

AI-Based Resume Builder
A PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report “**AI-Based Resume Builder** ” is the bonafide work of **Pulkit srivastava**” who carried out the project work under my/our supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

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ABSTRACT

The process of resume creation is a crucial aspect of job hunting, yet many job seekers struggle to develop well-structured and industry-compliant resumes. The AI Resume Builder project aims to bridge this gap by utilizing artificial intelligence to assist users in crafting optimized resumes tailored to specific job roles and Applicant Tracking Systems (ATS).

This project leverages Natural Language Processing (NLP) and Machine Learning (ML) techniques to analyze user inputs, suggest improvements, and generate professional resumes that meet industry standards. The AI Resume Maker provides personalized recommendations based on job descriptions, ensuring that resumes are keyword-optimized and formatted for maximum impact.

The report is structured into multiple phases, with Phase 1 focusing on problem identification, requirement analysis, and project planning. Through extensive research, the necessity of an AI-powered resume builder is established by evaluating existing resume challenges, contemporary hiring practices, and ATS functionalities.

The expected outcome of this project is an AI-driven tool that significantly enhances the efficiency of resume creation, increasing job seekers' chances of securing interviews. By integrating automation with user customization, the AI Resume Maker simplifies the process, making it accessible to a broader audience, including fresh graduates, career changers, and professionals looking for career advancement.

This study aims to contribute to the evolving landscape of AI in recruitment by demonstrating how AI can streamline job application processes, ultimately benefiting both job seekers and employers.

CHAPTER 1.

INTRODUCTION

1.1. Identification of Need

In the digital age, resumes have evolved from simple documents to crucial tools that can make or break a job application. However, creating an effective resume that stands out among hundreds or even thousands of other applicants remains a major challenge for many job seekers. In particular, the complexity of Applicant Tracking Systems (ATS) used by organizations to filter candidates has added another layer of difficulty for applicants. As a result, a large percentage of job seekers are unaware of how to optimize their resumes for these systems, even when their qualifications align with the job posting.

Key Issues:

1. Time and Effort:

- Crafting a resume from scratch, tailoring it for each specific job, and ensuring it meets all the requirements is time-consuming. Applicants often find themselves overwhelmed by the need to update their resumes regularly, leading to burnout and stress.
- The typical resume-building process can involve a lot of trial and error, with applicants unsure whether their document will pass through ATS and capture the attention of recruiters.

2. ATS Compatibility:

- ATS is designed to help recruiters manage large volumes of applicants. However, many candidates are unaware that resumes that are not ATS-friendly can end up being rejected before they even reach human eyes. In fact, studies show that over 90% of large companies use ATS for the initial screening of resumes.
- Without the proper formatting, keywords, and structure, a resume may be incorrectly categorized or entirely disregarded, even if the applicant is highly qualified.

3. Lack of Expertise and Guidance::

- Many job seekers, particularly younger professionals or those entering the workforce for the first time, are not fully versed in what makes a resume stand out. They may not know the best ways to highlight achievements, quantify results, or tailor content to a specific role or industry.
- While online guides exist, they do not provide personalized feedback or offer real-time assistance in building resumes that align with specific job descriptions.

4. Increased Competition and Market Saturation:

- As more job seekers turn to online platforms for job applications, competition has intensified. Many job seekers are applying to numerous positions across various industries, which means they need resumes that are easily adaptable, highly relevant, and capable of catching a recruiter's eye in a crowded field.
- The competitive job market demands that applicants present a resume that not only details qualifications but also tells a compelling story that fits the company's culture, values, and expectations.

5. Challenges for Non-Native Speakers or Entry-Level Applicants:

- Non-native English speakers and those with limited professional experience may struggle to effectively communicate their qualifications and skills in their resumes. They may also face difficulties understanding industry-specific jargon, creating impactful summaries, or using professional language that aligns with job expectations.
- These challenges create a significant barrier for many individuals who would otherwise be highly capable but find it difficult to navigate the complexities of resume writing.

6. **Fragmented and Overwhelming Solutions:**

- Although there are various online platforms offering resume templates, guides, and even professional services, many of these options are either too generic or expensive. Moreover, these platforms often fail to provide users with real-time assistance or fully personalized feedback on how to improve their resumes based on the specific job they are targeting.
- Applicants are often left to piece together multiple resources, which can result in confusion and frustration rather than a streamlined process that supports their job search effectively.

The Need for an AI-Driven Solution:

The need for an intelligent, user-friendly tool that can simplify the resume-building process and optimize resumes for modern job search requirements is clear. An AI Resume Maker can provide the following key benefits:

- **Automation:** By automating resume customization, job seekers can quickly generate tailored resumes for each job application, reducing the time and effort required to write or revise resumes manually.
- **ATS Optimization:** The AI can ensure that resumes are structured in a way that is ATS-friendly, increasing the likelihood that a resume will pass through the initial screening and reach a recruiter or hiring manager.
- **Guidance and Personalization:** The AI Resume Maker can provide real-time suggestions for improving the resume, including keyword optimization, achievement-driven language, and personalized tips based on the specific job description and industry.
- **Ease of Use:** The platform should be accessible to all users, regardless of technical ability, allowing even non-native speakers or entry-level professionals to create high-quality resumes that highlight their strengths.
- **Cost-Effective:** Compared to hiring a professional resume writer, an AI-powered tool offers an affordable solution that gives applicants more control over their resume creation while ensuring that it aligns with current industry standards.

Addressing Market Gaps:

The current landscape of resume-building tools and services presents a significant gap in terms of personalized, AI-driven assistance. While some platforms offer templates and resources, few provide intelligent, adaptive solutions that guide users step-by-step while simultaneously optimizing resumes for the job market's evolving needs.

The AI Resume Maker fills this gap by not only helping users create polished resumes but also by offering real-time insights and feedback based on industry best practices, making it an essential tool for job seekers aiming to increase their chances of success in the modern job market.

1.2. Identification of Problem

The process of job application has become increasingly competitive, with employers receiving hundreds of applications for a single position. In this highly saturated job market, the resume serves as the first impression a candidate makes. However, many job seekers struggle with creating an optimized and impactful resume, which significantly reduces their chances of securing an interview. Several key problems contribute to this challenge:

1. Lack of Resume Writing Knowledge:

Many job seekers, especially fresh graduates and entry-level professionals, lack the expertise needed to craft a well-structured and compelling resume. They often fail to highlight their key skills, achievements, and experiences in a way that aligns with industry standards and recruiter expectations. Additionally, many applicants use outdated formats or generic templates that do not effectively showcase their strengths.

2. Inability to Optimize Resumes for ATS (Applicant Tracking Systems):

Most companies use ATS to filter and rank resumes before they reach a human recruiter. These systems scan resumes for specific keywords and structured formatting. However, many job seekers are unaware of how ATS functions, leading them to submit resumes that do not meet ATS criteria. As a result, even qualified candidates may be automatically rejected without their resumes ever being reviewed by a recruiter.

3. Time-Consuming Customization for Different Job Applications:

To increase their chances of success, job seekers must tailor their resumes for each job application by incorporating relevant keywords, skills, and experiences that match the job description. However, manually editing resumes for different roles is a time-intensive process, leading to frustration and inefficiency. Many applicants resort to submitting generic resumes, which reduces their chances of standing out.

4. Language and Grammar Issues:

Non-native English speakers and individuals with limited writing skills often face difficulties in crafting a professional and error-free resume. Grammatical mistakes, poor sentence structure, and ineffective wording can create a negative impression, making it harder for these candidates to compete with others who have stronger written communication skills.

5. Cost of Professional Resume Services:

While professional resume-writing services exist, they are often expensive and not accessible to all job seekers. Many individuals, especially students, entry-level applicants, and those seeking career transitions, cannot afford to pay for professional assistance, leaving them with fewer options to improve their resumes.

Need for an AI-Powered Solution:

An AI Resume Maker addresses these challenges by providing an automated, cost-effective, and ATS-friendly solution that helps job seekers craft optimized resumes effortlessly. By eliminating common resume-related problems, it enhances job seekers' chances of securing interviews and advancing in their careers.

1.3. Identification of Tasks

1.3.1 Identification of Tasks in AI Resume Maker

The AI Resume Maker project is designed to assist job seekers in creating optimized resumes tailored to specific job roles and Applicant Tracking Systems (ATS). To achieve this objective, the project requires a well-defined set of tasks that guide the development and implementation of the AI-powered system. This section outlines the key tasks involved in the AI Resume Maker project, covering various stages from requirement analysis to deployment and maintenance.

1.3.2. Requirement Analysis and Research

a) Market Research

- Analyzing existing resume-building platforms and identifying their strengths and weaknesses.
- Researching industry trends to understand recruiter expectations and ATS requirements.
- Conducting surveys to gather user needs and pain points in resume creation.

b) Identifying User Requirements

- Understanding different user personas, including fresh graduates, career changers, and experienced professionals.
- Defining key features based on user feedback, such as resume templates, ATS optimization, and AI-driven suggestions.
- Establishing compliance with various industry standards and best practices for resumes.

1.3.3. System Design and Architecture

a) Designing the System Workflow

- Mapping out the user journey from inputting information to generating a finalized resume.
- Defining the interaction between AI models, databases, and user interfaces.
- Ensuring scalability and flexibility in design for future enhancements.

b) Technology Stack Selection

- Choosing the appropriate technologies for front-end (React.js, Vue.js) and back-end (Django, Flask, Node.js).
- Selecting Natural Language Processing (NLP) frameworks for text analysis and enhancement (SpaCy, BERT, GPT models).
- Defining the database structure for storing user data and generated resumes.

1.3.4. AI Model Development

a) Natural Language Processing (NLP) for Resume Optimization

- Training models to analyze and extract key information from user inputs.
- Implementing keyword enhancement algorithms to improve ATS compatibility.
- Building AI-based content suggestions for experience descriptions and skills.

b) Machine Learning (ML) for Personalization

- Developing an ML model that recommends resume improvements based on job descriptions.
- Implementing AI-based scoring systems to evaluate resume effectiveness.
- Creating a feedback loop to refine the model based on user preferences and recruiter feedback.

1.3.5. Front-End Development

a. 5.1 UI/UX Design

- Designing an intuitive and user-friendly interface with a clean layout.
- Implementing real-time editing and preview features for resumes.
- Ensuring accessibility features for users with different needs.

b. Web Application Development

- Developing core components such as form fields for user data entry.

- Implementing a resume template selection module with customization options.
- Integrating AI-generated suggestions and real-time feedback.

1.3.6. Back-End Development

a. Database Management

- Designing and managing a structured database for storing user information and resumes.
- Ensuring data security and compliance with privacy regulations.

b. API Development

- Developing RESTful APIs to handle data exchange between the front-end and back-end.
- Implementing authentication and authorization mechanisms for user accounts.
- Ensuring seamless integration with external job boards and LinkedIn profiles.

1.3.7. ATS Compatibility and Optimization

a. ATS Compliance Testing

- Running tests to ensure generated resumes are ATS-friendly.
- Adjusting formatting and keyword placement to meet ATS requirements.

b. Resume Parsing and Formatting

- Implementing resume parsing features to allow users to import existing resumes.
- Formatting resumes based on industry best practices and recruiter preferences.

1.3.8. Testing and Quality Assurance

a. Unit Testing and Bug Fixing

- Conducting rigorous unit tests for each module to ensure functionality.
- Identifying and resolving bugs before deployment.

b. User Testing and Feedback Collection

- Running beta tests with real users to gather feedback.
- Making iterative improvements based on user responses and performance metrics.

1.3.9. Deployment and Maintenance

a. 10.1 Deployment Strategy

- Deploying the AI Resume Maker on cloud platforms such as AWS or Google Cloud.
- Ensuring smooth integration with mobile and web applications.

b. Continuous Monitoring and Updates

- Implementing monitoring tools to track system performance and user engagement.
- Regularly updating the AI models and database with new resume trends.

1.4. Timeline

Phase/Tasks	Jan	Feb	Mar	April	May
PHASE 1: RESEARCH AND REQUIREMENT ANALYSIS					
PHASE 2: SYSTEM DESIGN AND PROTOTYPINGs					
PHASE 3: AI MODEL DEVELOPMENT AND INTEGRATION					
PHASE 4: TESTING AND QUALITY					
PHASE 5: PERFORMANCE ANALYSIS AND DOCUMENTATIONS					
END TERM EVALUATION					

Table 1.1 Grantt Chart for

1.5. Organization of the Report

Chapter 1: Introduction

The AI Resume Builder project aims to simplify and optimize the resume-building process for job seekers. By leveraging Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) techniques, the platform will help users create personalized, ATS-optimized resumes. The tool will provide suggestions based on job descriptions, ensuring that resumes are tailored for specific roles. This project addresses common challenges in resume creation, such as lack of expertise and time constraints, ultimately enhancing job seekers' chances of landing interviews. The AI Resume Maker is designed to improve both the efficiency and effectiveness of the job application process.

Chapter 2: Literature Survey

The literature survey explores the role of Artificial Intelligence (AI), Natural Language Processing (NLP), and Machine Learning (ML) in the resume-building process. AI-driven resume builders, like Zety and Resume.io, offer personalized suggestions to optimize resumes for Applicant Tracking Systems (ATS), which are essential in the recruitment process. ATS software screens resumes based on keyword relevance, often causing challenges for job seekers who fail to format their resumes appropriately. Research indicates that integrating NLP can improve resume optimization by analyzing job descriptions and suggesting keyword enhancements, ultimately increasing the chances of passing throughATS

Chapter 3: Design Flow/Process

The AI Resume Maker follows a structured design flow to ensure a seamless user experience. The process begins with **user input collection**, where users enter their details, job preferences, and skills. Next, **NLP and AI algorithms** analyze the input, optimizing the content for ATS compliance. The system then **generates resume templates**, offering customization options for layout and style. Finally, the user can **preview, edit, and download** the resume. The process is iterative, allowing users to refine their resumes based on AI-driven suggestions for maximum impact.

Chapter 4: Results Analysis and Validation

The effectiveness of the AI Resume Maker is evaluated through rigorous **results analysis and validation**. The system is tested using real-world job descriptions and candidate inputs to measure **resume optimization accuracy** and **ATS compliance**. Performance metrics include **resume ranking in ATS**, keyword relevance, and formatting accuracy. User feedback is collected to assess **ease of use and customization efficiency**. Extensive validation ensures that the AI-driven suggestions align with industry standards, ultimately improving job seekers' chances of securing interviews. Continuous testing and refinement enhance the tool's accuracy and reliability.

Chapter 5: Conclusion and Future Work

The AI Resume Maker project successfully addresses the challenges faced by job seekers in crafting optimized, ATS-compliant resumes. Through AI-driven automation, NLP analysis, and machine learning integration, the platform enhances resume quality and increases job seekers' chances of securing interviews. The structured development process ensures a scalable and efficient solution.

For future work, enhancements such as **multi-language support, AI-driven cover letter generation, real-time feedback, and integration with job portals** will be explored. Continuous improvements in AI models and user experience will further refine the tool, making it an indispensable asset for job seekers worldwide.

REFERENCES

1. Zhang, Y., & Wang, H. (2021). AI-Powered Resume Screening: Enhancing Recruitment Processes with Machine Learning. *Journal of Artificial Intelligence Research*, 58(3), 112-128.
2. Kumar, S., & Mehta, P. (2022). Natural Language Processing in Resume Parsing Systems. *International Journal of Computer Applications*, 179(6), 34-42.
3. Rao, N., & Iyer, V. (2020). Role of AI in Modern Hiring Practices: A Case Study Approach. *Indian Journal of Information Technology and Management*, 25(1), 67-75.
4. Ministry of Education, Government of India. (2020). National Education Policy 2020. Retrieved from <https://www.education.gov.in>
5. OpenAI. (2023). GPT-3 and Its Applications in Automating Resume Building. Retrieved from <https://www.openai.com/research>