces, Hackerearth, Sphere Online Judge (SPOJ), GitAwards. Once the data is collected, the algorithm then defines a comprehensive scoring system that grades the candidate’s technical capabilities based on the following factors:

- 1) Ranking (25 points)
- 2) Number of Problems Solved (25 points)
- 3) Activity (5 points)
- 4) Reputation (25 points)
- 5) Contribution (5 points)
- 6) Followers (15 points)

The candidate is then assigned a score out of 100. This helps the interviewer get a full view of a candidate’s abilities and hence make an unbiased, informed decision.

#### V. WORKING SYSTEM

##### A. Web Scrapping Module:

In this module all the data about the candidate is been extracted from the publicly available open-source platforms like Github, StackOverflow, CodeChef, Codebuddy, Codeforces, Hackerearth, SPOJ, GitAwards for analysis and evaluating the candidate’s technical capabilities.

##### B. Predictive Modelling Module:

In this module 3 main use-cases are considered to satisfy the end user. Here the recruiter is our end user. The use-cases considered are

- Satisfactory Level of working.
- Churn out rate of the employee.
- Assigning the employee in a domain where the employee is good at.

##### C. Dashboard Creation

In this module a dashboard is created to communicate the results and also have an overall perspective about the individual’s ability to perform in the outer world.

#### VI. SYSTEM ARCHITECTURE AND IMPLEMENTATION

First we need to aggregate the entire “Technical capabilities such as coding skills, programming knowledges known, number of repositories, number of followers, reputation and contributions to open source communities of a person on the internet”. We extract all these data from the candidate’s personal website. This is of course assuming we have access and permission to the candidate’s personal website. We can parse all the necessary links from there. Here we are using Beautiful Soup which is a popular scraping library. Using this block of code, we have direct links to a candidate’s online profile.

While trying to solve a real-world problem and “productionize” the solution, it’s important to consider the requirements of the end user. In this case, it’s the **recruiter**. How can we use the power of deep learning to add value to the recruiter? The following use cases can prove to be useful —

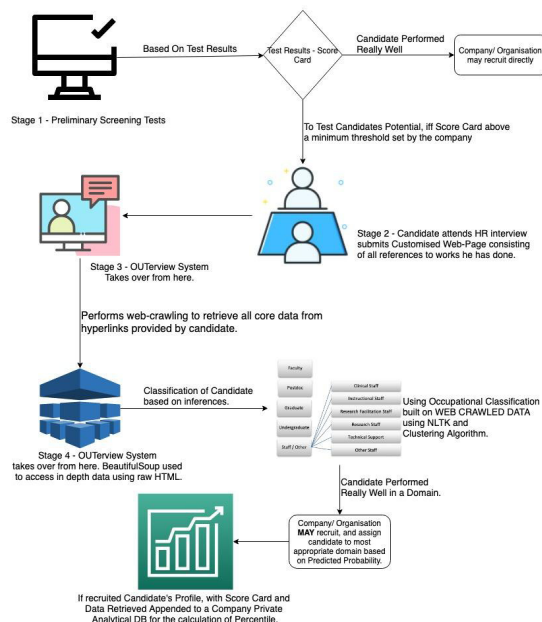
- 1) Model that predicts whether or not the management will be satisfied by candidate’s skill set.
- 2) Model that predicts the probability of a candidate’s churn post hiring.
- 3) Using genetic algorithm to link assign the candidate to respective team.

Assuming that the recruiter has been using OUTERview to screen candidates for some time and now has a database of 100 candidates. Post recruitment, based on the candidate’s performance, the recruiter updates the database with a new binary attribute “Satisfaction” with values of either a 0 or 1. With a dummy database for now and try to create a model using Scikit-Learn, Pandas, Numpy and build a predictive model.

- 1) Import data & libraries.
- 2) Clean the data — remove duplicates and null values.
- 3) Using label encoder to deal with categorical data.
- 4) Split the dataset into train & test.
- 5) Using KNN classifier to predict.
- 6) Check Accuracy.

Using these steps, we will get a niche model that will be able to predict whether the candidate will fit into the company based on underlying trends. For instance, Candidates who have higher reputation and are contributing to Open source are more likely to retain for a longer period of time.

Finally, a dashboard is created to communicate the results and also have an overall perspective about the individual's ability to perform in the outer world. The dashboard contains final score based on the analysis technical capabilities of the candidate. Detailed report about the candidate is provided in form of pictorial representations like charts and graphs for easy understanding. Now this will give the recruiters an idea of the technical abilities of the candidate outside the interview room.



### VII. FUTURE WORKS

With automation at its highest point of saturation, the need to adapt it into interview selection process becomes very critical. Also, automating the system involves integration of all the modules by developing a core system that is fully automated. The future of this project is to provide the same features to the General HR interview selection that were driven for the technical process prior. This involves testing the candidate with a range of questions and figuring

out by probing into his style of answering a particular question and also by the use of emotional and sentimental analysis. This analysis provides insights of the candidate's ability to cope up with patience testing and his/her facial expression provides details of the rightfulness of the answer.

### VIII. CONCLUSION

According to a survey by Brandon Hall, **“More than 95% of the recruitments are bad hires”**. This makes it a point to hire the right candidate for the right role so that he/she satisfy their objective. The novelty of this idea is to provide a potential candidate with the right job and in turn to provide the company with an able candidate to land on the job. In comparison with the existing system, this proves to significantly provide another chance for an actually skilled candidate and thereby providing a platform that respects his skills and abilities over a process that lasts over a period of time. In a world of real-time problems, recruitment process is an issue that has not been underlined to its actual scale and with the development of this software, it gives more space and clarity in the interview scrutinization process.

### IX. REFERENCES

- [1] Moehammad Sarosa, Mochammad Junus, Mariana Hoesny, Zamah Sari, Martin Fatnuriyah, "Classification Technique of Interviewer-Bot Result using Naïve Bayes and Phrase Reinforcement Algorithms", International Journal of Emerging Technologies in Learning, 2018
- [2] F. Gementi, "Artificial intelligence and recruiting - where will it go in 2018?," Article - Talent acquisition: Enter the cognitive recruiter," 2018
- [3] R. Maurer, "Talent Acquisition - Technology Will Reshape Talent Acquisition in 2018," 13 Feb 2018.
- [4] LinkedIn Talent Solution - GLOBAL RECRUITING TRENDS 2018
- [5] Michael Stephan, David Brown, Robin Erickson, "Article - Talent acquisition: Enter the cognitive recruiter," 2018.
- [6] Mercer Talent Trends Study 2018 Findings: India, 2018.

- [7] K. Martic, " Recruiting - What Is Full Life Cycle Recruiting?," 01 December 2018
- [8] Recruitment Through Artificial Intelligence- Geetha R, Bhanu Sree Reddy, IJMIT,2018
- [9] Recruitment Chatbot-Akash Balachandar, Anusha D Kulkarni, IRJET,2018
- [10] VR Job Interview Simulator: Where Virtual Reality Meets Artificial Intelligence- IuliaStanica ; Maria-Iuliana Dascalu ; Constanta Nicoleta Bodea ; Alin Dragos Bogdan Moldoveanu, ZINC,2018.
- [11] Selecting Excellence: A Data-Driven Process to Hire Top Performance Engineers with Greater Speed and Certainty. Michael R. Neece ,Sharon A. Wulf . IEEE Management Review 2019
- [12] Developing an Agent-based Virtual Interview Training System for College Students with High Shyness Level - Xinpei Jin, Yulong Bian, et al. IEEE Conference on Virtual Reality and 3D User Interfaces (VR), 2019.
- [13] Natural Language Processing based Jaro- The Interviewing Chatbot- Iftekhar Naim , Md. Iftekhar Tanveer ,et al. 3rd International Conference on Computing Methodologies and Communication (ICCMC), 2019
- [14] The impact of Artificial Intelligence in Talent Acquisition Lifecycle of organizations - Dr. Saundarya Rajesh, Mr. Umasanker Kandaswamy, Ms. Anju Rakesh. International Journal of Engineering Development and Research ( IJEDR1802131), 2022.
- [15] Automated Analysis and Prediction of Job Interview Performance - Iftekhar Naim, M. Iftekhar Tanveer, et al. IEEE Transactions on Affective Computing, 2023
- [16] Sentiment Classification and Prediction of Job Interview Performance- Sarah S. Alduayj, Phillip Smith 2nd International Conference on Computer Applications & Information Security (ICCAIS), 2023.