Visvesvaraya Technological University

Belgaum, Karnataka-590 014

A Project Phase – 1 Report entitled

"AI-BASED RESUME SCREENING AND INTERVIEW QUESTION GENERATOR"

Submitted in partial fulfilment of the requirement for the award

of the degree of

Master of Computer Applications

Submitted by

DHANANJAYA S M

1AY23MC024

Under the Guidance of

Prof. Sheela S Maharajpet

Acharya Institute of Technology

Acharya Dr. Sarvepalli Radhakrishnan Road,

Soladevanahalli,

Bengaluru – 560107

Master of Computer Applications

Acharya Institute of Technology

CERTIFICATE

This is to certify that **Mr. DHANANJAYA S M** bearing **USN 1AY23MC024** has satisfactorily completed his/her third semester Project Work Phase-1 entitled "**AI-Based Resume Screening and Interview Question Generator**" as a partial fulfilment for the award of a Master of Computer Applications degree, during the year **2024-2025** under joint supervision.

Internal Guide	Head of the Department	Principal
Prof.Sheela S Maharajpet	Dr.Ratnakirti Roy	Dr. C K Marigowda
Assistant Professor	HOD & Associate Professor	Acharya Institute of
Department of MCA	Department of MCA	Technology
Acharya Institute of	Acharya Institute of	
Technology	Technology	

DECLARATION

I **DHANANJAYA S M** student of the 3rd semester of Master of Computer Applications, Acharya Institute of Technology, Bangalore-560107, bearing **USN 1AY23MC024** hereby declare that the project entitled **"AI-Based Resume Screening and Interview Question Generator."** been carried out by me under the supervision of Internal Guide **Prof. Sheela S Maharajpet** submitted in partial fulfillment of the requirements for the award of the degree of Master of Computer Applications by the Visvesvaraya Technological University during the academic year 2024-2025. This report has not been submitted to any other organization/university for any award of degree or certificate.

Name:

Sign:

ACKNOWLEDGEMENT

ABSTRACT

Job seekers cannot predict which interview questions may come from their resumes. Hence, preparing for this part of recruitment may be tough for them. An AI-based system overcomes this issue by examining resumes to create corresponding questions concerning competency and experience trends regarding the job. This research builds a system that utilizes AI to scan resumes and create personalized interview questions. The system provides information and uses ML model & NLP techniques NER and Keyword Extraction to extract key achievements, skills, and qualifications. An algorithm for question ranking will rank questions asked by the candidate based on job description and relevance to industry trend. AI resume screening will help in analyzing the suitability of the candidate's resume for the job requirement. It will help recruiters to shortlist suitable candidates for further consideration. By giving candidates a tool to help prepare based on information and personalization, it can help candidates feel more confident and perform better in interviews. More advanced features can be included in the future like feedback in real time and adaptive learning so that one can continue to improve based on replies given by candidates. The hiring process is made efficient for employers due to Artificial Intelligence helping job seekers systematically prepare for interviews using AI to enhance their chances of getting hired. They get help to make their job offer chances better.

TABLE OF CONTENT

TABLE OF FIGURES

1. INTRODUCTION

Getting ready for a job interview can be tough and sometimes confusing. Many people don't know why their resumes are rejected or what kind of questions they will be asked in an interview. Often, they just prepare with common, general questions that may not really match the job they're applying for.But now, AI tools are making things easier for job seekers. These smart tools can look at your resume and suggest how to improve it not just by adding keywords, but by understanding your actual skills and experience. This helps your resume stand out and get past filters like ATS (Applicant Tracking Systems).

Even better, some AI tools can create interview questions that are personalized for you, based on your background and the job you want. So instead of practicing random questions, you can prepare for ones that really matter. This makes you feel more confident and ready to talk about what you're good at.AI tools can also give quick feedback, show you where you need to improve, and offer tips to help you do better in your job search. While there are still concerns about how AI is used like privacy and fairness these tools, when used the right way, can make preparing for a job interview much less stressful and much more helpful.

1.1 Role of Machine Learning in Resume Screening

Machine Learning (ML) and Artificial Intelligence (AI) have revolutionized the hiring process by enabling smarter resume analysis, improved job-role matching, and intelligent interview preparation. These technologies are used to identify patterns in resumes, extract skills, evaluate relevance to job descriptions, and provide actionable feedback. ML models reduce human error and subjectivity by automatically screening and ranking resumes, helping job seekers optimize their profiles based on data-driven insights. In addition, machine learning enables the generation of customized interview questions based on each applicant's skills, experience, and the targeted job, thereby enhancing their preparation and confidence.

1.2 Resume Matching, Interview Question Generation, and Skill Mapping

AI and NLP-driven systems analyze resumes beyond surface-level keywords by identifying context, achievements, and transferable skills. Techniques like word embeddings (Word2Vec, BERT) and semantic similarity scoring are used to match resumes with job descriptions accurately. Additionally, transformer-based models like T5 and GPT generate customized technical and behavioral interview questions that reflect the candidate's background. This ensures targeted preparation for each job application. Skill mapping allows the system to identify gaps and recommend training or certifications, making the job search more informed and effective.

1.3 Challenges of Existing Systems

Despite advancements, current automated recruitment systems face several limitations. Many ATS platforms are rigid and biased toward keyword matching, leading to the rejection of qualified applicants due to formatting issues or missing terms. Additionally, some systems require high computational resources, which limits accessibility for smaller platforms or independent job seekers. Integrating multiple components—resume parsing, job description analysis, question generation, and feedback—into a seamless system also presents challenges. Data privacy, candidate transparency, and explainability of AI decisions remain critical concerns that must be addressed to ensure fairness and trust.

1.4 Scope of Review

This review focuses on AI-based systems that support job seekers by offering automated resume screening, real-time feedback, and personalized interview question generation. It explores the latest research and technological applications in NLP and ML that enhance resume-job matching and applicant readiness. The review evaluates models such as BERT, GPT, and T5 for text analysis and generation, as well as machine learning algorithms for skill profiling and recommendation systems. Furthermore, it highlights the ethical challenges and technical barriers that still exist in AI-powered recruitment and discusses how emerging technologies can overcome them to create inclusive, supportive, and effective tools for job applicants.

2. EXISTING SYSTEM

2.1. Manual Resume Screening

In traditional hiring processes, recruiters manually review resumes to shortlist candidates. This involves scanning through educational qualifications, experience, and skills to match the job description. However, this approach is time-consuming, inconsistent, and prone to human bias, as different recruiters may interpret resumes differently.

2.2. Applicant Tracking System (ATS) for Resume Screening

Many companies use Applicant Tracking Systems (ATS) to streamline the screening process. ATS filters resumes based on predefined keywords, job roles, and experience levels. While this speeds up the initial screening, it often results in the rejection of qualified candidates due to rigid keyword matching. Additionally, ATS lacks the ability to analyze contextual meaning and soft skills, making it an imperfect solution.

2.3. Predefined Interview Question Sets

Interview questions are often selected from a fixed database or based on the interviewer's experience. These questions are typically generic and do not adapt to a candidate's specific skills or resume details. This lack of personalization limits the effectiveness of the interview process, as candidates are not evaluated on their unique strengths and industry-specific expertise.

2.4. Semi-Automated Screening and Interview Processes

Some organizations use basic AI-powered chatbots or machine learning models to assist in screening. These systems may rank candidates based on limited parameters such as experience and education but still fall short in analyzing deeper insights like problem-solving ability, adaptability, or soft skills. Furthermore, interview question generation in these systems remains largely rule-based rather than dynamic and personalized.

2.5. Challenges in the Existing System

The current hiring process faces several challenges. Manual screening and question preparation are time-consuming, leading to inefficiencies in recruitment. Human bias can influence candidate selection, affecting diversity and fairness. Additionally, existing ATS systems rely heavily on keyword matching, often filtering out strong candidates who do not use exact keywords. The lack of adaptability in interview question generation further reduces the ability to assess candidates effectively.

3. LITERATURE SURVEY

The hiring process in today's global economy has gone through an immense change, maturing into a more competitive and technologically advanced process. Most traditional hiring methods that centered on manual processes and human judgment all got supplemented with digital platforms, online job boards, and social networking. Such changes allowed employers to access minority candidates across the globe-bases with an immense pool of talent. One of the challenges faced by employers in the growth of recruiting is the new acquisition of data. Secondly, and most importantly perhaps, it is the search and selection with equity in mind. AI is fast becoming an increasingly more essential tool in recruitment by providing solutions to improve efficiency, equity-and scalability [1].

Due to the rapid growth of internet access, the recruitment process has given rise to firms reaching out to several applicants through online job portals. On the contrary, manual reviewing of thousands of resumes is labor-intensive and biased. Common keyword searching fails in the right candidate identification due to the natural language processing limitations. In this regard, automated resume screening systems utilize natural language processing and similarity models to gather relevant candidate details and prioritize resumes against job descriptions. Such an approach enhances efficiency, fairness, and accuracy in selecting candidates [2].

The rise of artificial intelligence and big data has transformed conventional hiring practices through interview systems that leverage AI to boost equity and efficiency. Companies looking to attract the finest talent can at least, with AI-enabled recruitment tools, provide an even and impartial assessment of the candidates. AI-driven platforms assess candidates' facial expressions, voice patterns, and language qualities to determine their fitness for a position. This approach would ease the process of recruitment and help filter out human biases. They are now becoming prominent on the bordering area of recruitment on the global front, with leading companies adopting them to boost recruitment outcomes [3].

The application of artificial intelligence (AI) in hiring has gained grounds of acceptance, making it efficient for selecting candidates autonomously. AI recruitment tools help in evaluating resumes, conducting interviews with job candidates based on

defined standards. Such advances have introduced efficiency into recruitment, but the issues of ethics, bias, and transparency nevertheless pose major concerns. Organizations must ensure that AI-based recruitment methods are fair, private, and non-discriminatory. Addressing the ethical issues will go a long way in building trust and accountability in AI-centric hiring systems [4].

The growth of online recruitment has seen the birth of job matching apps, which have made hiring processes simpler. Traditional means of recruitment sometime find it tough to manage larger volumes of unstructured data and hence these need to be automated. Profile matching models use the machine learning methods to extract relevant information from resumes and measure it against job requirements. Feature selection is very important in improving their matching accuracies, and this, for instance, can emphasize aspects favorable for jobs such as skills, experience, and education. This renders greater speed to the recruiting process, yielding equal benefits for both the employer and the applicant [5].

The revolutionary advent of artificial intelligence into recruitment and selection processes has exponentially enhanced HRM approaches, making them more efficient and effective in decision-making. AI computing tools take over the entire hiring process by assisting with screening CVs, candidate matching, and automating interviews, hence reducing the cost of recruitment while consuming less time. Some possible issues remain regarding bias, transparency, and ethics in implementing AI-driven recruiting solutions. Studies suggest that the use of AI can keep candidates engaged through real-time feedback and personalized job recommendations. While companies implement AI in hiring processes, they must ensure fairness and precision to ensure successful employment continuing into the future [6].

The use of Natural Language Processing (NLP) can minimize inefficiencies and bias in the traditional resume screening process. As NLP increases the access of unstructured resumes, it favours the larger applicants through better selection of keywords and removal of biases. Candidates with high keyword inclusion get identified while screening out resumes with low keyword inclusion. Further automation of the first

Screening phase helps recruiters shortlist qualified candidates with optimum efficiency Through streamlining the hiring process NLP enhances the fairness, reduces manual efforts and improves overall efficiency [7].

There have been recent advances in deep learning, natural language processing (NLP), and algorithms for data extraction, which provide shape and direction to the evolution of resume parsing. The diversity and complexity of present-day resumes pose challenges to traditional systems of rule-based parsing, thereby leading to inefficiency in candidate assessments. Recently developed methods make use of one or more deep learning frameworks, including convolutional neural networks (CNNs), recurrent neural networks (RNNs), and transformers, to improve the precision of extracting structured information. However, challenges associated with these approaches still remain: how to resolve linguistic ambiguities; how to ensure fairness in treatment; and how to integrate parsing systems with applicant tracking systems. Further studies aim to pursue multilingual parsing and ethical AI methods within hiring [8].

There has been growing interest in automated job interviews as part of the recruitment process due to advancements in AI and NLP. Intelligent systems now assist in creating skill-based questions, adapted to the candidate's background. In their latest research, machine learning models are suggested for automating question generation and suggestion, making use of external knowledge base profiles as well as click-through data. Although these systems enhance interview efficiency, bias and question relevance are some of the major issues with such systems. The next studies aim to provide improvements in the NLP methods that further help in enhancing the accuracy and customization of questions asked in interviews [9].

The increasing popularity of AI and NLP in recruiting has boosted hiring efficiency. Many recent studies have brought to the focus the importance of AI-enabled chatbots in candidate screening, automating interview procedures, and improving candidate experience. A resume is analyzed by machine-learning algorithms, which match candidates with job specifications as pertinent to their skills and similarities. But problems remain, including bias, ethical issues, and context misinterpretation. Current studies are being conducted to make AI models more proficient in achieving equity, transparency, and accuracy in recruitment systems supported by AI [10].

To a large extent, artificial intelligence is greatly responsible for the modes of modern recruitment, by expediting a number of phases of the whole hiring process, which encompasses resume evaluation, candidate grading, and interview coordination. New research is showing the benefits of AI-based recruitment along with the ethical dilemmas that are raised. It's effective and, at the same time, impartial, however, it can also reinforce pre-existing biases if trained on skewed data. The argument in the literature calls for transparency, accountability, and fairness in AI-fueled recruitment for it to be considerate of ethical action. Specialists and researchers have asked for a standard approach to be laid down on prejudice alleviation and space for improvements in AI recruitment [11].

The application of AI and deep learning in resume assessment, undoubtedly, contributed tremendously to the enhancement of the hiring process, automating skill extraction. Recent research proposes a conductor of complex clustering models like deep feature-based K-means clustering refined with AGT to enhance the accuracy of resume classification. These use TF-IDF and GloVe-based vectorization for resume pre-processing and significant feature extraction using CGRUN. Similarly, active research is on dealing with different resumes' formats and clustering method refinement even with the so fine accuracy of the choices they are governing [12].

While AI brings an unprecedented transformation to the recruiting process, it has raised persistent questions of algorithmic bias. Studies point out the underlying reasons for AI-related bias in recruitment as unbalanced training data, faulty algorithms, and biased decision-making trends. Scientists propose various techniques with the aim of addressing bias compensation, such are fairness-aware machine learning, adversarial debiasing, and explainable AI to further establish fairness in job recruitment. Implementing these actions involves usefulness with regard to continuous surveillance, incorporation of multilateral datasets, and transparent management in AI. The ethical frameworks for AI in the future will impact fair and responsible recruitment decisions [13].

Natural Language Processing (NLP) using Python helps in text processing, classification, and information extraction. It gives step-by-step directions to both

newbies as well as experienced programmers with the help of exercises and examples, to develop NLP apps. We will study practical applications and major algorithms for processing natural language [14]. Many studies and industry trends have analyzed the application of AI in recruitment. Use of AI improves efficiency in sourcing, communicating and deciding on candidates as well as reducing human bias in any recruiting process. A systematic review shows advancement and possible research pathways of AI in recruitment technologies [15].

In contrast to traditional keyword-based searches, EXPERT maps candidate qualifications, skills and experience with predefined job criteria to better match job descriptions with applicant profiles. It works in three phases – collection of resumes, application of ontology mapping and ranking of candidates. By automating the screening process, EXPERT also lessens the human effort, cuts resistance, and enhances efficiency [16].

4. PROPOSED WORK

Overview:

This project proposes the development of a web-based AI-powered tool aimed specifically at job seekers. The primary goal is to support users in improving their resume quality and preparing more effectively for interviews. The tool harnesses Natural Language Processing (NLP) and Machine Learning (ML) to analyze resumes, compare them with specific job descriptions, and generate personalized interview questions. Unlike traditional recruitment-focused systems, this platform is designed from the perspective of the job applicant, helping them understand what employers look for and providing actionable feedback to improve their job search outcomes.

4.1. Resume Upload and Analysis:

The system begins with a simple web interface where job seekers can upload their resumes in formats like PDF or DOCX. Upon upload, the system stores the resume securely and processes it using NLP techniques such as tokenization, named entity recognition, and skill extraction. This step is crucial for understanding the candidate's qualifications, experience, and areas of expertise.

4.2. Resume Parsing and Candidate Profiling

The AI-based system will utilize Natural Language Processing (NLP) and pre-trained transformer models (such as BERT or RoBERTa) to accurately extract and interpret information from resumes. Each applicant's resume will be analyzed for key attributes such as skills, education, work experience, and achievements. This parsed data will be securely stored in a centralized database. The AI will then build a detailed candidate profile, ensuring that the applicant is fairly represented even if the resume format is non-standard or lacks exact keyword matches.

4.3. Intelligent Screening Algorithm

Instead of traditional keyword-based filtering, the system will employ AI-based ranking algorithms to assess candidate-job fit. The algorithm will use vector-based semantic matching to evaluate how well a candidate's qualifications align with job requirements.

From the applicant's perspective, this ensures a more transparent and merit-based evaluation, reducing the chances of being unfairly screened out due to formatting or missing keywords.

4.4. Dynamic Interview Question Generation

The AI will dynamically generate personalized interview questions based on each applicant's resume content and the job description. Using deep learning models and question generation frameworks, the system will craft both technical and behavioral questions tailored to the applicant's experience, projects, and skills. This provides a fairer and more relevant interview experience, allowing candidates to better showcase their strengths and uniqueness.

4.5. Secure Candidate Database

A cloud-based, encrypted database will be used to securely store applicant data including parsed resume information, screening results, and generated questions. From the job seeker's perspective, this ensures that personal data is protected, adheres to privacy standards (e.g., GDPR compliance), and can be accessed or updated with consent. Role-based access will control who can view or modify candidate data.

4.6. Feedback and Resume Optimization System

The system provides applicants with personalized feedback to improve their resumes. It highlights weak areas, suggests improvements in structure and clarity, and recommends strong, job-specific keywords based on the role. This helps applicants align their resumes with industry standards and increases their chances of passing AI screening.

4.7. User-Friendly Web and Mobile Interface

A modern, accessible web and mobile dashboard will be developed specifically for job applicants. Through this interface, candidates can upload resumes, track application progress, view AI-generated questions, and receive feedback. The interface will be

designed with usability in mind, ensuring that applicants of all technical backgrounds can interact with the system easily. Accessibility features and support for multiple formats will ensure inclusivity across diverse user groups.

5. METHODOLOGY

An AI-powered resume interview question generator is used that systematically evaluates the resumes of job candidates and generates relevant interview questions. The system uses Natural Language Processing (NLP) and Machine Learning (ML) methods to extract vital skills, experience, and experiences from a candidate's CV and match them with job specifications.

The methodology consists of several key stages:
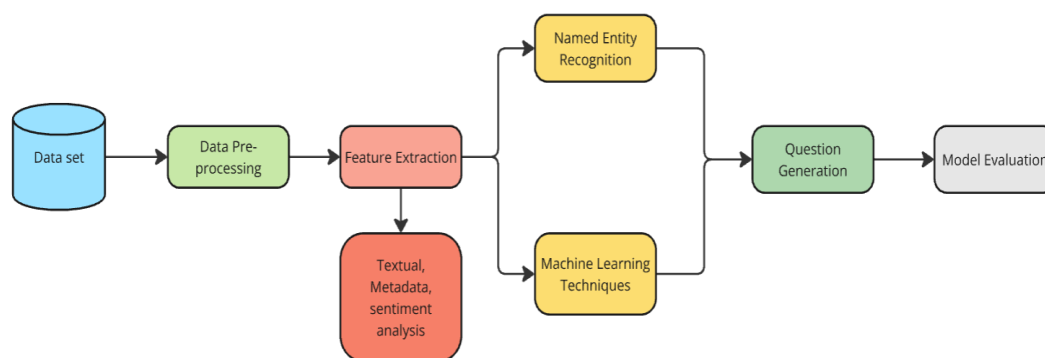
Figure 5.1: System Architecture

Data Collection: Collecting extensive sets of CVs from different sectors of industry and diverse levels of experience. This gathers a broad array of questions frequently posed in interviews for various job titles and sectors, culminating in job descriptions that outlined the necessary skills, qualifications, and experience needed for those roles.

Data Pre-processing: Pre-processing consists of the deletion of unnecessary information via text cleaning, normalization of text formats, missing data handling, deciding processing of data with nears for key entities like relevant skills, job titles, company names, and contributions mentioned in resumes in order to extract relevant keywords and phrases to outline the competency and experience of the candidate.

Feature Extraction: Some of the inputs to machine learning might include technical skills, educational background, work experience, or certification that would be

extracted by using Named Entity Recognition (NER) and keyword extraction. The extracted features are very significant in the discernment of various strengths of the prospects.

Model Training: Develop an AI-based resume interview question generator by collecting job descriptions via web scraping/APIs. Extract key features using textual, metadata, and sentiment analysis. Fine-tune BERT and T5 models to generate personalized interview questions based on job roles, skills, and experience. Evaluate model performance for relevance and accuracy.

5.1. Core Technologies and Algorithms

1. **BERT:** BERT stands for Bidirectional Encoder Representations from Transformers and was created by Google in 2018 as a machine learning model to translate natural language. BERT represents text bi-directionally, and in doing so, it pays attention to left and right context, becoming more semantically aware. BERT has made dramatic improvements in question answering, sentiment analysis, and text classification.
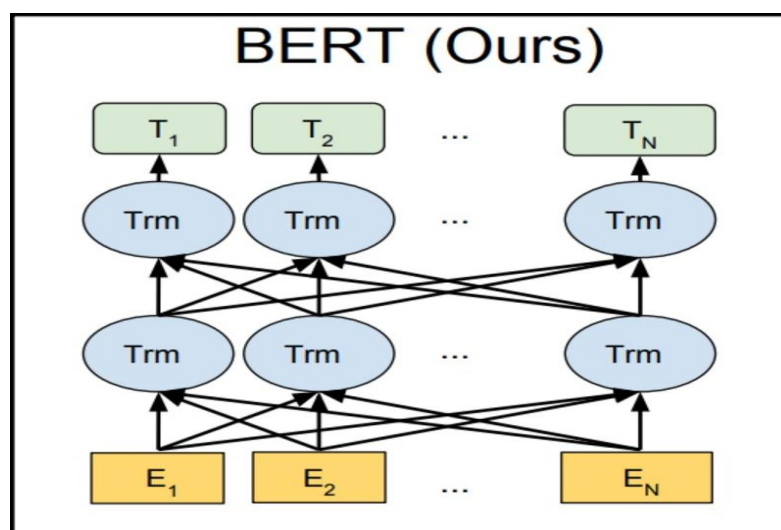

Figure 5.2 : Working of BERT

Key Formulas:

Multi-Head Attention: Multi-Head Attention allows BERT to focus on different parts of a sentence simultaneously by applying multiple attention mechanisms in parallel. Each head computes self-attention independently, and their outputs are concatenated.

$$MultiHead(Q,K,V) = Concat(H_1, H_2, \ldots, H_h)\, W^0$$

Where each H_i is calculated using:

$$H_i = Attention(QW_i^Q, KW_i^K, VW_i^V)$$

Masked Language Model: MLM is a pre-training objective where BERT randomly masks 15% of tokens in input text and predicts them based on surrounding context. The model learns bidirectional representations by considering both left and right contexts.

$$P(w_i|C) = \frac{\exp(h_i \cdot W)}{\Sigma_j \exp(h_j \cdot W)}$$

Where

- $P(w_i|C)$ is the Probability of masked word w_i given to context C.
- h_i is the hidden representation of the masked token.
- W is the output weight matrix.

2. **T5(Text-to-Text transfer Transformer):** T5 is a state-of-the-art pre-trained language model used for text transformation tasks**,** including summarization, translation, and question generation. In this system, T5 is employed to generate personalized interview questions by converting resume text into structured interview queries. The model interprets the candidate's experience, skills, and job description to create both behavioral and technical questions tailored to the applicant's profile.
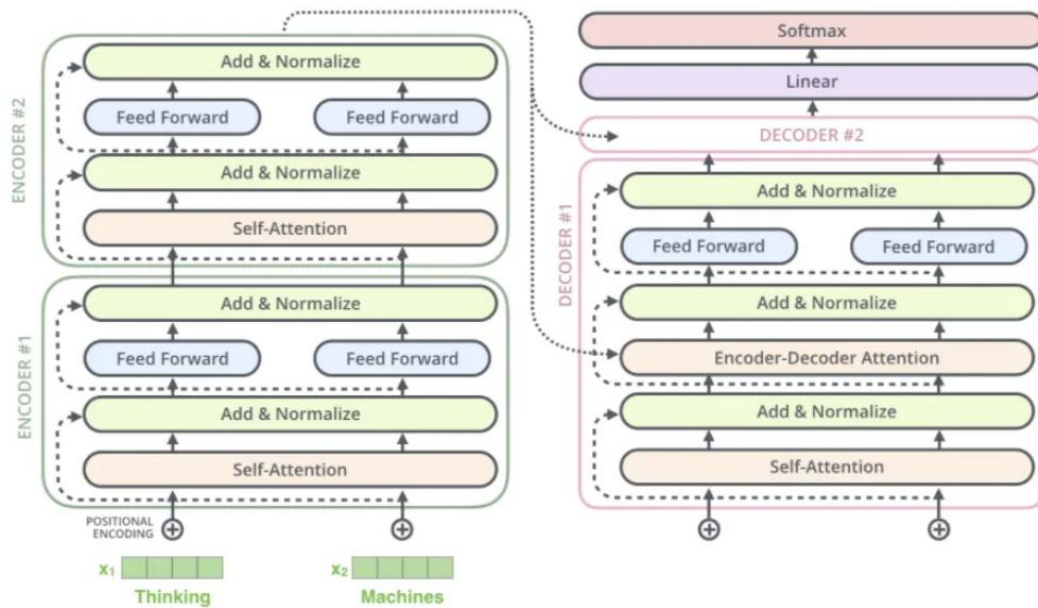
Figure 5.3: Text-to-Text Transformers

Key Formulas:

Feed-Forward Network: A Feed-Forward Network (FFN) is an essential part of Transformer architectures such as T5. It is utilized in each transformer layer to enhance token representations following self-attention. The FFN aids the model in grasping intricate transformations and feature representations.

$$FFN(x) = \max(0, xW_1 + b_1)W_2 + b_2$$

Where

- x is input vector
- W_1, W_2 are weight matrices.
- b_1, b_2 are biases.
- The ReLU activation function introduces non-linearity.

5.1.2. Vector Embedding and Semantic Matching

The system transforms both resumes and job descriptions into high-dimensional vector embedding's using sentence transformers or BERT-based embedding's. Cosine similarity is then calculated to assess the relevance of each candidate to the given job. This AI-driven semantic matching avoids rigid keyword-based screening, ensuring applicants aren't unfairly rejected due to minor wording differences.

5.1.3. Resume Feedback Generation (Using GPT or T5)

Once resumes are parsed, the system generates feedback for applicants using generative models like GPT or T5. Feedback includes:

- Missing key skills based on job-role comparison.
- Weak phrasing or vague statements in experience sections.
- Suggestions for stronger keywords, industry-standard terms, and measurable impact statements. This enables applicants to optimize their resumes and boost visibility in AI-screened systems.

5.1.4. MySQL/SQLite Database

A relational database is used to store structured resume data, parsed information, feedback logs, generated questions, and screening results. The data is encrypted and managed using role-based access control to protect applicant privacy and ensure compliance with data protection regulations (e.g., GDPR).

5.1.5. Tensor Flow/Keras

These deep learning libraries are used for training and deploying custom models, such as binary classifiers for eligibility prediction or fine-tuned models for question generation. Tensor Flow is also employed for performance optimization and serving AI models in real time.

5.2. Testing and Decision-Making Logic

5.2.1 Resume Screening Evaluation

After training, the screening algorithm is tested on resumes collected from multiple domains. Each resume undergoes semantic analysis and is compared with a job profile. The matching score is calculated using cosine similarity. Candidates are then ranked based on their alignment with the job requirements.

5.2.2. Question Generation Validation

To ensure relevance and fairness, interview questions generated from resumes are compared against expert-written questions. Models are tested for:

- Relevance to the resume content.
- Diversity in question types (technical, behavioral).
- Clarity and specificity. This ensures that each candidate receives balanced and personalized questions.

5.2.3. Decision-Making System

Based on the matching score and resume feedback, the system assigns one of the following:

- **"Recommended"** – Resume aligns well, questions are generated.
- **"Needs Improvement"** – Resume lacks key areas; suggestions are provided.
- **"Not suitable"** – Candidate is significantly misaligned; constructive feedback is given to aid improvement.

This decision logic ensures fairness and transparency in how resumes are evaluated and candidates are guided.

Question Generation: The interview questions are generated by a rule-based and machine-learning approach. Questions will be of behavioral, technical, and situational nature that would not come up randomly, but in consideration with the skills andexperience opted for. The rank building algorithm will rank the questions according to their relevance and complexity.

Model Evaluation: Features extracted out of the datasets are used for training Random Forests and Deep Neural Networks models. Having been trained, Random Forest and Deep Learning models work on the input data to assign a label to it on the basis of rules learned from the input data. The question-generation phase will utilize aggregated information contained in the extracted entities and keywords for constructing sensible questions, which will subsequently be followed with evaluation of trained models to ascertain the quality, accuracy, and relevance of the output generated.

6. TITLE OF THE PROJECT

The Need for an AI-Based Resume Screening and Interview Question Generator with the increasing reliance on automation in recruitment, job seekers often find themselves at a disadvantage when applying through systems that filter resumes using rigid algorithms or poorly designed keyword matchers. Traditional Application Tracking Systems (ATS) often discard capable candidates due to formatting issues, lack of exact keyword matches, or limited personalization. These challenges can lead to missed opportunities and unfair assessments. To address these limitations, this project proposes an AI-based system designed from the applicant's perspective, focusing on enhancing visibility, readiness, and confidence in the hiring process.

6.1. AI-Powered Resume Analysis and Matching: Artificial Intelligence plays a pivotal role in helping applicants understand how their resume aligns with a specific job description. Using Natural Language Processing (NLP), the system analyzes resumes in-depth extracting skills, experiences, and qualifications and matches them semantically against job postings. This process enables more transparent and merit-based screening, allowing candidates to be judged on true relevance rather than superficial keyword matches.

6.2. Personalized Resume Feedback and Optimization: Many applicants struggle to tailor their resumes for each job. The system addresses this by offering automated, personalized feedback. It highlights weak areas, suggests improvements in phrasing or structure, and recommends strong, role-specific keywords. This ensures that applicants are better equipped to meet AI screening criteria and increase their chances of selection.

6.3. Dynamic Interview Question Generation: Preparing for interviews is another challenge. The system uses text-to-text transformers (like T5) to generate custom interview questions based on the applicant's resume and the targeted role. These questions, which cover both technical and behavioral aspects, help candidates anticipate what might be asked and prepare more effectively. It transforms interview preparation into a focused and personalized process.

6.4. Skill and Experience-Based Profiling: The system builds a comprehensive profile of the applicant by identifying core competencies, achievements, and experiences. This profile acts as a career snapshot that can be refined over time. It also enables better question generation, more accurate feedback, and potential job-fit insights. By focusing on actual content rather than format, the system ensures fair profiling across various resume styles.

6.5. Machine Learning for Enhanced Fairness and Precision

The system employs machine learning algorithms to continuously improve screening accuracy and fairness. It learns from past data to better detect valuable but underrepresented attributes in resumes and avoid bias. Over time, the model adapts to diverse industries, resume styles, and job roles, making the screening process more inclusive and reflective of true talent.

By incorporating AI, NLP, and machine learning, this project aims to empower job seekers through smart resume insights and preparation tools. It bridges the gap between candidates and AI-driven recruitment systems, promoting visibility, readiness, and personalized career support**.**

For these reasons, I am naming the project as:

"AI-Powered Resume Screening and Interview Question Generator"

7. RESEARCH GAP

Based on a thorough review of existing literature, the following key research gaps have been identified in the domain of AI-driven hiring assistance and resume screening particularly from the job applicant's point of view:

7.1. Limited Personalization and Scalability

Most resume screening tools rely on generic keyword matchers or static templates, offering limited personalization. They are often built for recruiters, not for job seekers trying to understand and improve their resumes. There's a pressing need for scalable, user-friendly platforms that provide individualized feedback across various roles and industries.

7.2. Underutilization of Advanced NLP and Deep Learning Models

Current tools frequently use basic models like rule-based filters, TF-IDF, or simple classifiers (e.g., SVM, Naive Bayes). These lack the semantic depth **of** transformer-based models like BERT, GPT, or T5**,** which can better interpret context, tone, and role-specific nuances in resumes and job descriptions.

7.3. Lack of Transparency in Resume Rejection Reasons

A major pain point for applicants is the black-box nature of AI screening. Users rarely receive detailed feedback about why their resume was rejected. Few tools offer transparent or explainable AI models that clarify mismatches and provide actionable suggestions.

7.4. Inadequate Interview Preparation Features

While some platforms generate generic practice questions, most lack dynamic, resume-driven interview preparation. There's a gap in systems that generate personalized interview questions based on the applicant's actual experiences, skills, and the targeted job role using advanced language generation models.

7.5. Difficulty in Handling Resume Variability

Many systems struggle with diverse resume formats, design templates, and unconventional layouts. This results in parsing errors or missed information. Robust parsing models that adapt to varied structures while preserving contextual integrity are still lacking.

7.6. Vulnerability to Keyword Stuffing and Manipulation

Applicants often game the system by overloading resumes with keywords to pass ATS filters. Few tools can differentiate between genuine expertise and keyword manipulation. There's a need for intelligent screening that balances keywords with actual experience.

7.7. High Resource Requirements and Limited Offline Access

AI tools with heavy NLP models require substantial computational power or constant internet connectivity, making them inaccessible to applicants with limited devices or bandwidth. Lightweight models with offline capabilities and cloud-based support would widen accessibility.

7.8. Weak Integration with Career Development Tools

Most AI screeners operate in isolation and do not connect with broader career development platforms such as LinkedIn profiles, learning platforms, or mentorship tools. Integrating these could offer ongoing support, progress tracking, and role-based learning recommendations.

7.9. Sensitivity to Linguistic and Cultural Variations

AI models may be biased towards resumes written in certain tones, languages, or styles disadvantaging non-native speakers or applicants from diverse cultural backgrounds. More inclusive NLP training and bias mitigation techniques are needed for fairness.

7.10. Limited Consideration of Ethics and Data Privacy

There's insufficient discussion around how user data is stored, processed, and used in AI-based resume screeners. Applicants are rarely given control over their data, raising ethical concerns. Research into privacy-preserving AI, explainable models, and user consent mechanisms is critical.

The major research gap lies in the absence of a unified, applicant-centric, AI-based platform that offers intelligent resume screening, personalized feedback, and dynamic interview preparation—all while maintaining fairness, transparency, and low-resource accessibility. Most current systems focus on recruiter efficiency rather than empowering job seekers. Bridging this gap requires a scalable, explainable, and ethically designed AI system that not only improves applicant visibility but also builds trust in AI-driven hiring processes.

8. OBJECTIVES

8.1. Automated Resume Screening: To develop an AI-powered system that automatically screens and evaluates resumes based on job descriptions using Natural Language Processing (NLP). The objective is to identify key skills, experiences, and qualifications, providing a fair and accurate assessment from the job applicant's perspective.

8.2. Resume Optimization Guidance: To provide personalized, actionable feedback that helps applicants optimize their resumes. This includes suggesting improvements in formatting, phrasing, and keyword usage to increase the chances of passing through Applicant Tracking Systems (ATS) and AI filters.

8.3. AI-Generated Interview Questions: To generate customized interview questions based on the applicant's resume and the targeted job role. These questions will cover technical skills, soft skills, and behavioral aspects, allowing applicants to prepare more effectively for real interviews.

8.4. Skill Gap Identification and Insights: To analyze applicant resumes for missing or weakly presented skills relevant to the job description and provide insights or recommendations on areas to improve. This helps candidates tailor their learning or reskilling efforts.

8.6. Adaptive Learning Using Machine Learning: To continuously refine the resume screening and question generation process using machine learning. The system will adapt to new job trends, diverse writing styles, and user interactions, ensuring high relevance and fairness in evaluations.

9. CONCLUSION

The AI-Powered Resume Screening and Interview Question Generator enhances job search efficiency and applicant preparedness by leveraging natural language processing, machine learning, and intelligent automation. Unlike traditional Applicant Tracking Systems (ATS) that rely on rigid keyword matching and often overlook qualified candidates, this system ensures fair and accurate resume evaluation by analyzing context, relevance, and intent. It reduces applicant uncertainty by offering real-time, personalized resume feedback and tailored interview questions aligned with the specific job role. By automating resume screening and question generation, the system reduces preparation time, minimizes guesswork, and boosts confidence. It empowers job seekers to identify skill gaps, refine their resumes, and prepare more strategically for interviews. Additionally, its adaptive learning models improve over time, ensuring evolving job market relevance and inclusivity. This research demonstrates the practical benefits of AI in job application processes, paving the way for future enhancements such as personalized learning plans, behavioral assessment, and holistic career profiling. Overall, the system provides a transparent, supportive, and intelligent solution to help applicants navigate AI-driven hiring landscapes with greater success and clarity.

REFERENCES:

[1] Vivek, R. (2023). Enhancing diversity and reducing bias in recruitment through AI: A review of strategies and challenges. *Informatics, Economics, Management, 2(4),* 0101–0118. https://doi.org/10.47813/2782-5280-2023-2-4-0101-0118

[2] Daryani, Chirag & Chhabra, Gurneet & Patel, Harsh & Chhabra, Indrajeet & Patel, Ruchi. (2020). AN AUTOMATED RESUME SCREENING SYSTEM USING NATURAL LANGUAGE PROCESSING AND SIMILARITY. 99-103. 10.26480/etit.02.2020.99.103.

[3] Lee, B. C., & Kim, B. Y. (2021). Development of an AI-based interview system for remote hiring. *International Journal of Advanced Research in Engineering and Technology, 12(3),* 654–663. https://doi.org/10.34218/IJARET.12.3.2021.060

[4] Stuss, M. M., & Fularski, A. (2024). Ethical considerations of using artificial intelligence (AI) in recruitment processes. *Education of Economists and Managers, 71(1),* 53–67. https://doi.org/10.33119/EEIM.2024.71.4

[5] Rodriguez, L. G., & Chavez, E. P. (2019). Feature selection for job matching application using profile matching model. *2019 IEEE 4th International Conference on Computer and Communication Systems*, 263–266. https://doi.org/10.1109/CCOMS.2019.8821742

[6] Rathore, S. P. S. (2023). The impact of AI on recruitment and selection processes: Analyzing the role of AI in automating and enhancing recruitment and selection procedures. *International Journal for Global Academic & Scientific Research, 2(2),* 78-93. https://doi.org/10.55938/ijgasr.v2i2.50

[7] Saatci, M., Kaya, R., & Ünlü, R. (2024). Resume Screening With Natural Language Processing (NLP). Alphanumeric Journal, 12(2), 121-140. https://doi.org/10.17093/alphanumeric.1536577

[8] Victoire, T. A., Vasuki, M., & Selvi, Y. S. (2024). DeepResume: Deep learning-based resume parsing for candidate screening. *International Journal of Current Science, 14(2),* 377–382.

[9] Qin, C., Zhu, H., Shen, D., Sun, Y., Yao, K., Wang, P., & Xiong, H. (2023). Automatic skill-oriented question generation and recommendation for intelligent job interviews. *ACM Transactions on Information Systems, 42(1),* 27. https://doi.org/10.1145/3604552

[10] Bhagia, Y., Abbas, S. M., Kumar, S., & Maheshwari, S. (2024). Conversational AI: A survey. *International Research Journal of Engineering and Technology, 11(4),* 833–842.

[11] Stuss, M. M., & Fularski, A. (2024). Ethical considerations of using artificial intelligence (AI) in recruitment processes. *Education of Economists and Managers, 71(1),* 53–67. https://doi.org/10.33119/EEIM.2024.71.4

[12] Priyanka, J. H., & Parveen, N. (2024). An efficient resume skill extraction using deep feature-based AGT optimized K-means clustering. *Multimedia Tools and Applications, 83,* 65967–65986. https://doi.org/10.1007/s11042-024-18220-0

[13] Albaroudi, E., Mansouri, T., & Alameer, A. (2024). A Comprehensive Review of AI Techniques for Addressing Algorithmic Bias in Job Hiring. *AI*, *5*(1), 383-404. https://doi.org/10.3390/ai5010019.

[14] Bird, Steven & Klein, Ewan & Loper, Edward. (2009). Natural Language Processing with Python.

[15] Nawaz, Nishad. (2019). How Far Have We Come With The Study Of Artificial Intelligence For Recruitment Process.

[16] V. Senthil kumaran & Annamalai, Sankar. (2013). Towards an automated system for intelligent screening of candidates for recruitment using ontology mapping EXPERT. International Journal of Metadata, Semantics and Ontologies. 8. 56-64. 10.1504/IJMSO.2013.054184.