A
Project Report
On

Applicant Tracking System (ATS)

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Submitted by

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RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES

(catering the Educational Needs of Gifted Rural Youth of AP)

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CERTIFICATE OF PROJECT COMPLETION

This is to certify that the work entitled **"Applicant Tracking System"** is bonafide work of **Bandla Sneha(R180133)** carried out under our guidance and supervision for the partial fulfilment for the degree of Bachelor of Technology in Computer Science and Engineering during the academic session January2024-April2024 at RGUKT-RK VALLEY.

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DECLARATION

We, **Bandla Sneha(R180133)**hereby declare that the project report entitled "**Applicant Tracking System**" done under guidance of **Mr. P.Santhosh Kumar** is submitted in partial fulfilment for the degree of Bachelor of Technology in Computer Science and Engineering during the academic session January 2024 – April 2024 at RGUKT-RK Valley. we also declare that this project is a result of our own effort and has not been copied or imitated from any source. Citations from any websites are mentioned in the references. To the best of my knowledge, the results embodied in this dissertation work have not been submitted to any university or institute for the award of any degree or diploma.

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ABSTRACT

In today's competitive job market, efficient and effective recruitment is crucial. we dive into the critical world of job applications and the ever-evolving role of Applicant Tracking Systems (ATS) in the hiring process. In today's job market, understanding and optimizing your resume for ATS is no longer optional; it's essential. That's why we're excited to share project: building an **ATS Large Language Application using Google Gemini Pro**, designed to revolutionize how job seekers craft their resumes.

An ATS is software solution Designed to manage recruitment lifecycle, automating tasks and centralizing application data.This abstract highlights the key benefits of implementing an ATS, including:

- **Enhanced Efficiency:** Automating resume collection, screening, and communication frees up valuable recruiter time for more strategic tasks.
- **Improved Quality of Hire:** ATS capabilities like keyword filtering and skills matching ensure a targeted talent pool, leading to better candidate selection.
- **Reduced Bias:** Objective criteria-based screening through ATS minimizes human bias in the hiring process.

This abstract paves the way for a discussion on the various features of an ATS, along with considerations for selecting the right system for an organization's specific needs. By leveraging the power of ATS technology, companies can gain a competitive edge in attracting top talent and building a strong workforce.

Chapter 1

Introduction

1.1. INTRODUCTION

In today's competitive job market, finding the right candidates

quickly and efficiently is essential for the success of any organization. However, with a deluge of resumes pouring in for each job opening, manually sifting through them can be time-consuming and prone to human error. This is where Resume Applicant Tracking System (ATS) comes into play, revolutionizing the way bu-sinesses manage their recruitment process.

Google Gemini Pro offers a cutting-edge solution for resume ATS tracking, empowering hiring teams to streamline their hiring process and identify top talent with ease. By leveraging the advanced capabilities of Google Gemini Pro, recruiters can efficiently manage and organize resumes, automate tedious tasks, and gain valuable insights to make informed hiring decisions.

With Resume ATS Tracking on Google Gemini Pro, recruiters can:

1. **Effortlessly Manage Resume Influx:** Say goodbye to the daunting task of manually sorting through stacks of resumes. Google Gemini Pro's intuitive interface allows recruiters to seamlessly upload, organize, and categorize resumes, ensuring no candidate gets lost in the shuffle.

2. **Automate Resume Parsing:** Parsing resumes for key information can be a tedious and time-consuming process. Google Gemini Pro's advanced parsing algorithms automatically extract relevant details from resumes, such as work experience, skills, and education, and neatly organize them into structured formats for easy review.

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3. **Customize Search and Filtering:** Finding the perfect candidate for the job is made simple with Google Gemini Pro's customizable search and filtering options. Recruiters can narrow down their candidate pool based on specific criteria, such as experience level, skills, and location, ensuring they find the best fit for the role.

4. **Track Application Progress:** Keep tabs on each candidate's journey through the hiring process with Google Gemini Pro's application tracking feature. From initial submission to final disposition, recruiters can easily track the status of each application, schedule interviews, and send automated notifications to keep candidates informed.

5. **Collaborate Seamlessly:** Collaboration is key to successful hiring. With Google Gemini Pro, recruiters can collaborate seamlessly with team members, share feedback, assign tasks, and communicate within the platform, ensuring everyone is on the same page throughout the recruitment process.

6. **Gain Actionable Insights:** Make data-driven hiring decisions with Google Gemini Pro's robust reporting and analytics tools. Track key recruitment metrics, such as time-to-fill, source of hire, and candidate demographics, and gain valuable insights to optimize your hiring strategy.

In conclusion, Resume ATS Tracking on Google Gemini Pro empowers organizations to streamline their hiring process, identify top talent, and make informed hiring decisions with confidence. Say goodbye to manual resume sorting and hello to a more efficient and effective recruitment process with Google Gemini Pro.

Fig.1.1

1.2.Purpose

The purpose of using an Applicant Tracking System (ATS) like Google Gemini Pro is to streamline and optimize the recruitment process for organizations. Here are some key purposes:

- **Efficiency:** ATS automates various recruitment tasks, such as resume parsing, candidate screening, and interview scheduling, saving recruiters significant time and effort. It allows them to focus more on engaging with qualified candidates rather than administrative tasks.

- **Centralization:** ATS serves as a centralized database for storing and managing candidate information, resumes, and job openings. This centralization ensures that all hiring team

members have access to the same data, promoting collaboration and consistency in the hiring process.

- **Candidate Management:** ATS helps recruiters effectively manage the entire candidate lifecycle, from application submission to onboarding. It tracks candidate progress through various stages of the recruitment pipeline, ensuring no candidate falls through the cracks.

- **Improved Candidate Experience:** With features like automated email notifications and status updates, ATS enhances the candidate experience by keeping applicants informed about their application status and next steps in the process.

- **Compliance and Reporting:** ATS helps organizations stay compliant with labor laws and regulations by maintaining an auditable record of all recruitment activities. Additionally, it generates reports and analytics on key recruitment metrics, providing insights to optimize hiring strategies and improve outcomes.

- **Integration with Other Systems:** ATS can integrate with other HR systems, such as payroll, HRIS, and onboarding platforms, streamlining data exchange and processes across the entire employee lifecycle.

Overall, the purpose of using an ATS like Google Gemini Pro is to simplify and enhance the recruitment process, enabling

organizations to identify and hire top talent more efficiently and effectively.

1.3 Benefits of ATS

The key benefits of implementing an ATS, including:

- **Enhanced Efficiency:** Automating resume collection, screening, and communication frees up valuable recruiter time for more strategic tasks.
- **Improved Quality of Hire:** ATS capabilities like keyword filtering and skills matching ensure a targeted talent pool, leading to better candidate selection.
- **Reduced Bias:** Objective criteria-based screening through ATS minimizes human bias in the hiring process.

1.4.Technologies used

- Python
- Large Language Model(LLM)
- Google Gemini Pro

Chapter 2
Technologies and Libraries

2.1 Large Language Model(LLM)

LLMs are a type of artificial intelligence (AI) excelling at processing and generating human language. They're trained on massive datasets of text and code, enabling them to perform various tasks like:

- **Text generation:** Creating different creative text formats, like poems, code, scripts, musical pieces, emails, and letters.
- **Machine translation:** Converting text from one language to another.
- **Question answering:** Providing summaries of factual topics or creating stories.
- **Natural Language Processing (NLP):** Analyzing and understanding the meaning behind human language.

How do LLMs relate to ATS?

Both recruiters and job seekers can benefit from LLMs like (Gemini Pro) when dealing with ATS:

- **For Recruiters:**
  - **Advanced Screening:** LLMs can analyze resumes deeper than just keywords. They can grasp the context and achievements described, providing a more comprehensive evaluation of candidates.
  - **Reduced Bias:** By relying on objective criteria identified by the LLM, recruiters can minimize bias in the initial screening stages.
- **For Job Seekers:**

- **Crafting Strong Resumes:** LLMs can analyze job descriptions and suggest relevant keywords and skills to incorporate into a resume.
- **Optimizing Content and Formatting:** LLMs can advise on structuring resumes for better searchability by ATS systems.

Benefits of using LLMs with ATS:

- **Improved Efficiency:** Faster and more accurate screening for recruiters, saving them valuable time.
- **Stronger Candidate Pools:** Identification of top talent that might otherwise be overlooked by basic keyword matching.
- **Enhanced Candidate Experience:** Job seekers with optimized resumes have a better chance of getting noticed.
- **Reduced Bias:** More objective screening based on skills and experience rather than subjective factors.

Overall, LLMs like Gemini Pro can significantly enhance the effectiveness of ATS for both recruiters and job seekers in today's competitive recruitment landscape.

2.2. Google Gemini Pro

Gemini Pro is a large language model (LLM) developed by Google DeepMind! I am part of the Gemini family of LLMs, designed to handle various tasks including writing, planning, learning, and more.

Here's a breakdown of key features and what makes Gemini pro stand out:

- **Strong Capabilities:** It is excel at processing and generating text, performing well in tasks like writing different creative text formats, translation, question answering, and natural language understanding.

- **Focus on Scaling:** Compared to other Gemini models, It optimized to handle a wide range of tasks effectively.
- **Long Context Understanding:** One of Gemini Pro breakthrough features is the ability to understand and analyze information within a very large context window (up to 1 million tokens in the latest public preview). This allows me to grasp complexities and nuances in text that simpler models might miss.

How can Gemini Pro be used with Applicant Tracking Systems (ATS)?

Both recruiters and job seekers can leverage Gemini Pro capabilities to optimize the ATS experience:

- **For Recruiters:**
  - **Enhanced Screening:** I can analyze resumes with exceptional accuracy, extracting skills, experiences, and qualifications. This allows for highly targeted screening, identifying the most relevant candidates for the job description.
  - **Reduced Bias:** By focusing on objective criteria from resumes, I can help minimize bias in the initial screening stages.
- **For Job Seekers:**
  - **Building Strong Resumes:** I can analyze your resume and a target job description, pinpointing missing keywords and suggesting improvements for better searchability by ATS systems.
  - **Understanding Context:** I go beyond just keywords. I can analyze the context and achievements described in your resume, providing a more comprehensive picture of your qualifications.

Overall, Gemini Pro aim to bridge the gap between recruiters and job seekers in the ATS environment. By leveraging my capabilities, recruiters can streamline their hiring process and

identify top talent, while job seekers can craft resumes that get noticed by potential employers.

- Google Gemini Pro does provide an API key that allows you to access its functionalities through code.

2.3 Streamlit

Streamlit is a free and open-source Python library designed specifically to help you rapidly build beautiful and interactive web apps in minutes. Here are some key points about Streamlit:

Core functionalities:

- **Transforms Python scripts:** Streamlit excels at taking regular Python code and turning it into functional web apps.
- **Focus on Python:** Unlike traditional web development that involves languages like HTML, CSS, and Javascript, Streamlit allows you to build these apps entirely in Python. This makes it a great option for data scientists and machine learning engineers who are already comfortable with Python but might not have experience with front-end web development.
- **Quick Development:** Streamlit boasts a very easy-to-use API, allowing you to create complex and interactive web apps with just a few lines of Python code. This significantly reduces development time compared to traditional web development methods.

Benefits of using Streamlit:

- **Fast Prototyping:** Streamlit is ideal for quickly creating prototypes or Minimum Viable Products (MVPs) of your data science or machine learning projects. This allows you to get early feedback and iterate on your ideas efficiently.
- **Data App Creation:** Streamlit is particularly well-suited for building data apps. You can easily visualize and explore your data sets, create interactive dashboards, and even deploy machine learning models as web services. **10**

- **Sharing and Collaboration:** The web apps you create with Streamlit are easily shareable with colleagues, stakeholders, or even clients. This allows for better collaboration and communication around data analysis and insights.

2.4 OS

In Python, the os module provides functions for interacting with the operating system. It offers a portable way to perform various OS-related tasks, meaning the code you write using this module can work on different operating systems (Windows, macOS, Linux) with minimal modifications.

Here are some key functionalities of the os module:

- **File and Directory Management:**
  - Create, delete, rename, and move files and directories.
  - Check file and directory existence and permissions.
  - Get file and directory attributes.
- **Process Management:**
  - Execute system commands and capture their output.
  - Get information about running processes.
- **Environment Interaction:**
  - Access and modify environment variables.
  - Get the current working directory and change it.
  - Get the operating system name and version.

2.5 PyPDF2

PyPDF2 is a free and open-source pure-Python library that allows you to manipulate PDF files. It provides functionalities for various tasks such as:

- **Merging PDFs:** Combine multiple PDF files into a single document.
- **Splitting PDFs:** Extract specific pages or groups of pages to create new PDFs. **11**

- **Extracting Text and Metadata:** Retrieve text content and metadata (title, author, etc.) from PDFs.
- **Cropping Pages:** Define specific regions of interest on a page and extract only that content.
- **Adding Watermarks:** Overlay text or images on top of existing PDF content.
- **Encrypting and Decrypting PDFs:** Secure PDFs with passwords and control access permissions.

2.6 dotenv

dotenv is a popular library or module used for managing environment variables in various programming languages. It simplifies the process of separating configuration details from your application code. Here's a breakdown of how dotenv works:

Concept of Environment Variables:

- Environment variables are key-value pairs that store configuration details for your application.
- These variables are typically set at the system level or within the application itself.
- Accessing environment variables within your code allows you to modify configurations without changing the code itself.

How dotenv Works:

1. **.env File:** dotenv relies on a file named .env located at the root of your project directory.
2. **Key-Value Pairs:** This file stores configuration details in the format KEY=VALUE. For example, API_KEY=your_api_key_here.

3. **Loading Variables:** During application startup, dotenv reads the .env file and injects those key-value pairs into the system's environment variables.
4. **Accessing Values:** Your application code can then access these configuration details using the standard methods for retrieving environment variables within your programming language.

2.7 json

JSON (JavaScript Object Notation) is a lightweight and human-readable data format used for data interchange. It's widely adopted for transmitting data between servers and web applications, APIs, and various other data processing tasks. Here's a breakdown of key characteristics and functionalities of JSON:

Core Attributes:

- **Text-based:** JSON data is written in plain text, making it easy for humans to read and understand compared to binary formats.
- **Human-readable:** The syntax resembles JavaScript object literals, with key-value pairs and hierarchical structures using curly braces ({}) and square brackets ([]).
- **Language-independent:** JSON is not specific to JavaScript; it's a data format that can be parsed and generated by programming languages like Python, Java, C++, and many others.
- **Lightweight:** JSON files are generally smaller compared to other data formats like XML, making them efficient for data transmission.

Data Structures Supported by JSON:

- **Objects:** Represented by curly braces {}, containing key-value pairs separated by colons (:). Keys are typically strings, and values can be strings, numbers, booleans, arrays, or even nested objects.

- **Arrays:** Ordered collections of values enclosed in square brackets []. Elements within an array can be of any valid JSON data type, including other arrays or objects.
- **Strings:** Text data enclosed in double quotes (").
- **Numbers:** Can be integers or floating-point numbers.
- **Booleans:** Represent true or false values (true or false).
- **Null:** Represents the absence of a value.

Common Use Cases of JSON:

- **API Data Exchange:** JSON is a popular choice for exchanging data between web applications and servers through APIs (Application Programming Interfaces). It allows for a standardized way to send and receive structured data.
- **Web Application Data Storage:** JSON can be used to store and manage application data on the client-side (browser) using local storage or IndexedDB. This enables features like offline functionality or user preferences persistence.
- **Configuration Files:** JSON can be used to store configuration settings for applications, such as database connection details, API keys, or UI themes. This keeps configuration separate from the application code.
- **Data Serialization:** JSON's lightweight nature makes it suitable for serializing complex data structures into a transferable format. This is useful for exchanging data between different systems or storing data persistently.

Chapter 3

ATS Procedure

3.1. Steps to ATS:

1.Setting Up:

Create a Project Directory: Organize your code and files in a dedicated project directory.

Install Libraries: Use package managers like pip to install the required libraries:

- Streamlit
- PyPDF2
- dotenv (optional, if using environment variables)

2.Create an Environment File:

- If you plan to use environment variables for your Google API key (when GenerativeAI becomes public), create a file named .env in your project directory.
- Inside the .env file, add a line specifying your API key: GOOGLE_API_KEY=your_api_key_here (replace with your actual key).

3.Code Implementation:

Save the provided code as a Python file (e.g., app .py).

4.Run the Streamlit App:

- Open a terminal or command prompt and navigate to your project directory.
- Run the following command to start the Streamlit app:

Bash

streamlit run app.py

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**5.This will launch the app in your web browser, typically at http://localhost:8501.**

- **Using the App :**

  - The app displays a title, explanation text, and two text areas:
  - Paste your job description in the top text area.
  - Upload your resume as a PDF file using the file upload button.
  - Click the "Submit" button.

6.After submitting it Provides

- Jd match percentage
- Missing keywords
- Profile summary

3.2.ATS Work flow
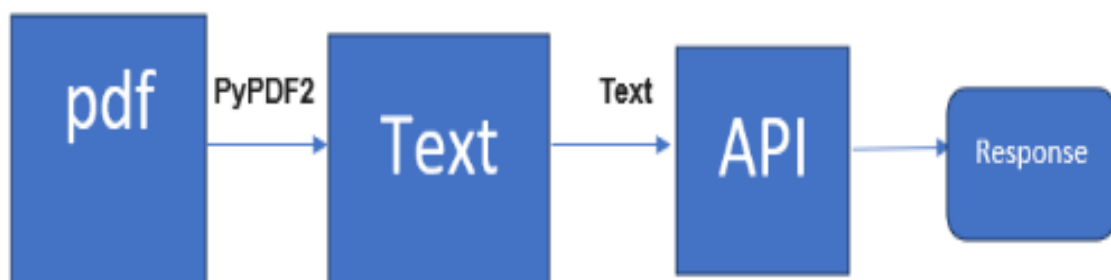
Architecture of project

Fig 3.1

1.Imports:

```
pp.py > ...
   import streamlit as st
   import google.generativeai as genai
   import os
   import PyPDF2 as pdf
   from dotenv import load_dotenv
   import json
```

- streamlit as st: Imports the Streamlit library for building the web app.
- google.generativeai as genai: Imports the Google GenerativeAI library
- os: Used for environment variable access.
- PyPDF2 as pdf: Imports the PyPDF2 library for PDF text extraction.
- from dotenv import load_dotenv: Imports the load_dotenv function to load environment variables.
- json: Used for potentially working with JSON data (not directly used in the current code).

2. Environment Variables:

```
   7
8   load_dotenv() ## load all our environment variables
   9
```

load_dotenv(): This line loads environment variables from a file named .env in your project directory. You'll need to create this file and store your Google API key as GOOGLE_API_KEY.

3.GenerativeAI Configuration

```
    9
10   genai.configure(api_key=os.getenv("GOOGLE_API_KEY"))
11
    tabnine: test | explain | document | ask
```

- genai.configure(api_key=os.getenv("GOOGLE_API_KEY")): This section is currently commented out as GenerativeAI is in limited preview. If it becomes publicly available, you'll need to uncomment this line and replace "GOOGLE_API_KEY" with the actual API key from your environment variable.

4. Function Definitions:

- get_gemini_repsonse(input): This function takes an input string and presumably uses the GenerativeAI model to generate a response.

```
tabnine: test | explain | document | ask
def get_gemini_repsonse(input):
    model=genai.GenerativeModel('gemini-pro')
    response=model.generate_content(input)
    return response.text
```

- input_pdf_text(uploaded_file): This function extracts text from a uploaded PDF file using PyPDF2. It iterates through all pages and combines the extracted text into a single string.

```
tabnine: test | explain | document | ask
def input_pdf_text(uploaded_file):
    reader=pdf.PdfReader(uploaded_file)
    text=""
    for page in range(len(reader.pages)):
        page=reader.pages[page]
        text+=str(page.extract_text())
    return text

#Prompt Template
```

5. Prompt Template:

- This section defines a string template used for the prompt sent to GenerativeAI . It includes placeholders for the resume text ({text}) and job description ({jd}). The desired output structure is also defined as a JSON object with properties like "JD Match", "MissingKeywords", and "Profile Summary".

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```
#Prompt Template

input_prompt="""
Hey Act Like a skilled or very experience ATS(Application Tracking System)
with a deep understanding of tech field,software engineering,data science ,data analyst
and big data engineer. Your task is to evaluate the resume based on the given job description.
You must consider the job market is very competitive and you should provide
best assistance for improving thr resumes. Assign the percentage Matching based
on Jd and
the missing keywords with high accuracy
resume:{text}
description:{jd}

#I want the response in one single string having the structure

{{"JD Match":"%","MissingKeywords:[]","Profile Summary":""}}
"""
```

6. Streamlit App:

- The code creates a Streamlit app with a title, text explaining the purpose, and two text areas:
    - One for pasting the job description.
    - Another for uploading a resume in PDF format.
- A button labeled "Submit" triggers actions when clicked.

```
## Streamlit app
st.title("Smart ATS")
st.text("Improve Your Resume ATS")
jd=st.text_area("Paste the Job Description")
uploaded_file=st.file_uploader("Upload Your Resume",type="pdf",help="Please uplaod the pdf")


submit = st.button("Submit")
```

7.Functionality upon clicking Submit:

- If a PDF file is uploaded:
    - The text is extracted using the input_pdf_text function.

- The call get_gemini_repsonse with a formatted prompt containing the extracted text and the job description from the text area.
  - Since GenerativeAI is available, the response variable is assigned an string.
- Finally, the app displays a subheader with the response string (which would ideally contain the analysis results in JSON format if GenerativeAI is functional).

```python
if submit:
    if uploaded_file is not None:
        text=input_pdf_text(uploaded_file)
        response=get_gemini_repsonse(input_prompt)
        st.subheader(response)
```

8.Output layout Structure

Smart ATS

Improve Your Resume ATS

Paste the Job Description

Upload Your Resume

Drag and drop file here
Limit 200MB per file • PDF

Browse files

Submit

Figure 3.2

Results
Sample output1

This is a full-time hybrid role for a Python Developer at Chipster Technologies. As a Python Developer, you will be responsible for back-end web development, software development, object-oriented programming, and working with databases. Your day-to-day tasks will include coding, debugging, testing, and collaborating with cross-functional teams. While the role is primarily based

Upload Your Resume

Drag and drop file here
Limit 200MB per file • PDF

Browse files

sneha.pdf 75.3KB

Submit

{{"JD Match":"20%","MissingKeywords":["Machine Learning","Deep Learning","Big Data","Cloud Computing","Agile","Scrum","DevOps"],"Profile Summary":"The provided resume lacks essential keywords and skills for the desired tech field roles. To enhance it, consider highlighting relevant experience in software engineering, data analytics, data science, or big data engineering. Include quantifiable accomplishments and demonstrate proficiency in industry tools and technologies."}}

Figure 3.2.1

Sample ouput2

Smart ATS

Improve Your Resume ATS

Paste the Job Description

This is a full-time hybrid role for a Python Developer at Chipster Technologies. As a Python Developer, you will be responsible for back-end web development, software development, object-oriented programming, and working with databases. Your day-to-day tasks will include coding, debugging, testing, and collaborating with cross-functional teams. While the role is primarily based

Upload Your Resume

Drag and drop file here
Limit 200MB per file • PDF

Browse files

poojitha.pdf 47.8KB

Submit

{{"JD Match":"45%","MissingKeywords": ["Hadoop","Spark","Big Data Analytics"],"Profile Summary":""}}

Figure 3.2.2

Chapter 4

Requirements Specification

4.1 packages

pip install streamlit

pip install os

pip install opencv-python

pip install json

import streamlit as st

import google.generativeai as genai

import os

import PyPDF2 as pdf

from dotenv import load_dotenv

import json

Chapter 5

Conclusions

5.1.Conclusion

ATS play a significant role in modern recruitment, offering Efficiency: ATS streamline the initial screening process by automating resume filtering based on keywords and criteria. This saves recruiters time and allows them to focus on promising candidates.

- **Scalability:** ATS can handle large volumes of applications efficiently, making them suitable for companies receiving numerous applications for a single position.
- **Standardization:** ATS ensure consistency in the initial screening process by applying the same criteria to all applicants.
- **Data-driven insights:** ATS can provide valuable data on applicant demographics, skills, and qualifications, aiding recruitment strategy and identifying trends.

In conclusion,an ATS is a valuable tool for modern recruitment, offering efficiency, improved candidate experience, data-driven insights, compliance, scalability, and a competitive advantage. By leveraging the capabilities of an ATS, organizations can streamline their hiring processes and build strong, diverse teams that drive business succes

Chapter 6

Future Scope

The future scope of integrating ATS with Google Gemini Pro could be transformative for recruitment processes. Here are some potential directions for this integration:

Advanced Candidate Matching: It could analyze job descriptions and candidate resumes more intelligently, identifying relevant skills, experiences, and qualifications with greater accuracy.

Personalized Candidate Engagement: Google Gemini Pro's AI could enable personalized candidate engagement within the ATS platform. Through natural language processing (NLP) and sentiment analysis, the system could tailor communication with candidates based on their preferences, communication style, and stage in the recruitment process

Predictive Analytics for Recruitment: Integrating Google Gemini Pro's predictive analytics capabilities with ATS data could enable predictive modeling for recruitment. The system could forecast future hiring needs, identify potential talent gaps, and recommend proactive hiring strategies

Automated Resume Screening and Ranking: ATS integrated with Google Gemini Pro could automate the resume screening and ranking process to a greater extent. The system could analyze resumes using natural language understanding (NLU) and machine learning algorithms to identify top candidates based on predefined criteria. It could also learn from past hiring decisions to continuously improve its screening and ranking accuracy.

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