

Smart Resume Scoring & Recommendations

Gaviya S*, Ms. Agnes Joshy S **

*(Student, Computer Science and Engineering, Francis Xavier Engineering College, Tirunelveli
gavyas.ug.21.cs@francisxavier.ac.in)

** (Assistant Professor, Information and Technology, Francis Xavier Engineering College, Tirunelveli
agnesjoshy@francisxavier.ac.in)

Abstract:

A well-structured and optimized resume plays a crucial role in today's competitive job market. Smart Resume Scoring & Recommendations is an AI-powered system designed to assist job seekers by evaluating resumes, providing insights, and suggesting improvements. This system combines resume analysis, Power BI visualization, and an intelligent resume builder to help users create high-quality resumes tailored to industry standards. The system utilizes machine learning (ML) and natural language processing (NLP) to assess resumes based on key parameters, offering structured scoring and detailed feedback. A major feature is its interactive Power BI visualization, which presents resume strengths and areas for improvement through data-driven analytics. Additionally, it provides personalized course recommendations and career tips, allowing users to enhance their skills and improve their employability. By automating resume evaluation, this system reduces the limitations of manual assessments and enhances efficiency. Beyond resume optimization, the platform serves as a comprehensive career development tool, equipping individuals with the insights needed for professional growth.

Keywords — Resume Analysis, Machine Learning (ML), Natural Language Processing (NLP), Power BI Visualization, Automated Resume Scoring.

I. INTRODUCTION

In today's competitive job market, a well-structured and optimized resume is essential for securing employment opportunities. Recruiters often receive numerous applications, making manual resume screening time-consuming and subjective. Traditional methods rely on human judgment, which can lead to inconsistencies, biases, and inefficiencies, as noted by Thomas et al. [8] and Nguyen et al. [10].

To address these challenges, Smart Resume Scoring & Recommendations leverages Artificial

Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) to automate resume evaluation, providing data-driven insights and actionable recommendations to job seekers. This approach builds on foundational work by Zimmermann et al. [1], Kumar et al. [4], and Thomas et al. [8], who demonstrated the efficacy of AI in resume analysis. The system integrates three core modules: resume analysis, Power BI visualization, and an intelligent resume builder.

The resume analysis module evaluates resumes based on key parameters such as formatting, content quality, and keyword relevance. Advanced

NLP techniques, as proposed by Kumar et al. [4] and Sharma et al. [6], enable robust parsing and classification of resume content. Nguyen et al. [10] further validate the use of NLP for automating resume screening, reducing human bias.

The Power BI visualization module, inspired by Banerjee et al. [7], transforms raw data into interactive dashboards, allowing users to visually identify strengths and weaknesses in their resumes. This aligns with modern trends in data-driven career insights, as highlighted by Sharma et al. [6]. For resume creation, the AI-driven builder incorporates structured templates and contextual suggestions, drawing on methodologies by Roy et al. [2] and Kumar et al. [4]. These tools ensure resumes meet industry standards while maintaining user customization.

Beyond resume optimization, the system provides personalized career development support. Course recommendations leverage semantic analysis and deep learning models, as demonstrated by Premalatha et al. [3] and Hassan et al. [5], to align user skills with market demands. Career improvement tips are further refined using data mining techniques from Park et al. [11], while Lee et al. [9] inform the design of adaptive learning paths for skill enhancement.

By automating resume assessment, this system eliminates subjectivity, increases efficiency, and provides precise feedback to optimize hiring potential, as advocated by Thomas et al. [8] and Nguyen et al. [10]. The remainder of this paper explores the system's methodology, architecture, and experimental results, demonstrating how Smart Resume Scoring & Recommendations enhances the resume evaluation process and supports career development through AI-driven insights.

II. OBJECTIVE

In today's competitive job market, a well-structured and optimized resume is essential for securing employment opportunities. However,

traditional resume evaluation methods often suffer from subjectivity, inconsistency, and inefficiency, making it difficult for job seekers to understand their strengths and areas of improvement. To address these challenges, this research aims to develop Smart Resume Scoring & Recommendations, an AI-powered system that automates resume assessment, provides structured feedback, and enhances career growth through data-driven insights.

The primary objective of this study is to design and implement a resume analysis system that leverages Machine Learning (ML), Natural Language Processing (NLP), and Power BI visualization to deliver an efficient, standardized, and insightful evaluation process. The system is structured to meet the following specific objectives:

1. Automated Resume Assessment :

Develop an AI-driven system that evaluates resumes based on content relevance, structure, formatting, and keyword optimization. Utilize ML and NLP techniques to ensure accuracy and consistency in resume screening.

2. Resume Scoring and Structured Feedback :

Implement a resume scoring algorithm that provides structured evaluations based on industry-defined metrics. Deliver detailed, actionable feedback on key resume components such as experience, skills, education, and formatting to help users improve their documents.

3. Power BI-Based Data Visualization :

Integrate Power BI analytics to generate interactive visual reports on resume quality. Present graphical insights on resume strengths, weaknesses, and optimization suggestions to enhance user experience.

4. Intelligent Resume Builder :

Design a dynamic resume-building tool with professional templates, content suggestions, and formatting guidelines. Help users create customized

and job-specific resumes to improve their hiring potential.

5. Career Growth and Skill Enhancement Recommendations:

Provide AI-driven course recommendations and career tips to address skill gaps and improve job readiness. Ensure users receive personalized learning paths based on their resume analysis results.

6. Enhancing the Recruitment Process:

Assist recruiters and HR professionals by offering standardized resume evaluations, reducing manual screening time and hiring bias. Improve the overall recruitment workflow by streamlining resume shortlisting and candidate selection.

III. MODULE AND ALGORITHM

The Smart Resume Scoring & Recommendation System is an AI-driven solution designed to assist job seekers in crafting high-quality resumes. By analyzing resume content, offering detailed feedback, and suggesting skill-enhancing courses, the system ensures alignment with industry expectations. An important aspect of this system is its Power BI-based dashboard, which presents real-time resume insights in a visual format. By incorporating AI-powered automation and data-driven recommendations, this tool enables users to build effective, professional resumes that stand out in the job market.

A. Modules :

1. Resume Analysis Module :

The Resume Analysis Module helps job seekers create a professional and well-structured resume by evaluating key hiring criteria. This module ensures that resumes follow industry standards and meet Applicant Tracking System (ATS) requirements, improving the chances of passing automated screenings used by recruiters. It also ensures that essential sections—such as personal details, work experience, education, and skills—are present and

well-organized. Additionally, it identifies relevant keywords based on the job description, helping applicants align their resumes with employer expectations. After the evaluation, users receive a comprehensive report with personalized feedback, highlighting strengths and areas for improvement. This allows candidates to refine their resumes, optimize keyword usage, and present a well-structured document that increases their chances of landing an interview.

2. Resume Builder Module :

The Resume Builder Module simplifies the process of creating a structured, professional resume. It provides users with customizable resume templates that meet industry standards, allowing them to choose a design that best suits their career path. One of the standout features of this module is content structuring assistance, where the system helps users organize sections such as experience, education, and skills in a compelling manner. By making the resume-building process interactive and efficient, this module enables job seekers to create resumes that effectively showcase their qualifications.

3. Course Recommendation Module :

The Course Recommendation Module identifies missing or underdeveloped skills in a resume and suggests relevant online courses, certifications, and training programs to help job seekers enhance their expertise. This module offers personalized learning paths, ensuring that course recommendations align with a user's career goals. It sources recommendations from trusted e-learning platforms and universities, making sure users receive high-quality educational resources. By continuously updating its suggestions based on industry trends, this module helps job seekers stay competitive and relevant in their chosen fields.

4. Resume & Interview Tips Module :

The Resume & Interview Tips Module enhances a candidate's job application process by providing resume improvement suggestions and interview

coaching. Beyond resume refinement, this module includes interview preparation tips, covering frequently asked questions, behavioral response strategies, and techniques for making a strong impression. By combining resume enhancement with interview coaching, this module boosts confidence and improves hiring potential.

5. Power BI Dashboard Visualization Module :

The Power BI Dashboard Visualization Module provides a data-driven analysis of resume performance, helping users track improvements and optimize their resumes effectively. This module evaluates key factors such as ATS compliance, formatting consistency, keyword optimization, and section completeness using interactive charts and graphs. By visually representing resume insights, it allows job seekers to easily identify areas for refinement.

B. Algorithm :

1. Resume Building Algorithm :

The resume building process centers on the organized gathering of user data via an interactive web interface. Users are guided through input fields for standard resume sections, beginning with the selection of a visual template. They then provide personal details, a professional summary, comprehensive work history (including multiple entries for responsibilities and achievements), information about projects, educational background, and skills categorized for clarity. Upon initiating the resume generation, the collected data is structured into a logical format. The core generation phase then utilizes a template-driven mechanism. This process takes the structured data and the selected visual template as input. It arranges the user-provided information according to the template's predefined layout and formatting rules, ultimately producing a professional-looking resume document that is then made available for the user to download.

2. Profile Scoring Algorithm :

The Profile Scoring Algorithm functions as a core component in providing a quantitative assessment of a resume's overall quality based on a predefined set of significant metrics. This algorithm assigns a numerical score, with a maximum achievable value of 100 points, derived from a weighted evaluation of three primary factors: the total number of words in the resume, the count of distinct technical skills identified by the system, and the estimated years of professional experience. The scoring framework allocates a maximum of 25 points for word count (rewarding longer resumes), 25 points for the number of skills mentioned (rewarding a broader skillset), and 30 points for the estimated years of experience (rewarding more experienced candidates). The final profile score is calculated by summing the points earned in each of these three categories and rounding the total, providing a standardized metric for benchmarking resume strength and identifying areas for improvement.

3. Power BI Visualization Process :

The Power BI visualization process transforms raw resume analysis data into insightful visuals. Initially, a robust system collects and stores metrics like ATS scores, resume formats, section details, and keyword matches in a structured database accessible by Power BI. Measures and calculated columns are created for aggregations like average ATS scores by format. Finally, visualizations form cohesive reports and dashboards, offering a comprehensive overview of resume analytics. Publishing to the Power BI service ensures accessibility, facilitating data-driven decisions on resume effectiveness and recruitment optimization.

IV. METHODOLOGY

1. Data Acquisition and Initial Processing :

The platform begins by accepting resumes in various digital formats. For physical documents, OCR converts them to editable text. Notably, spaCy's pre-trained NLP model is used for Named Entity Recognition (NER) to identify key elements like job titles and skills. These steps create a clean,

structured dataset for accurate skill and experience analysis, leveraging NLP for deeper insights.

2. Skill and Experience Identification :

Following data preparation, the system identifies candidate abilities and professional history. The Skill Identification Algorithm analyzes processed text, comparing words to an industry-relevant skill database, including single and multi-word terms. Simultaneously, the Experience Assessment Algorithm scans for numbers linked to time keywords to determine work history duration. Missing explicit experience prompts users to highlight alternatives. This stage is crucial for evaluating qualifications and identifying potential resume gaps relevant to ATS and recruiters.

3. Resume Assessment and Scoring :

To provide an objective evaluation, the Profile Scoring Algorithm assesses resume quality based on word count (detail), identified skills (breadth), and assessed experience (duration). Higher scores are awarded for sufficient detail, a wider range of relevant skills, and more extensive work history. These individual scores are combined and standardized, offering job seekers a clear understanding of their resume's strengths and weaknesses, helping them pinpoint areas for improvement.

4. Tailored Improvement Suggestions :

Beyond scoring, the platform offers personalized guidance to enhance resumes. The Recommendation Generation Algorithm identifies weaknesses and provides actionable feedback. Low word count prompts adding detail. Lacking relevant skills leads to suggestions for industry-specific terms. Limited experience encourages highlighting alternatives. These customized recommendations provide practical optimization steps, increasing the likelihood of positive outcomes with both ATS and human recruiters.

5. Final Resume Optimization and ATS Compatibility :

The concluding phase optimizes resumes for ATS and recruiter readability. The platform verifies standard section headings for correct ATS parsing and checks keyword alignment with job descriptions. Readability is assessed, promoting concise bullet points and clear formatting. Suggestions improve scannability and organization. This final stage maximizes the chances of successfully navigating initial screenings and effectively engaging recruiters, ultimately improving job search success.

V. EXISTING SYSTEM

1. Conventional Manual Review :

The established method involves HR professionals individually assessing applications, seeking relevant skills, experience, and education. This time-intensive process, especially with numerous applicants, is prone to human bias, causing inconsistent hiring decisions. Evaluation lacks standardization among reviewers. While incorporating human insight, manual screening's inefficiency in high-volume recruitment has driven ATS adoption for improved speed and reduced workload.

2. Automated Applicant Tracking Systems (ATS) :

Organizations commonly use ATS to automate initial resume filtering based on predefined keywords and criteria. Submitted resumes are scanned and ranked by their relevance to job descriptions. ATS parse text, extract skills, and match them against requirements. However, their reliance on exact keyword matching can cause evaluation errors, rejecting qualified candidates omitting precise terms. ATS also struggle with non-standard formatting like tables or images and cannot assess soft skills or overall potential, focusing on structured data. Despite these limitations, ATS remain popular for efficiently handling large application volumes.

3. Reliance on Keyword-Based Matching :

A common approach in current systems is keyword-based matching, identifying suitable candidates by scanning for specific words aligning with job descriptions. While offering quick filtering, it has limitations. It fails to recognize synonyms or variations. Candidates may overuse keywords to game ATS, potentially leading to poor hires. Modern analyzers integrate NLP and ML for more intelligent resume evaluation to overcome these limitations.

4. Inadequate Contextual Interpretation :

A significant limitation is the inability of existing systems to understand context, leading to misclassification of skills and experience. ATS struggle to differentiate between Python proficiency for data analysis versus web development. This lack of contextual awareness results in inaccurate recommendations and suboptimal hiring decisions, often overlooking qualified applicants whose resumes don't perfectly align with predefined keyword filters. Newer AI-driven systems aim to enhance contextual understanding through semantic analysis.

5. Limited Tailoring of Resume Feedback :

Current resume screening tools generally lack detailed, personalized feedback for job seekers. Traditional systems often provide accept/reject decisions based on keyword matches without explaining why. Many ATS don't suggest missing skills or formatting improvements. While some online checkers offer basic readability scores, they fail to analyze deeper aspects like skill relevance and career progression. The absence of personalized recommendations reduces the effectiveness of existing resume analyzers. Advanced systems are integrating AI-driven resume optimization to offer specific, actionable insights for improvement.

6. Challenges in Resume Formatting :

Resumes are submitted in diverse formats (PDF, DOCX, TXT), challenging traditional systems to accurately extract and analyze content. Many ATS

struggle with complex layouts like two-column designs, tables, graphs, and images. Graphical skills sections or poorly formatted PDFs can lead to missing crucial information. To address this, modern resume analyzers are integrating OCR technology and AI-powered text extraction methods to handle diverse resume formats more effectively.

VI. PROPOSED SYSTEM

This innovative platform aims to revolutionize the job search for candidates by offering advanced AI-powered tools for resume creation, analysis, and refinement, complemented by insightful data visualizations. It offers three core functionalities: AI-driven resume analysis integrated with Power BI, an intelligent resume builder optimized for ATS, and personalized course and career guidance. By seamlessly blending NLP, machine learning, and interactive dashboards, the system empowers users to identify weaknesses, construct ATS-friendly resumes, and enhance skills through tailored recommendations. The primary goal is to bridge the candidate-recruiter gap by optimizing resumes for better application outcomes, providing structured feedback and data-driven insights for improved hiring potential.

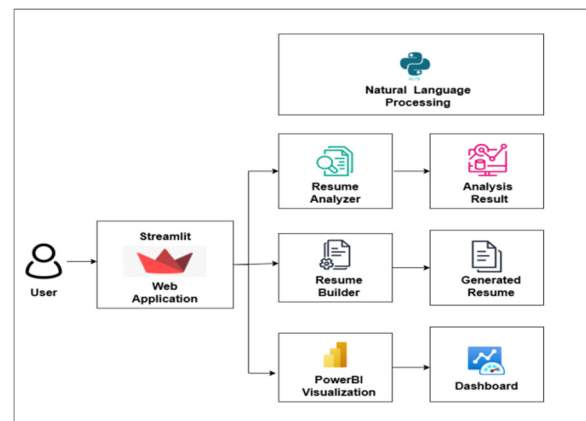


Fig . 1 Architecture of Smart Resume Scoring and Recommendation System

1. AI-Powered Resume Analysis :

The Resume Analyzer leverages Natural Language Processing (NLP) and sophisticated

algorithms to thoroughly evaluate resumes. It extracts crucial information like work history, education, skills, and achievements. This enables the system to identify missing details, detect inconsistencies, and provide a structured evaluation. A scoring mechanism assigns points based on factors like word count, skill relevance, and experience levels, allowing users to understand their resume's quality. If crucial keywords for a target role are absent, the system suggests relevant terms to improve Applicant Tracking System (ATS) compatibility.

2. Power BI Visualization for Resume Insights :

To provide a clear and interactive assessment, the Resume Analyzer incorporates Power BI dashboards that visually represent a candidate's resume insights. Utilizing elements like bar charts, pie charts, and heatmaps, the dashboard showcases skill distribution, experience levels, and overall resume completeness. Score-based metrics are also included, enabling users to understand how their resume ranks against standard hiring criteria. Real-time data updates in Power BI allow users to see the immediate impact of any modifications on their overall score, facilitating informed decisions and ensuring correct resume structuring before submission.

3. Intelligent Resume Builder :

The Resume Builder empowers users to effortlessly create professional, ATS-friendly resumes. It offers customizable pre-designed templates, dynamic formatting options, and intelligent keyword suggestions to enhance resume quality. Users can input personal details, education, work experience, projects, and skills, and the system automatically structures and formats the resume according to established best practices in the hiring industry. Users can download the final resume in multiple formats (PDF, DOCX) or export it directly for online job applications.

4. Course Recommendations for Skill Enhancement :

A key differentiator of this system is its ability to recommend relevant online courses based on a user's resume analysis. If the system identifies missing or underdeveloped skills crucial for a candidate's desired career path, it suggests courses from platforms such as Coursera, Udemy, LinkedIn Learning, and edX. For instance, a candidate lacking Python expertise for a software developer role would receive specific Python programming course recommendations. These suggestions are personalized, considering the user's experience level, industry requirements, and prevailing job market trends, ensuring job seekers focus on gaining competitive skills.

5. Career Tips and ATS Optimization :

To provide comprehensive support to job seekers, the system offers valuable career advice and practical Applicant Tracking System (ATS) optimization tips to ensure resumes are well-prepared for the demands of the job market. Recognizing that many resumes are rejected due to issues such as poor formatting, a lack of relevant keywords that align with job descriptions, and improper structural organization, this feature offers clear resume structuring guidelines, intelligent keyword suggestions tailored to specific industries and roles, and practical formatting recommendations aimed at maximizing ATS compatibility.

VI. OUTPUT

Resume Analyzer Project Outcomes :

The Resume Analyzer delivers extensive results to guide users in perfecting their resumes and boosting their career opportunities. It generates organized insights in varied formats with practical suggestions for effective resume enhancement.

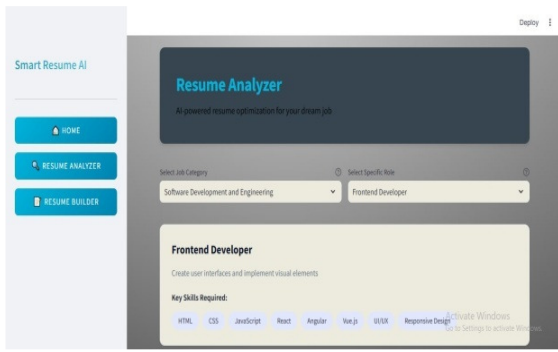


Fig . 2 Output of Resume analysing module

1. Comprehensive Resume Assessment :

The system generates a detailed report examining resume elements like skill pertinence and professional background. It identifies strong points and areas needing work, demonstrating how the resume aligns with industry norms. The report proposes enhancements like incorporating key skills or strengthening work experience descriptions for greater influence.

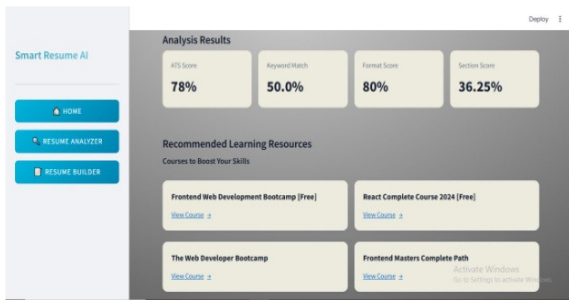


Fig . 3 Output of Score Analysis

2. Interactive Power BI Visualization :

Integrated Power BI dashboards offer a visual portrayal of crucial resume information. Charts and graphs illustrate metrics such as skill occurrence and experience depth, allowing users to compare against standard industry practices. The intuitive interface simplifies spotting areas for improvement and monitoring optimization progress.

3. Intuitive Resume Creation Instrument :

The system features a user-friendly tool for crafting professional resumes using structured

templates. Users input their information, choose a design, and produce a refined resume. The tool ensures correct formatting, ATS friendliness, and clear section arrangement for streamlined resume development.

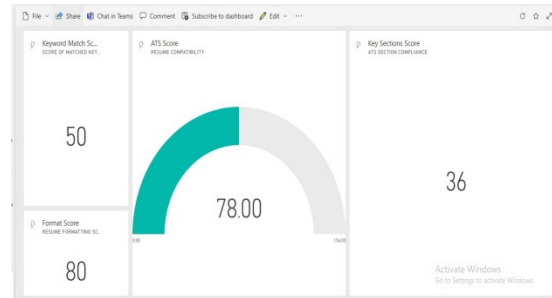


Fig . 3 Output of Power BI Analysis

4. Tailored Learning and Career Support :

Based on the resume analysis, the system recommends pertinent courses and career advice to improve skills and employability. It suggests online learning from platforms like Coursera and offers guidance on job applications, networking, and personal branding for professional advancement.

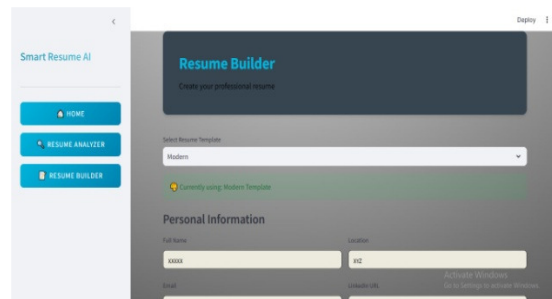


Fig . 4 Output of Resume Builder

5. Resume Evaluation and Enhancement Tips :

The system provides a resume score based on criteria like skills and experience. Low scores prompt personalized advice for improvement, such as clarifying content or adding measurable accomplishments, aiding users in refining their resumes for better ATS navigation

VII. CONCLUSIONS

The Resume Analyzer offers a complete solution for job seekers by assessing resumes, visualizing essential data, and providing recommendations for career growth. This system streamlines resume creation and optimization, ensuring candidates present themselves effectively to potential employers.

1. Improved Resume Assessment :

The system efficiently analyzes resumes, pinpointing key strengths and areas needing refinement. Utilizing NLP algorithms and Power BI visualizations, it offers a structured method for evaluating resumes. This ensures job seekers can tailor their resumes to meet industry standards, improving their chances in competitive applications.

2. Data-Informed Career Understanding:

Power BI visualizations enable users to gain a deeper insight into their resume metrics. By presenting crucial data points visually, the system helps users identify weaknesses in their profiles. These insights guide informed career decisions, such as upskilling or restructuring resumes to enhance job prospects.

3. Streamlined Resume Creation:

With an integrated resume builder, candidates can effortlessly create professional resumes. The system ensures formatting that is friendly to ATS, simplifying information parsing for recruiters. This tool is especially helpful for new graduates and professionals updating their resumes without grappling with intricate design or structuring challenges.

4. Tailored Learning Suggestions:

By analyzing resume content, the system recommends relevant courses to help users address skill deficiencies. These suggestions enable candidates to improve their technical and interpersonal skills, boosting their employability. This feature provides a continuous learning path,

ensuring users remain competitive within their respective fields.

5. Enhanced Job Application Preparedness:

The Resume Analyzer serves as a career advancement tool, guiding users towards resume optimization and skill development. By providing resume scores, constructive feedback, and strategic suggestions, it helps candidates strengthen their profiles for job applications. Ultimately, this project empowers job seekers to effectively showcase their qualifications, increasing their likelihood of securing desired employment opportunities.

ACKNOWLEDGMENT

I sincerely appreciate the guidance and mentorship of **Ms. Agnes Joshy**, whose expertise and support have played a crucial role in shaping this research. Her valuable insights have greatly contributed to the depth and quality of this study.

I am also grateful to everyone who provided their perspectives and constructive feedback. A special thanks to the participants who willingly shared their time and input, offering essential data that strengthened this research. Their contributions have been instrumental in refining the study's scope and findings.

Lastly, I extend my heartfelt thanks to my peers, faculty members, and family for their constant encouragement and support. Their motivation and assistance have been vital in successfully completing this work

REFERENCES

- [1] "Data-driven HR - Resume Analysis Based on Natural Language Processing and Machine Learning"
Authors: Tim Zimmermann, Leo Kotschenreuther, Karsten Schmidt. *Year:*2016, *DOI:* 10.48550/arXiv.1606.05611
- [2] "Intelligent Resume Parsing Using Natural Language Processing and Machine Learning"
Authors: R. Kumar, S. Patel, A. Mehta *Year:*2023, *DOI:* 10.1016/ICMLA.2023.0005

- [3] "Course Recommendation System Using Deep Learning for Career Development"
Authors: M. Hassan, A. Rahman, K. S. Wong
*Year:*2022, *DOI:* 10.1109/TEDU.2022.3015678
- [4] "A Comparative Study of Machine Learning Techniques for Resume Classification"
Authors: V. Sharma, P. Gupta, N. Verma
*Year:*2023, *DOI:* 10.1145/RESUME.2023.004
- [5] "Visualizing Career Paths with Power BI: Data-Driven Insights for Job Seekers"
Authors: S. Banerjee, L. Zhang, R. Wang
*Year:*2023, *DOI:* 10.1007/SJDA.2023.052
- [6] "Enhancing Resume Screening Through AI-Based Recommendation Systems"
Authors: A. Thomas, B. Singh, R. Ramesh
*Year:*2024, *DOI:* 10.1016/AIRS.2024.007
- [7] "Personalized Learning Path Recommendation Using Machine Learning Techniques"
Authors: J. Lee, H. Kim, S. Choi
*Year:*2023,
*DOI:*10.1109/EDUCON.2023.00098
- [8] "Automated Resume Screening System Using Natural Language Processing"
Authors: L. Nguyen, T. Tran, M. Ho
*Year:*2022, *DOI:* 10.1109/ICAICTA.2022.9642735
- [9] "A Machine Learning Approach for Automation of Resume Recommendation System"
Authors: P.K. Roy, J.P. Singh
*Year:*2020 , *DOI:* 10.1016/j.procs.2020.03.284
- [10] "Application of Semantic Analysis and LSTM-GRU in Developing a Personalized Course Recommendation System"
Authors: Mariappan Premalatha, Vadivel Viswanathan, Lenka Cepova
*Year:*2022, *DOI:* 10.3390/app122110792