RESPORT – AUTOMATED VIDEO INTERVIEW INTERFACE

Submitted in partial fulfillment of the
requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

By

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(DEEMED TO BE UNIVERSITY)
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NOVEMBER - 2022

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Kshitij Barnwal (Reg.No - 39110540) and Abhinay Dewangan(39110005)** who carried out the Project Phase-1 entitled **"RESPORT – AUTOMATED VIDEO INTERVIEW INTERFACE"** under my supervision from June 2022 to November 2022.

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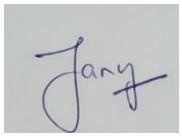

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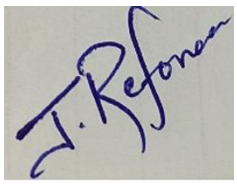

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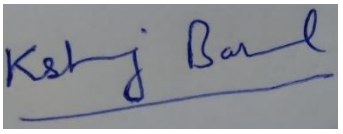
DECLARATION

I, **Kshitij Barnwal(Reg.No- 39110540),** hereby declare that the Project Phase-1 Report entitled **"RESPORT – AUTOMATED VIDEO INTERVIEW INTERFACE"** done by me under the guidance of **Dr. JOSHILA GRACE L.K, M.E.,Ph.D** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.



DATE: 20-04-2023

PLACE:Chennai **SIGNATURE OF THECANDIDATE**

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T.Sasikala M.E., Ph. D**, **Dean**, School of Computing, **Dr. L. Lakshmanan M.E., Ph.D.,** Head of the Department of Computer Science and Engineering for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Project Guide **Dr. Joshila Grace L.K M.E.,Ph.D,**for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my phase-1 project work.

I wish to express my thanks toall Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project.

ABSTRACT

Resport, it’s a state-of-the-art video recruiting software that uses Explainable AI to pre-screen and shortlist candidates, bringing the best talent out there for the role you're looking for. AI-powered interview software claims to help employers sift through applications to find the best people for the job. Performance on AI-powered interviews is often not the only metric prospective employers use to evaluate a candidate. And these systems may actually reduce bias and find better candidates than human interviewers do.

Video interviewing may seem like a new fad for companies who want to seem modern to millennials, but the concept was first imagined 15 years ago and is currently taking the human resource industry by storm. Different companies are in going different directions for the future of video interviewing. An Interviewer used to spend endless hours interviewing potential candidates, only to be forced to settle on a candidate because of interview fatigue. Now-a-days, interviewers were able to interview dozens and dozens of candidates, all by lifting a finger. Interviewers were able to find some amazing candidates using this interface. For example, HireVue has been researching and implementing artificial intelligence to their video interviews.

In 2018, an artificial intelligence (AI) interview platform was introduced and adopted by companies in Korea. This study aims to explore the perspectives of applicants who have experienced an AI-based interview through this platform and examines the opinions of companies, a platform developer and academia. Applicants perceived an AI-based interview to be better than traditional evaluation procedures in procedural fairness, objectivity and consistency of algorithms. However, some applicants were dissatisfied about being assessed by AI.

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Selection in big companies is a must need for a candidate who is preparing for an interview with great effort that's why they require an aspirant who is proficient in coding as well as fluent in his words for better future interaction with clients for a company. Interview-AI is a web application which helps you practice for interview. It asks you an interview question and you have to answer that question. Response given by a candidate then is being move forward to the companies who are recruiting and based on the performance or technical skills an interviewer in a company can easily find a best suited candidate for their company.

Now-a-days companies are asking these AI video interview to add some great features like, adding a programming question with great editor and compiler interface with an option of changing to many programming languages with great test-cases and after that another question to explain the previous programming question in a certain amount of time with some preparation time basically the approach of the question.

Each type of video interview software works differently. Live video interview platforms act like regular interviewing, but over a video conferencing platform where a candidate and a hiring manager speak in real-time. Asynchronous video interview platforms allow a candidate to answer pre-defined interview questions on their own time that are later reviewed by a recruiter. The process requires candidates to record themselves answering timed questions and submit the video for algorithmic analysis of their words, speaking tones, and even facial tics.

The objective of this project is to find the best behavioral fit between candidates and companies with respect to their long-term association with the company and satisfaction level with the job. The hack achieves this by creating a virtual interview system that asks a series of questions to the candidates and runs a complex machine learning algorithm to analyze the responses and calculate the satisfaction factor of the candidate. The project is an attempt to address the challenge of finding the best fit candidates out of a huge number of applicants which is a pressing demand of modern-day recruiting. The concept involves after taking all the responses of the candidates using Natural Language Processing our interface just make a separate report of a candidate on the basis of their Introduction, technical skills, efficient words used, posture maintenance, strengths & weekness, work experience in his career, number of project done, time spend in the previous companies, checks the speaking rate (speed at which a candidate is speaking) and some unique keywords for fast and better selection of a candidate on the based of that candidate's report.

CHAPTER 2

LITERATURE SURVEY

The recruitment process can be defined as gathering or accumulating a group of diverse and qualified candidates for the associated vacancy of a company. A recruitment process seeks the right person to fit for the vacancy or role of a company selected from several candidates who desired to have this role as their job. The goal is to find a potential person who is most suitable for the role as well as fit to the culture of the organization. The recruitment process involves targeting several prospective people with appropriate job skills and persuade and motivate them to work for the organization. Recruitment is considered as the strategy of HR because it creates the first opportunity to predict future employees' behavior and plan accordingly. Also, another strategic purpose would be to minimize recruitment costs and to shorten the time of recruitment to reduce the loss from an empty position. Recruitment Process is a very important process for a company and consists of around five steps to find the best candidate with sufficient skill for the job role they are applying. The first step for this model is to set some recruitment objectives like attracting suitable candidates according to the job description to fill the empty position. The second step is to develop a strategy of recruitment by generating some questions in mind such as whom to recruit, what is nature of the job offer, what is the budget constraints, and so on. The third step is recruitment activities which require different types of activities posting jobs in specific sites, extend the recruitment time if needed, selecting the recruiter's types, and basically, it involves the types of recruitment methods that will use in this step. The fourth step of the model is to observe the interest of job applicants such as the interest of accepting the job, expectation from the job, applicant self insights, and also the decision-making process of the applicant. And the fifth and final step is to evaluate the whole recruitment results by going back to the recruitment objective and measuring the outcome of the results which help to learn from experiences and improve the effectiveness of future recruitment processes.

Artificial Intelligence (AI) is intelligence exhibited by machines. In computer science the field of AI defines itself as the study of intelligent agents. Generally, the term AI is

used when a machine simulates functions that humans associate with other human minds such as learning and problem solving. In general, AI can be thought of as a system that mimics general humane abilities such as learning, speech, problem-solving which make it behave like an intelligent human. In further elaboration, AI can be defined as a system that can interpret and learn from external data to accomplish specific goals by adapting the situation. Subfields of AI such as Machine Learning, Natural Language processing, Image Processing and Data mining have become an important topic for today's tech giants. Machine Learning is actively being used in Googles predictive search bar, in the Gmail spam filer, in Netflixs show suggestions. Natural Language Processing exists in Apples Siri and Google voice. Image Processing is necessary for facebooks facial recognition tagging software and in Googles self-driving cars. Data Mining has become a slang for software industry due to the mass amounts of data being collected every day. Companies like Facebook and Google collect large amounts of statistics from users every second and need a way to interpret the data they receive. Artificial Intelligence has already proven to be useful new tool in today's technology heavy culture. Artificial Intelligence has come a long way in the last decade. But there's still a large amount of work required to develop strong AI. Giving a machine Common Sense or intuition is a critical component of allowing a machine to truly learn. Knowing how to convert the input to output appears important, but a machine that truly understands why output relates to the input is necessary for strong AI. It is also necessary to further develop methods for detecting human emotions and actions. This is a multi-disciplinary subject and will require advancements in Psychology, Linguistics, Machine Learning, Natural Language Processing and Image Processing to learn how humans behave to detect emotions and to analyze human expressions and body language.

AI has been used and implemented significantly in recruiting professionals in various companies from 2018 and becomes one of the latest trends in the recruitment industry since then Recruiting the most suitable professional has always been a challenging task. In today's world, people spend and share most of their time and views on social media which becomes an integral part of their life. For this recruiter started posting their job advertisement on social media to attract candidates. But this

creates a significantly huge number of applicants and hiring the most appropriate talent on time has become a challenge to HR. Not only that to screen and evaluate a large number of applications for single job post companies had to appoint a lot of recruiters which is very expensive, and also the effectiveness and efficiency of digital tools are very high in comparison with a human. So, to overcome such challenges and make recruitment more efficient and timely, recruitment companies need to use AI-powered digital and tools. IKEA, Unilever, and Amazon, which have used AI-powered recruitment systems like Robot Vera, chatbot called Mya, HireVue Assessments, have helped in their particular and specialized ways to improve their talent-hiring capabilities.

The use of AI tools has emerged in almost every step of recruitment which transforming the recruitment market more innovatively and these AI tools has become a huge help of selecting the right candidates from a vast pool of different applicants and profiles. These tools are a great help in different ways such as creating job descriptions using proper wording and language which is bias-free, gender-neutral and target a particular set of candidates for the job. For example, AI firms such as Textio implement AI to help their clients to customize the wording and language of job ads and descriptions and make them personalized. The AI-powered CV screening tool ATS (Applicant Tracking System) can pre-screen an applicant and detect and evaluate the keywords to place the right candidate to the appropriate openings. An AI-powered chatbot is also getting popular in recruitment. These chatbots can interact with the candidates, answer their queries 24/7, enable real-time and personal engagement through text message, email, social media, etc. By using natural language processing these bots are able to process and interact with people almost like a human by using contextual words, shorthand, emotions, etc. For example, an AI-powered assistant named Olivia from AI startup Paradox to interact with candidates via text messages and social media channels to learn their qualifications, competences, and relevant job experience. Video chat analysis is also being used as an AI-powered tool where the system can be programmed to analyse the interviewee's features like age, lighting, tone of voice, cadence, the keyword used, mood, behaviour, eye contact, emotion, etc. For example, Affectiva, HireIQ, Hire Vue that tries to evaluate a candidate's performance during a video interview by analysing candidates' facial expressions, use and frequency of words, tone, and

speaking patterns to evaluate their emotional intelligence, honesty, and personality. AI-recruiters can process volumes of social media data by scanning social media space to find the right talents and assess the candidate's social values, beliefs, attitude to get an idea about that candidate's personal and professional traits without putting any bias or favour. For example, using AI-powered recruiting tools across social media like Facebook, WayUp, and Muse, Unilever was able to increase its fresh graduate candidates pool at a considerably lower cost than before. The applications in the recruitment process are prospective and the increasing demand for these tools with new features makes it more promising. But still, practically AI tools are not used to a great extent in the recruitment field. So, there are many things to learn to integrate and adapt to these new technologies without any friction. Therefore, the study aimed to know the challenges and opportunities of AI in recruitment to get the maximum advantage of it.

Minimizing the human biases is the most prominent aspect of AI-based recruitment, with the rapidly emerging trend of utilizing AI technologies in the business environment in the last two decades, the recruitment and selection practices of the HR management will gradually incorporate more AI-based software into its process. The growth of AI provides promising solutions for recruiters to optimize talent acquisition by taking over time-consuming repetitive tasks such as sourcing and screening applicants, to improve the quality of the hiring process, and eliminate biased - human decisions. Maria Michaelides (2018, p. 21) mentions that AI is helping to improve the selection of a diversified pool of candidates through an algorithmic assessment platform, which can be set up to reduce biases and maximize objectivity. Van Esch, Black (2019, p. 2) also states that these advantages come from AI's ability to process information and make decisions at volumes and speeds that far exceed human capacity and the availability of AI-enabled recruiting tools and systems that overcome common cognitive biases that hurt the reliability and validity of human judgment in recruiting activities. Furthermore, they also stated (p. 10) that AI-enabled recruiting systems are less biased and more objective than humans. J.Dijkkamp (2019, p. 25) also states that where biases often emerge in screening stages, since that is a human thing, these tools can exclude these biases.

AI will add a deeper level of transparency in the hiring process by eliminating human biases and improving job seeker perceptions about employers who will enhance employers' image and brand. Unilever used HireVue and reported that it dramatically increased the speed and quality of the finalists who were subsequently interviewed in person and made offers. A large part of the screening process will disappear as the task and responsibility of the HR professional, where it is no longer necessary to assess resumes in the future, and AI tools will do this. Savola & Torqe (2019, p. 32) proclaims that chatbots help recruiters by dealing with the first stages of recruitment, like asking and replying to frequently asked questions like on employee benefits or company culture, and thus allowing human recruiters to concentrate on the later stages of recruitment. Hence, AI plays a prominent role in replacing the repetitive and tedious work of HR as Savola & Torqe (2019, p. 19) claims that In this way, recruiters can deal with other parts of the recruitment process, like interviewing, while AI increasingly takes care of the candidate sourcing/attraction, selection, screening, and testing.

Even there are studies conducted stating that new technology and big data makes HRM(Human Resource Management) more efficient and accurate, there are people who consider that human resource analytics can be only a transient trend if the technology transformation does not manage to become a continuing part of management decision-making. One remarkable entirety of challenges that AI-based recruitment entails is personal privacy and the way how data is handled and analyzed. It concerns both HR professionals and online HRM users when it comes to analyzing data or sharing own information. Martincevic and Kozina (2018) sees it almost impossible for organizations to operate successfully without any level of adaptation of new technologies. The ability to adapt new technology in organizations determines largely how they are able achieve their market competitiveness. Previous studies have shown that the adaptation of new technology entails several benefits when it comes to improved performance. An important entirety of challenges that AI-based recruitment entails is unconscious discrimination during hiring processes by organizations (Stuart & Norvig, 2016). Researchers have mentioned several problems that exploitation of AI can cause, such as losing jobs to automation and in

some cases AI systems can be used when there are undesirable ends. What especially touches recruitment, is the possibility of losing jobs to automation, since there are already many job positions that have been replaced by AI programs which in turn can increase unemployment. Even though AI-based systems are extremely beneficial at recognizing talent, there are still some activities that should be conducted by humans, namely activities such as negotiations, appraisal of cultural fit and rapport building.

The necessity of AI video interview arises when conducting an interview for acquisition of excellent talent in a non-face-to-face situation due to similar situations such as Covid-19. As a matter to be supplemented in general AI interviews, it is difficult to evaluate the reliability and qualitative factors. In addition, the AI interview is conducted not in a two-way Q&A, rather in a one-sided Q&A process. When conducting an interview using AI image analysis technology, it supplements subjective information that evaluates interview management and provides quantitative analysis data and HR expert data. Image-based multi-modal AI image analysis technology, bioanalysis-based HR analysis technology, and web RTC-based P2P image communication technology are applied. The goal of applying this technology is to propose a method in which biological analysis results (gaze, posture, voice, gesture, landmark) and HR information (opinions or features based on user propensity) can be processed on a single screen to select the right person for the hire.

Our research, instead, focuses on the human experience of technology in organisations. We first focused on the impact that AI has at a human level when we were researching Automated Video Interviews (AVIs) and looking at their effects on young job-seekers. Our interest in this technology, therefore, started from a concern for the human. We wanted to understand how AVIs were perceived by young job-seekers, and whether AVIs might be contributing to an extra level of anxiety within the job seeking process. Consequently, our research questions were simple, borne from a real issue, rather than the academic literature. AVIs(Automated Video Interviews) represent a fertile topic for research, as the technology is very new, and its use has increased much faster than the academic/practitioner literature on how to use it. However, despite our increasing understanding of the technology, its

complexity, and its limits, we still felt we were missing some important insights on the impact that the technology was having on humans. We decided to use human-centred methodology, by adopting a phenomenological approach to research. Our interviews zoomed into the subjectively lived experience of our young, job-seeking participants by asking about their perceptions. In speaking to research participants, we were almost agnostic to the technology, instead focusing our enquiries on what had happened to them before, during and after their AVIs.

First and foremost, we found that job seekers were confused about the type of interview they were being asked to undertake, and more specifically, the type of AVI involved.

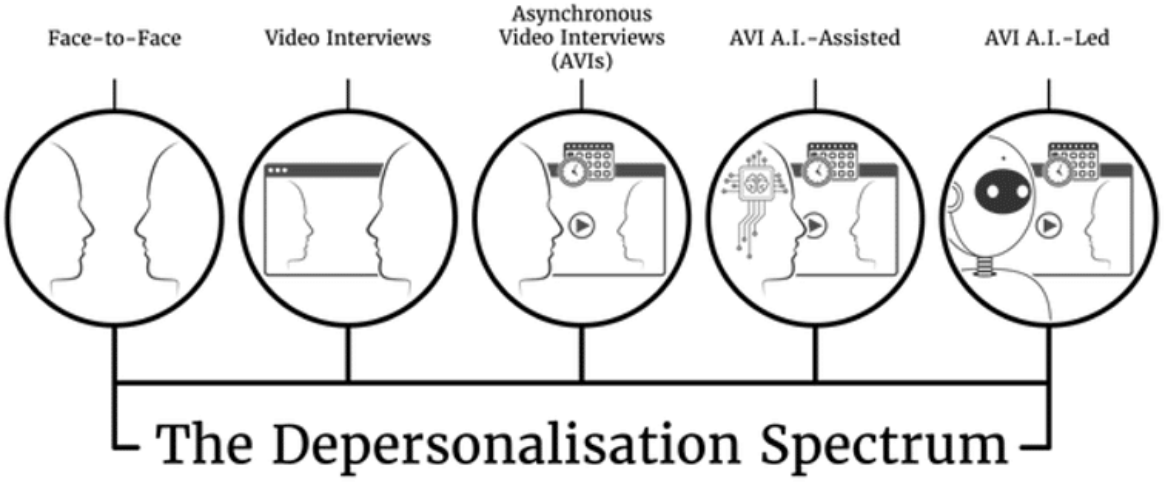


Fig 2.1 : Our Depersonalisation Spectrum

This lack of understanding from AVI job-seekers meant that, during the interviews, the candidates tried to perform in a rigid way (e.g. holding a fixed gaze, a fake smile, or unnatural posture; speaking with a monotonous voice; holding their hands still) to try to comply with a technology that they did not understand. Many told us that they felt they had to behave like robots.

This diminished humanity wasn't always perceived as a negative thing, as some candidates believed that the technology was a more efficient way of screening than a human interaction, due to its perceived objectivity. Many considered the AI as superior to human cognition. Therefore, job-seekers saw their 'robotic performance'

as an inevitable part of the recruitment experience and a necessary trade-off to enjoy a more objective application process.

The constant unnatural performance that job-seekers reported, in front of a screen that did not return any cue of approval or disapproval, led to the overuse of emotional and cognitive resources. Many candidates told us they felt energy-depleted by this experience.

Some identified challenges that the AI can bring to companies are the adaptation of new technology within AI and lack of trust. Having an adequate adaptability towards AI and having proper tools to utilize AI are extremely important because it need to be known how to use AI in the organization. Several professionals mentioned that HR departments are considered as traditional and hence it is extremely important to pay attention to the overall adaptability of new technologies. One of the professionals mentioned that in order to gain all the benefits that the use of AI in recruitments brings, organizations need to be able to buy AI. This implies that organizations need to have enough time to dedicate to new technologies. It was discussed during the interviews that several organizations consider that they want to use AI, but they do not necessary know why and how to use it. It can be the case that the organization do not necessary need the speed or quality brought by AI or the organization might not even have the technical team to implement AI. An important aspect of using AI in recruitment process is to consider how well AI can understand company’s values and whether AI completely understands what kinds of job candidates the company is looking for. This comes to the concept of biased machine learning and to Amazon case example that was brought up by three interviewed professionals. According to one of the professionals, an area where AI might have difficulties is understanding cultural barriers, since terminology varies between cultures and nations. Hence one of the most fundamental challenges of using AI in recruitment that was discussed during the interview is how to train people to train machines in order to avoid biases.

AI technologies used in job interviews, domestic interviewers' evaluations on

applicants answering given questions as shown in are collected, significant features are extracted, and then exemplary interviewers' judgment mechanisms are learned by way of machine learning. V4 is the method to extract significant features. This is an AI technology to recognize and process the four types of information: Visual, Vocal, Verbal, and Vital. Based on video and voice information, it is possible to measure the applicant's external characteristics. Each applicant's competencies are evaluated based on the results, including performance competency, relationship competency, organizational fitness, fitness to the official position, communication ability, emotional expression ability, and favourability. Second, As V4 learns experts' senses and know-how, applicants' real-time reactions are analyzed and judged. Visual technology extracts from each applicant's face, analyzes each facial part's delicate movements, and extracts necessary data from the video information, including the applicant’s emotional state, eye movement, facial movement, and head rotation. Based on the extracted data of facial changes, the applicant's feelings are analyzed, such as joy, sadness, anger, distaste, fear, and tension. As for auditory and vocal technology, the vocal method extracts applicants' vocal waves to analyze vocal factors such as utterance time, speed, and volume. In addition, each applicant's answers are analyzed in terms of temporal change to collect vocal spectrum data in real-time.As for verbal technology, voice data are extracted just as in the case of vocal technology. Each applicant's linguistic habits, times of using a particular word, and the like are analyzed to grasp his/her linguistic behaviours and tendencies. Finally, vital (biological) data are collected to grasp applicants' emotional state and dishonesty based on the fact that the current biological state is related to his/her blood flow and pulse.

2.1 INFERENCES FROM LITREATURE SURVEY

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. A literature review also includes a critical evaluation of the material; this is why it is called a literature review rather than a literature report. It is a process of reviewing the literature, as well as a form of writing. A review of prior, relevant literature is an essential feature of any academic project. An effective review creates a firm

foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed. AI in recruitment is relatively a new topic and research is being done to assess the advantages and challenges of using AI in recruitment and selection. However, there is a knowledge gap that exists when recruiters need to understand how the AI algorithm works for them and assists them to get maximum benefits of using AI. A literature review is thus a valuable way forward to fill this gap. To compose a successful relevant literature section, a systematic search can ensure that the author compiles a relatively complete list of relevant literature (Webster and Watson 2002).

The literature review covers relevant literature on the topic and is not limited to one search methodology, one set of journals, or geographic region (Webster & Watson, 2010). In this case, all the articles were searched from various sources like Google Scholar, Research Gate, and Umea university library. A literature review is commonly structured as concept-centric, meaning concepts determine the organizing framework of the review; however, some authors take an author-centric approach and present a summary of relevant articles (Webster & Watson, 2010). This review is concept centric as the concept of AI and recruitment determines the organizing framework of this review. The tone of a successful review informs the reader about what has been learned rather than being overly critical (Webster and Watson 2002). The selected literature informs the reader about 9 the knowledge and understanding of AI being used in recruitment and how it is impacting the recruitment industry.

The AI interviewer analyzes applicants' biological signals and answers data while communicating with them online and then allots assignments to judge competencies required for given tasks. To this end, the method to determine an applicant's external and internal elements is also applied. First of all, the applicant's face, voice, vocabulary, and pulse, are measured to determine his/her emotions and genuineness. The AI interviewer reads facial expressions and emotions. The tone color and interval between answers are also used as a basis for judgment. Answers are then converted into text form in real-time in order to analyze the used words. During the question and answer session, the AI interviewer gives each applicant questions according to the general contents and employment purposes. During the

self-introduction session, pressuring interview questions are used to analyze the applicant's disposition and expected performance. Every interview is recorded. After the interview ends, AI evaluation sheets are completed and provided to personnel managers as a basis for judgment. The AI-based interview system's deep-learning process is designed to detect significant features autonomously in reflecting the score that experts gave based on interview videos. AI learns from more than 400,000 interview videos and derives and analyzes more than100,000 evaluation data sets. With the given scores as the basis, AI generates many mathematical dimensions and changes parameters to reduce errors continually. To this end, the same interview videos are allotted to evaluators periodically to verify the reliability.

The AI-based job interview model applied the classification algorithm to judge whether successful applicants were predicted correctly and whether disqualified applicants were predicted. The level of relevance between the 'AI-based job interview score' and 'actual score in the job interview evaluation process' was determined as high when the applicant given a high score in the AI-based interview obtained a high score in the actual job interview as well. Likewise, as a candidate given a low score in the AI-based job interview is given a low score in the actual job interview, the AI-based job interview was evaluated as valid. This static correlation was utilized as a significant index that indicates the AI-based job interview model's validity.

In this thesis it was chosen to do a thematic literature review where main topics and issues have been picked out from scanning over past literature covering the topic of AI in HRM and more specifically the recruitment process. The purpose of using a thematic approach to the literature review is that it allows for a clear and simple overview of what the previous research have covered in relation to the issue which this thesis aims to explore. As a thematic literature review has a focus on covering a specific topic and the themes emerging from that, it seemed the most fitting for this thesis in order to explore recruitment and technology within HRM (Broadhurst & Harrington, 2016). The themes were identified by seeing the main ideas written about in previous journals and from there categorizing it into areas of interested which would best capture and describe what had been previously researched.

A wide selection of journals covering the independent topics of interest was found, such as Artificial Intelligence, Human Resource Management and the recruitment

process. Based on journals covering the use of Artificial Intelligence in Human Resource Management was found. When searching for papers it was chosen to focus on some of the more recent papers in order to be sure of a relevant research problem, however it was made sure to conduct a comprehensive search on all existing literature to make sure not to miss any of the key concepts or theories within the subject. The papers will guide this study to identify what topics have already been 23 covered by previous literature and where in the research there is a gap that could be filled or expanded on with this study. Key journals were searched with the help of Primo search and Google Scholar, where it was also checked what sources some key journals which had found had cited to be sure the most relevant and up to date journals had been found.

Both forward and backward search has been done for conducting this literature review. The forward search means to find an article that has cited some impactful papers. Different search engines like Google Scholar, Research Gate perform such a forward search (Schryen, 2015; Webster & Watson, 2002). The backward search is meaning the process of finding the articles by searching through the reference list of important and significant papers (Webster & Watson, 2002; Vom Brocke et al., 2015). We have conducted our search by keeping our research question in mind. According to Templier & Paré (2015) and Okoli (2015), the investigation must be done keeping the research question in focus and the search strategy has to closely related to the research question. Our search started by searching with the keyword “AI in Recruitment”, which closely related to our research question. This results in many hits including some unrelated search results which are not related to “AI in recruitment”. The selection process is done by following some steps, firstly screening through the abstract, keyword, and the exclusion and inclusion criteria. After the initial screening the selected papers were again reviewed by reading the introduction and the conclusion and 26 articles have been selected. Finally, these selected papers were reviewed as a whole for relevance, credibility, and rigor. However, after reviewing the 26 articles, 22 articles were found to the most relevant. We have extended our search to do some related research such as AI and its different areas, the recruitment process, and how it works in general, which is necessary to realize the advantages, disadvantages of AI, and its impact on the recruitment process.

2.2 OPEN PROBLEMS IN EXISTING SYSTEM

Well, another research was done on AI Video Interviews. Researchers invited 57 human raters and 57 interviewees to participate in our experiment. All human raters were human resource professionals, and their average work experience was 12.49 years (SD = 7.19), with an average of 5.81 years of experience as a job interviewer. The interviewees were new graduates or students who were seeking full-time or part-time job opportunities in the field of human resources (HR). The interviewees had an average work experience of 2.28 years (SD = 4.73). The interviewees were invited to sign up for our AVI-AI software application on any android or iOS mobile device, and the interviewees could decide when they were ready to start the interview. The software guided them through the interview step by step, and the interviewees were informed that their interview answers and responses, including audio and visual information, would be recorded and analyzed by our AI algorithms.

The questions for the interviewees were structured in a standard pattern, in which each interviewee answered the same five questions that were behaviorally orientated to assess interpersonal communication skills. The questions were displayed on the screen, and 1 min was allowed for thinking after each question was announced. The audiovisual function was automatically started upon entering the answer screen. Three minutes were provided to answer each question. If an interviewee completed the question within 3 min, they could choose to skip to the next question or the system would automatically move on to the next question after 3 min. The entire video interview process for each interviewee was approximately 20 min. After all the interviewees finished the video interview, one of the human raters was randomly selected to evaluate three interviewees' communication skills and personality traits.

Based on the above literature review, where the majority of the literature we found has focused more on general opportunities it is suggested that more research should

be conducted in AI in recruitment as it is a recent topic that has shown many promises and prospects. And more research should be done giving detailed attention to the challenges of using this technology. Another suggestion is that more study on the use of AI-based hiring from candidates' point of view is required and should be considered by researchers as mostly we could find case studies are done from the organization's perspective.

CHAPTER 3
REQUIREMENT ANALYSIS

3.1 FEASIBILITY STUDIES/RISK ANALYSIS OF THE PROJECT

We used the inductive approach and thematic analysis to analyze our 22 selected articles. We familiarize ourselves with the data by going through the articles which helped us to understand not only the data but also eliminated the preconceived notion and bias towards the results. We then started the coding process by loading the documents in ATLAS.ti cloud platform and created codes for all 22 articles individually. ATLAS.ti cloud platform enabled us to collaborate remotely online at the same time. Once done with the coding, we started collating codes into potential themes and defined clear names for each of the four themes created. These four themes namely, AI role, actor role, AI adoption, and potential risks, encapsulated the generous view of what the previous research had identified.
The theme of the Actor role emphasizes on advantages and opportunities that the actors, both recruiters, and applicants, will be able to achieve from the implementation of AI in recruitment and selection. The theme of AI role explores the impact of AI in recruitment and selection as a powerful technology tool by discussing in detail all dominant advantages of AI in the recruitment process. The theme of potential risk identified some challenges of using AI in the recruitment process. It uncovered some risks associated with the system. Though there may exist a lot of opportunities utilizing AI in recruitment, making decisions by AI impacts directly human life that may end up creating some challenges towards successful implementation. Finally, the theme of AI adoption identified how well people are agreeing to use AI and collaborating with other actors for sharing the knowledge and information, which may help to get the benefits and opportunities created by AI. Also, this theme explores the challenges of adopting new technological knowledge of AI-enabled tools by the actors. The challenges of this theme depend mostly on the willingness of people to adopt the technology and how much they are ready to collaborate to achieve the proper benefits and opportunities of AI.

The present study examines technical trends related to AI-based interview services that are growing rapidly and presents the results of AI-based interview system

development and application to an employment process. This study is significant because it contributes to enterprises, job seekers, and the society. Specifically, regarding each of these three perspectives, first in the perspective of enterprises, it provides a high validity method that improves the limitations and problems of the existing employment methods. It also saves time and expenses for offline interviews, provides more applicants with interview opportunities, and improves interviews' effectiveness, with bias reduced. Second, from the job seekers' perspective, sufficient opportunities are given to all jobseekers with the sense of relative deprivation addressed. In addition, such online interviews in a video conference format can be conducted with no limitation of time and place and save time/expense while the focus is on applicants' competencies. Finally, in the perspective of society, as the existing custom of employment that focuses on documentation-based qualifications is changing into the practice of performance-based employment, social costs are reduced in the preparation and activity of employment for both enterprises and job seekers. In addition, fair opportunities and evaluations are secured. AI-based job interviews were developed to support the reasonable selection of outstanding candidates and the decision-making aspect in the employment process. It is expected that the design specifications and solution application results presented by the present study can be utilized widely in support of the existing document screening process that estimates applicants ‘future performance based on each applicant's resume and self-introduction but with only limited validity, written examinations whose relevance to actual performance is relatively low, and aptitude tests as well.

3.2 SOFTWARE REQUIREMENTS SPECIFICATION DOCUMENT

Software Requirement Specification (SRS) Format as name suggests, is complete specification and description of requirements of software that needs to be fulfilled for successful development of software system. These requirements can be functional as well as non-functional depending upon type of requirement. The interaction between different customers and contractor is done because its necessary to fully understand needs of customers.

Selection in big companies requires an aspirant to be proficient in coding as well as fluent in his words. The latter sometimes becomes a major anchor for various students with the ability to achieve high otherwise. This is a problem that our current interface looks at resolving. We are building an interface that helps users with a situation by the use of an AI that asks questions on the basis of a code which the aspirant has written, asked from a diverse pack of frequently asked coding questions. Then the AI asks the aspirant questions related to his code and some staple questions. At the end of this experience, the user receives his interview profile showing him his flaws in answering questions, his fluency, and his ability to handle the situation verbally.

It includes the speech recognition and video recognition using tensorflow of deep learning and using opencv for computer for video recognition. Using API Service it uses speech recognition in the form of text for the machine to use Natural Language Processing to separate each keyword in the form of a report for a particular candidate and give that report to the employee/interviewee of that company.

Based on what you said and expressions on your face, it gives you a report containing the following:

- Speaking rate: Tells you at what speed(wpm) you were speaking and whether your speaking-rate was correct or you should increase or decrease your speed. Most used words: Shows a bar-chart representing the words used most by you in your speech.
- Emotional analysis: Shows a pie chart showing the amount of emotions(happy, sad, joy, fear, disgust, etc.) in your speech.
- Word Cloud: Creates a word-cloud of most-important keywords and concepts of your speech.
- Facial analysis: Gives the list of emotions seen on your face while giving interview. It also gives other information like age, gender and smile.

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEM

The objective of this project is to find the best behavioral fit between candidates and companies with respect to their long term association with the company and satisfaction level with the job. The hack achieves this by creating a virtual interview system that asks a series of questions to the candidates and runs a complex machine learning algorithm to analyse the responses and calculate the satisfaction factor of the candidate on the scale of 0 to 1. Each company can define their own satisfaction factor to filter out candidates. For the hackathon, a satisfaction factor greater than 0.5 has been identified to denote a fit with the company where the company would like to move forward with the candidate in the interview process after the screening round via Interview.AI. The data is sourced from Kaggle to build the classification model based on Support Vector Machine (SVM). The Prediction model of the satisfaction level is based on the quantification of the following factors: time spent in previous company, number of projects involved, salary level, average hours worked weekly, last evaluation, promotion, work accident and still working or not. The hack also eliminates any bias which the companies may have while screening the candidates and automates the tedious task of initial screening of candidates.

The project is an attempt to address the challenge of finding the best fit candidates out of a huge number of applicants which is a pressing demand of modern day recruiting. It also finds itself aligned with the objectives of the startup Olivia-Recruiting.AI which is trying to solve the recruitment process with a meaningful use of AI.

The intelligent interview system utilizes the Voice UI interface of the Amazon Alexa to ask behavioral questions to the candidates to give a virtual feel of the interview.

4,1 **SELECTED METHODOLOGY OR PROCESS MODE**L

Resport is an AI-powered video interview bot with a human touch. It can rate the candidate's body language, facial expressions and voice emotions during the interview and make the assessment without any bias.

The machine learning-powered video interview and assessment tool can find out how many times a candidate smiled during the interview. And if there was excitement in the voice of the person and what was the level of engagement with the interviewer. Such traits are much needed in leaders, influencers or those in profiles involving personal interaction, such as sales, and customer service.

Resport accommodates customized interview formats, flow and questions in minutes. Recruiters can benefit from its detailed analytics and scores support and make informed hiring decisions.

Resport evaluates:-

- Body language
- Emotional Intelligence
- Domain Knowledge
- Personal Characteristics

Users of AI and machine learning algorithms would agree that the agility of these tools at providing recommendations and decision-making support is unparalleled. They decipher patterns and build predictive models basis past successful hiring and performance data. They then apply these models to screen, grade and select the right fit candidate.

With the help of video analytics and natural language processing, video interview bots can automatically detect facial action units and analyse content relevance, structure and grammatical errors.
Bots can also derive interesting patterns from candidates' voice and words, which

may miss out from a human eye. While listening to the candidate's answer, the bot can rate the situation and the grammar as well. Video bots also have a deep learning for accurate speech transcription for various accents, which can help in interviewing candidates across the world.

4.2 ARCHITECTURE / OVERALL DESIGN OF PROPOSED SYSTEM

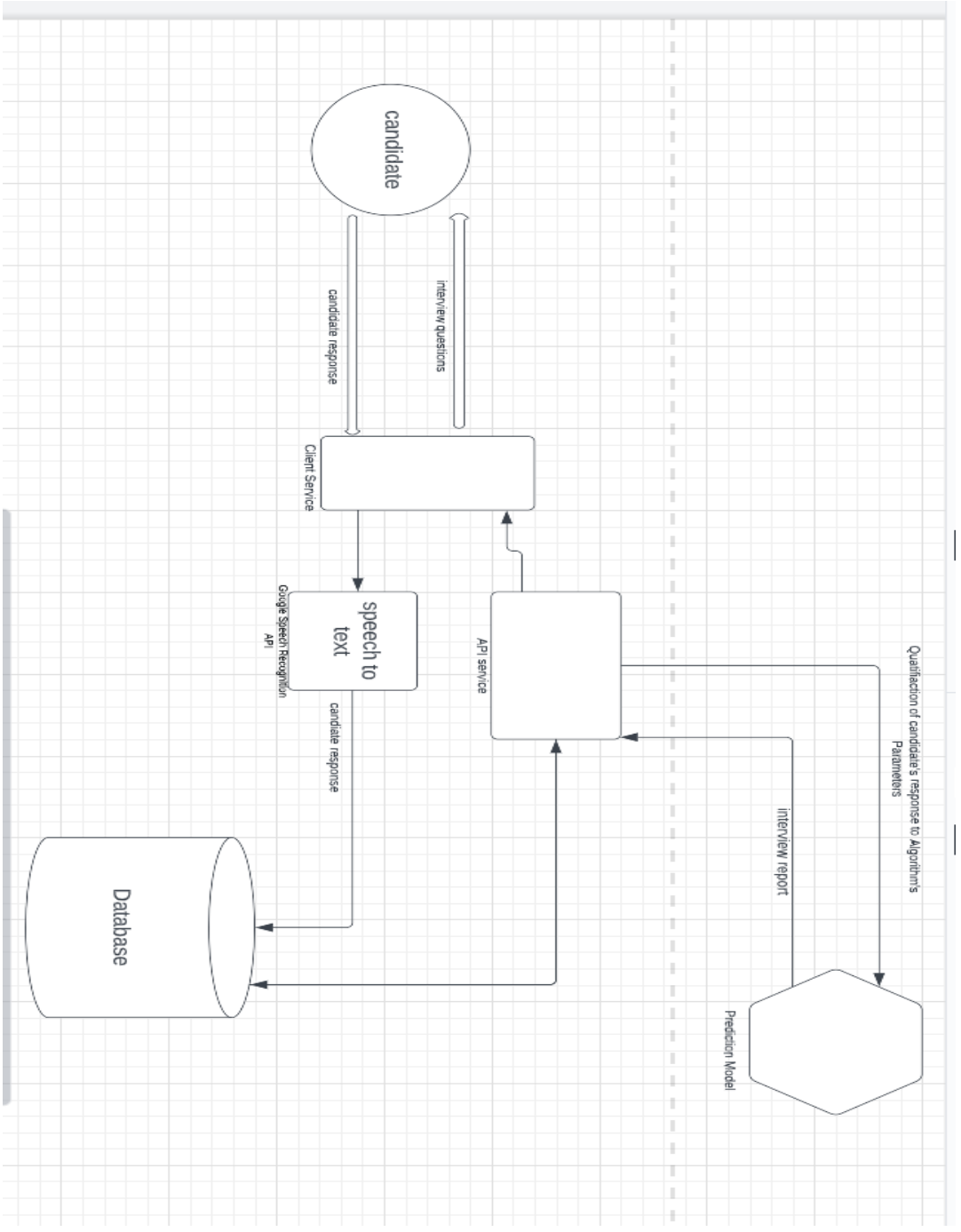


Fig 4.1 : Our System Architecture for Project

4.3 DESCRIPTION OF SOFTWARE FOR IMPLEMENTATION AND TESTING PLAN OF THE PROPOSED MODEL/SYSTEM

Resport is an AI Automated Video Interview used to take interviews by artificial intelligence machines to select a better suited candidate for the suitable company. The software basically asks simple questions that are been instructed by us humans to the machines which are been asked by interviewers in previous years then AI basically analyze the bode structure of the interviewee and how he is giving each questions responses and what are the skills he is involved in knowing. After this our software will use Natural Language Processing to separate each keyword in the responses of a particular candidate and provide an actual interviewer in the form of a report to analyze any candidate on the basis of requirement of the role company in wanting right now on an urgent basis. AI Automated Video Interview after research been done after 2018 it has been very popular and is been used by company to eliminate many candidates to select the best candidate among them.

Creating Interactive Pages →

- HTML provides the structure of the page, CSS the (visual and aural) layout, for a variety of devices.
- We will create Log In Page, Main Home Page, Settings Page and Report Page in a form of pdf.
- HTML is used to create the above pages with proper classes and attributes so as to structure the pages in order to allow them to work as per use.
- CSS is use to style the HTML structure so as to make them more interactive and user friendly.
- Simple Javascript is used to work for buttons in main.js file and record audio using recorder.js.

Creating Web App→

- JSON is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays. It is a common data format with diverse uses in electronic data interchange, including that of web applications with servers.

- The speech recognition part of the Web Speech API allows authorized Web applications to access the device's microphone and produces a transcript of the voice being recorded. This allows Web applications to use voice as one of the input & control method, similar to touch or keyboard. SpeechRecognition will work out of the box if all you need to do is work with existing audio files. Specific use cases, however, require a few dependencies. Notably, the PyAudio package is needed for capturing microphone input.

- Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products.

- The TensorFlow platform helps you implement best practices for data automation, model tracking, performance monitoring, and model retraining. Using production-level tools to automate and track model training over the lifetime of a product, service, or business process is critical to success.

- Natural Language Processing is a field of computer science, artificial intelligence concerned with the interactions between computers and human (natural) languages, and, in particular, concerned with programming computers to fruitfully process large natural language data. Challenges in natural-language processing frequently involve speech recognition, natural-language understanding, and natural-language generation.

4.4 PROJECT MANAGEMENT PLAN

We will be managing our project by working on the front end part for better UI design for the candidate for better use of our software of AI Video Interview for creating interactive web pages for our web app.

Then for various questions to be asked by our AI machine will will use JSON file to store all our questions in one format for better access for the machine for questions.

AI will be learned using TensorFlow and OpenCV for deep learning to be learned efficient to ask a particular question to select the best candidate for the company on the basis of candidates skills.

After recording each responses we will convert all the text form extracted using speech recognition using Natural Language Processing we can extract keywords in the form of pdf for the interviewee in a company for selection from many candidates.

We can get feedbacks or review in the form of notes from a candidate for better future changes in our software.

As, it is a team project so one member will handle all the front-end part for better interaction with software for candidates and one member will handle all the back-end and database part for better functioning of a software.

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