Six Weeks Industrial Training Project Report

On

"JOB MARKET ANALYSIS IN INDIA"

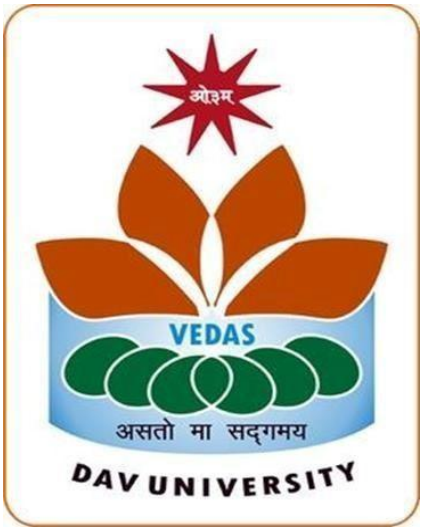
Submitted in the partial fulfilment of the requirement for the award of degree of

Bachelor of Technology

In

Computer Science and Artificial Intelligence

Batch (2022-2026)



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Last but not least, I pay my sincere thanks and gratitude to all the Staff Members of CoderRoots for their support and for making our training valuable and fruitful.

DECLARATION

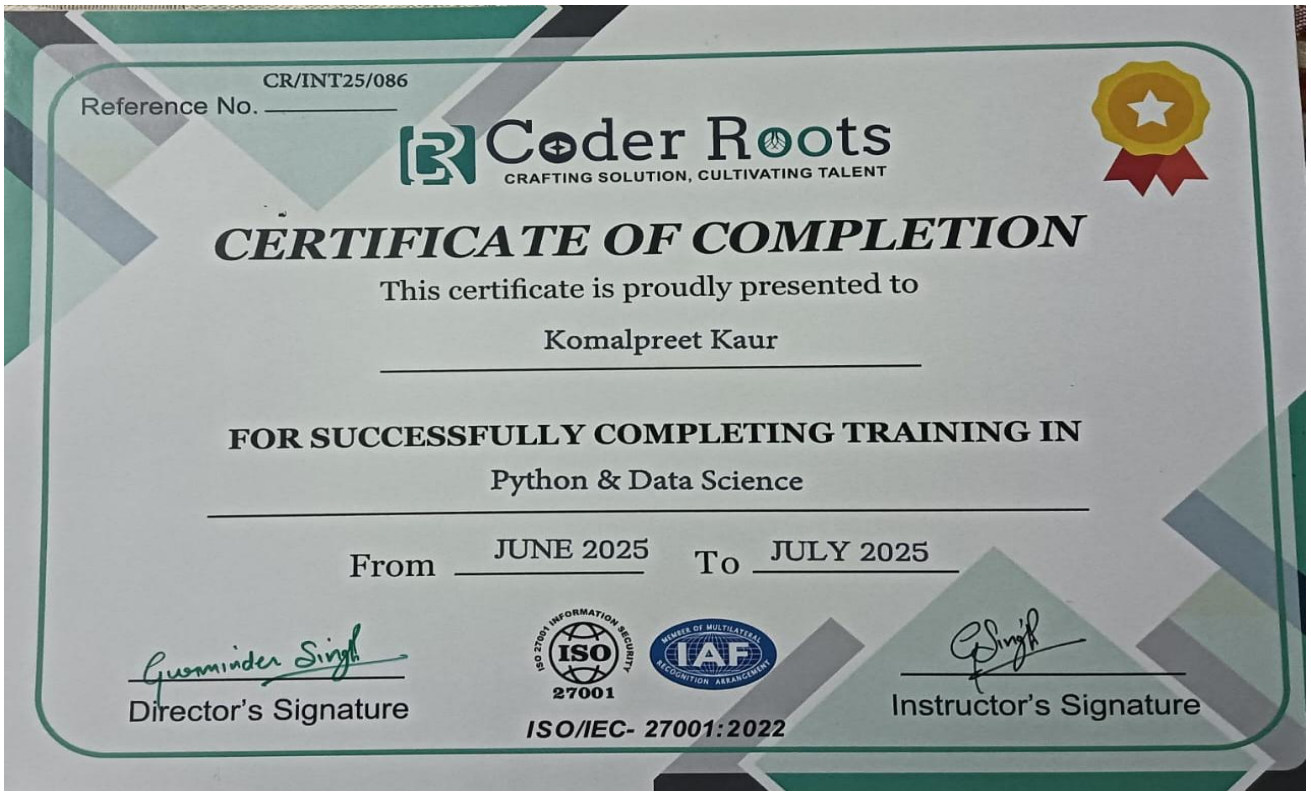
I, Komalpreet Kaur, hereby declare that the work which is being presented in this project/training titled “Job Market Analysis In India” by me, in partial fulfilment of the requirements for the award of Bachelor of Technology (B.Tech) Degree in “Computer Science and Artificial Intelligence” is an authentic record of my own work carried out under the guidance of Mr. Gurminder Singh(“Machine learning Engineer”).

To the best of my knowledge, the matter embodied in this report has not been submitted to any other University/ Institute for the award of any degree or diploma.

KOMALPREET KAUR

(12200066)

CERTIFICATE



ABSTRACT

The **Job Market Analysis Dashboard** is an interactive data analytics system designed to analyze, visualize, and interpret employment trends across India. The project leverages a combination of **pre-scraped datasets** and **live job-scraping technology** to extract real-time job postings from online recruitment platforms. By integrating automated data collection with advanced analytical visualizations, the dashboard provides a comprehensive view of the Indian job market, including city-wise demand, skill trends, hiring patterns, and comparative insights between major cities.

The system is built using **Python**, with **Streamlit** providing the interactive user interface and tools such as **Pandas, NumPy, Matplotlib, Plotly, and ECharts** powering the statistical and graphical analyses. A custom-built **web scraper using Selenium** retrieves India-wide job postings from Jooble, ensuring the availability of updated and dynamic employment information. The processed data is then visualized through dynamic charts, treemaps, pie charts, word clouds, and geographical map-based analytics.

The dashboard enables users—including students, job seekers, researchers, and recruiters—to explore key job metrics such as top hiring companies, most demanded skills, trending job roles, and experience-level distribution. Its comparison and map visualization modules further enhance its ability to deliver actionable insights. Overall, this project demonstrates how automated data collection combined with interactive visualization techniques can support informed decision-making in an evolving job market.

COMPANY PROFILE INTRODUCTION TO INDUSTRY/ INSTITUTE CONTENT

CODER ROOTS, is an ISO 9001:2015 & 27001:2022 certified IT Company, founded in 2022. We are specialized in web development, web design, software solutions, App development, digital marketing & branding, cyber security, internship programs etc.

This start-up was founded to help and increase business owner's efficiency through cutting-edge Digital Transformation of traditional working with the use of latest and advanced technological platforms. Since then, we are committed to provide end-to-end solutions through web development, wire-framing and highly skilled engineering execution. We prefer to form long-lasting strategic partnerships with clients by offering the solutions at affordable prices with timely deliveries and measurable business results.

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By leveraging our extensive technological expertise, We, here at CODER ROOTS ensure that every project meets the highest standards of quality and efficiency.

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CHAPTER 1

INTRODUCTION TO PROJECT

1.1 Purpose and significance

The primary purpose of this project is to conduct a comprehensive **Job Market Analysis** to understand current employment trends, in-demand skills, salary expectations, and hiring patterns across different industries and job roles. The analysis aims to provide data-driven insights that can help students, job seekers, institutions, and organizations make informed decisions regarding career planning, skill development, training programs, and recruitment strategies.

The significance of this project lies in its ability to:

- **Bridge the gap between job seekers and employers** by identifying the most sought-after skills and qualifications in today's labor market.
- **Assist students and graduates** in aligning their academic and training choices with real-world industry needs.
- **Enable institutions and training centers** to design curricula that match current and future employment trends.
- **Support organizations and HR teams** in optimizing hiring processes through awareness of changing market demands.
- **Provide statistical insights** into job availability, growth opportunities, and competition levels across sectors.

1.2 Objectives

The specific objectives of the Job Market Analysis project are:

- To identify **trending job roles and career opportunities** across major industries.
- To analyze **in-demand technical and soft skills** required by employers.
- To evaluate **industry-wise hiring demand**, progression, and predicted future workforce needs.
- To present findings through **interactive visualizations, graphs, and statistical summaries** for better comprehension and decision-making.

1.3 Problem Definition

1.3.1 Overview

In today's dynamic employment ecosystem, job seekers often struggle to identify suitable roles due to rapidly changing job requirements, technological advancements, and fluctuating recruitment trends. A lack of market awareness leads to skill mismatch, unemployment, underemployment, and ineffective career planning.

Recruiters and organizations also face challenges when determining competitive salaries, identifying talent gaps, and forecasting future workforce needs without reliable data.

These factors highlight the need for a systematic and data-driven **Job Market Analysis** that offers clear and real-time insights into hiring behaviours, skill demands, and employment trends.

1.3.2 Key Challenges

1. **Skill-Industry Mismatch**- Many job seekers lack the specific skills required for available positions, leading to unemployment.
2. **Constantly Changing Job Trends**- Rapid evolution of job roles due to technological progress makes demand patterns unpredictable.
3. **Lack Of Centralized Data-** Job information is scattered across multiple sources, making accurate collection and analysis difficult.
4. **Competitive Job Market**- High competition for limited positions requires precise understanding of employer expectations.

CHAPTER 2

EXISTING SYSTEM

The current job market analysis for India relies on traditional job portals, basic search filters, and manual data exploration performed by job seekers, students, and recruiters. While many platforms such as TimesJobs, Naukri, and LinkedIn provide job listings, they lack an integrated analytical system that offers insights into hiring trends, skill demands, city-wise opportunities, and experience-level distribution. Most insights today are generated manually, which makes the process time-consuming, inconsistent, and unsuitable for large-scale or real-time analysis. There is no unified dashboard that aggregates, cleans, and visualizes data to help users make data-driven career or hiring decisions.

2.1 Current Methods of Evaluation

- Job seekers manually browse portals like TimesJobs, Naukri, and Indeed to search for openings and read job descriptions individually.
- Basic filters such as job title, location, and experience are used, but they do not provide deeper insights or analytics.
- Students and researchers collect job postings manually into Excel sheets for analysis, which is slow and error-prone.
- There are no integrated dashboards or visualization tools that automatically analyze and display job market trends.

2.2 Limitations of the Existing System

● Job market analysis is mostly manual, making it slow and unsuitable for large volumes of job postings.
● Existing job portals do not provide centralized insights like top skills, hiring trends, or city-wise comparisons.
● No real-time analytical dashboards are available; users must interpret raw listings themselves.
● Manual data collection in Excel leads to errors, inconsistency, and incomplete analysis.
● No automated system exists for cleaning, processing, or visualizing job data in a user-friendly format.
● Lack of comparative tools makes it difficult to evaluate cities, roles, or experience levels effectively.

CHAPTER 3

PROPOSED SYSTEM

The proposed system is an **Automated Job Market Analysis Dashboard** that collects job postings, processes the data, and presents meaningful insights through interactive visualizations. It replaces manual browsing and spreadsheet-based evaluation with a centralized platform that analyzes hiring patterns, skill demand, and city-wise opportunities across India.

3.1 System Overview

● The system automatically gathers job data from online job portals and stores it in structured format.
● Collected data is cleaned, preprocessed, and standardized (skills, roles, cities, experience).
● An interactive dashboard built using Streamlit allows users to explore job trends visually.
● Visual analytics include charts, treemaps, maps, comparisons, and skill word clouds.
● Users can analyse job data city-wise, across all India, or compare two cities simultaneously.
● Live scraping option enables real-time view of the current job market.

3.2 Key Features

● **Live Job Scraping** – Automatically extracts latest job postings from online portals.
● **City-wise Analysis** – Shows top roles, skills, companies, and experience distribution for selected cities.
● **All India Analysis** – Provides nationwide view of skill demand, popular job titles, and hiring trends.
● **Compare Two Cities** – Side-by-side comparison of job availability, skills, and experience levels.
● **Interactive Visualizations** – Bar charts, pie charts, treemaps, line charts, word clouds, and maps.
● **Skill Frequency Analysis** – Identifies most demanded skills across roles and locations.
● **Experience-Level Trends** – Displays distributions and averages for different experience

categories.

● **Job Role Mapping** – Shows most popular job role for each city on an India map.

3.3 Benefits

● **Faster and Automated Analysis** – Eliminates manual browsing and spreadsheet work.

● **Centralized Insights** – Users get all important analytics in a single dashboard.

● **Real-Time Job Information** – Live scraping provides updated hiring data.

● **Improved Decision Making** – Helps students, job seekers, and recruiters identify best cities, skills, and roles.

● **Accurate Visualization** – Clear charts and maps make trends easy to understand.

● **Higher Data Reliability** – Cleaning and preprocessing ensure consistent, usable datasets.

● **Saves Time and Effort** – Reduces hours of manual analysis to seconds.

● **User-Friendly Interface** – Designed for both technical and non-technical users.

3.4 Expected Outcome

● A fully functional dashboard capable of analyzing and visualizing job market trends in India.

● Real-time job insights including most demanded skills, roles, companies, and city-wise opportunities.

● Cleaner, standardized datasets suitable for research, placement training, and market studies.

● Improved understanding of hiring patterns to assist students, job seekers, and recruiters.

● Accurate visual analytics supporting better career planning and employment decisions.

CHAPTER 4

FEASIBILITY STUDY

4.1 What Is Feasibility Study

A feasibility study is conducted to evaluate whether the proposed **Job Market Analysis Dashboard** can be successfully developed, implemented, and used. It examines technical, economic, and operational aspects to ensure the system is practical and beneficial.

4.1.1 Technical Feasibility

● The system uses widely available and reliable technologies such as Python, Streamlit, Pandas, NumPy, Matplotlib, Plotly, Selenium, and BeautifulSoup.
● All tools and libraries required for data scraping, processing, and visualization are open-source and compatible with standard operating systems.
● The job scraping process can run on any system with a modern browser (Chrome/Firefox) and stable internet connectivity.
● Hardware requirements are minimal, with the system able to run smoothly on a standard computer with 4–8 GB RAM.
● The dashboard can be deployed on cloud platforms like Streamlit Cloud, Heroku, or local servers without advanced infrastructure.
● Hence, the system is **technically feasible** and can be implemented using easily accessible resources.

4.1.2 Economic Feasibility

● All technologies and libraries used in the project are **free and open-source**, eliminating licensing or subscription costs.
● Data scraping and visualization do not require any paid APIs or external services.
● The development and maintenance cost of the system is minimal, making it economically viable for students, institutions, and organizations.
● Since no specialized hardware is required, operational expenses remain low.
● Compared to manual data analysis efforts, the automated dashboard significantly reduces time and labor costs.

● Thus, the system is **economically feasible** with very low development and operational expenses.

4.1.3 Operational Feasibility

● The proposed dashboard is user-friendly, with simple navigation and clear visualizations that require no technical expertise to operate.
● Job seekers, students, and recruiters can easily use the system to explore hiring trends and make informed decisions.
● The dashboard integrates both static dataset analysis and optional live scraping, providing flexibility for different users.
● Since the system automates time-consuming tasks like data cleaning, trend analysis, and visualization, it greatly reduces manual effort.
● Institutions can use the dashboard for placement training, skill development planning, and industry trend analysis.
● Therefore, the system is **operationally feasible**, practical to adopt, and easy for end-users to understand and utilize.

CHAPTER 5

SYSTEM REQUIREMENT SPECIFICATION

The System Requirements Specification (SRS) document outlines the functional and nonfunctional requirements for the Job Market Analysis System. It provides a detailed description of the system's behavior, functionalities, and limitations. The system is developed using Python and data science libraries to analyze and evaluate Job data effectively.

5.1 Functional Requirements

1. Data Scraping

- The system should scrape job postings from supported job portals.
- It should extract job title, company name, location, skills, experience, and posting date.

2. Data Preprocessing

- Clean and standardize raw job data.
- Remove duplicates, empty entries, and inconsistent labels.
- Convert skills and experience values into readable formats.

3. Dashboard Navigation

- Provide different modes: Home, City-wise Analysis, All India Analysis, Compare Two Cities, Job Map, and Live Scraping.
- Allow users to switch between datasets (Excel / Live Scraped Data).

4. Visualization & Trend Analysis

- Generate bar charts, pie charts, line charts, treemaps, boxplots, and word clouds to analyze job roles, companies, skills, and experience-level trends across cities and nationwide.

5. Interactive Job Map

- Display top job roles and job availability across major Indian cities using an interactive India map for geographical trend analysis.

5.2 Non Functional Requirements

1. Performance

- The dashboard should load data and generate visualizations within a few seconds.
- Scraping should run efficiently without crashing.

2. Usability

- The interface must be user-friendly and easy for non-technical users.
- Visualizations should be clear, readable, and well-organized.

3. Reliability

- The system should run without errors and recover gracefully from invalid inputs.
- Scraping should handle slow internet or missing HTML elements safely.

4. Scalability

- The system should handle large datasets without performance degradation.
- Should allow adding new job portals in the future.

5. Maintainability

- The code must be modular, readable, and easy to update.
- Visual components and scraping functions should be reusable.

6. Compatibility

- The system should run on Windows, Linux, and macOS.
- Support multiple browsers for Selenium-based scraping.

5.3 Hardware & Software Requirements

5.3.1 Hardware Requirements

- A computer or laptop with minimum **4 GB RAM** (8 GB recommended).

- **Dual-core processor** or higher (i3/i5/i7 or equivalent).
- **10 GB free disk space** for dataset storage, logs, and temporary scraping files.
- Stable **internet connection** for scraping and visualization updates.

5.3.2 Software Requirements

- **Operating System:** Windows 10/11, Linux, or macOS
- **Text Editor :** Visual Studio Code
- **Browser (for UI):** Chrome / Edge / Firefox (latest)

CHAPTER 6

TOOLS AND TECHNOLOGIES USED

6.1 Technologies Used

6.1.1 PYTHON

Fig 6.1

6.1.1.1 What is python?

Python is a high-level, interpreted, and object-oriented programming language known for its simplicity and readability. Its dynamic typing, built-in data structures, and support for modular programming make it ideal for rapid application development. Python allows the use of modules and packages, making programs easy to structure and reuse. The Python interpreter and standard library are freely available across all major platform

6.1.2 PANDAS

Fig. 6.2

6.1.2.1 What is Pandas?

Pandas is one of the most widely used Python libraries for data manipulation and data analysis. It provides powerful tools to handle structured datasets efficiently and is a core component of the Python data science ecosystem. It provides specialized data structures—mainly Series and DataFrame—designed to handle tabular, time-series, and statistical data.The name “pandas” comes from panel data, reflecting its ability to work with multidimensional datasets.

6.1.3 Selenium

Fig. 6.3

6.1.3.1 What is Selenium?

Selenium is an open-source automation tool used for web browser automation. In this project, Selenium is used to automatically open job portals, load dynamic webpages, and extract job postings in real time. It helps scrape data from websites that use JavaScript to display content, which cannot be captured through simple HTML requests. Selenium plays a key role in the live scraping feature of the dashboard by collecting job titles, company names, skills, experience levels, and locations directly from the browser.

6.1.4 BeautifulSoup

Fig.6.4

6.1.4.1 What is BeautifulSoup?

BeautifulSoup is a Python library used for parsing HTML and XML documents. It extracts specific elements such as job titles, skills, companies, and locations from a webpage in a structured and readable format. In this project, BeautifulSoup is used to process the HTML content obtained through web scraping and identify important job details accurately. It makes it easy to navigate, search, and extract data from complex webpage structures, helping convert raw HTML into clean, usable information for analysis.

6.1.5 ECharts (via streamlit-echarts)

Fig. 6.5

6.1.5.1 what is ECharts (via streamlit-echarts)?

ECharts is a powerful open-source JavaScript visualization library developed by Apache. It is used to create highly interactive and visually rich charts such as bar charts, pie charts, line charts, treemaps, and boxplots. In this project, ECharts is integrated through the streamlit-echarts plugin, allowing these advanced visualizations to be displayed directly inside the Streamlit dashboard. This helps present job market data in a dynamic and user-friendly way, improving analysis and decision-making.

6.1.6 Plotly & Matplotlib

Fig.6.6

6.1.6.1 What is Plotly & Matplotlib?

Plotly and **Matplotlib** are Python visualization libraries used to create graphical representations of job market data.

Plotly is an interactive plotting library that enables dynamic visualizations such as scatter plots, bar charts, and interactive maps. In this project, it is used to generate the India-wide job map and other charts that allow users to zoom, hover, and explore data interactively.

Matplotlib is a widely used static visualization library that helps create word clouds, line plots, and other basic charts. It provides precise control over graphical elements and supports visual representations needed for skill and job trend analysis.

Together, Plotly and Matplotlib help present insights in an easy-to-understand graphical format, supporting better interpretation of job data.

6.2 TOOLS AND EDITORS USED

6.2.1 VSCODE

Fig. 6.7

6.2.2.1 What is VScode?

Visual Studio Code (VS Code) is a lightweight yet powerful open-source code editor developed by Microsoft. It works on Windows, macOS, Linux, and even web browsers. VS Code supports debugging, syntax highlighting, IntelliSense, code refactoring, Git integration, and a wide range of extensions, making it one of the most popular development tools today.

6.2.2 IDLE

6.2.3.1 What Is Python Idle?

IDLE is a built-in Python IDE that provides a straightforward environment for writing and executing Python programs. It requires no additional installation, making it convenient for first-time learners and advanced users alike.

6.2.3STREAMLIT

Fig 6.8

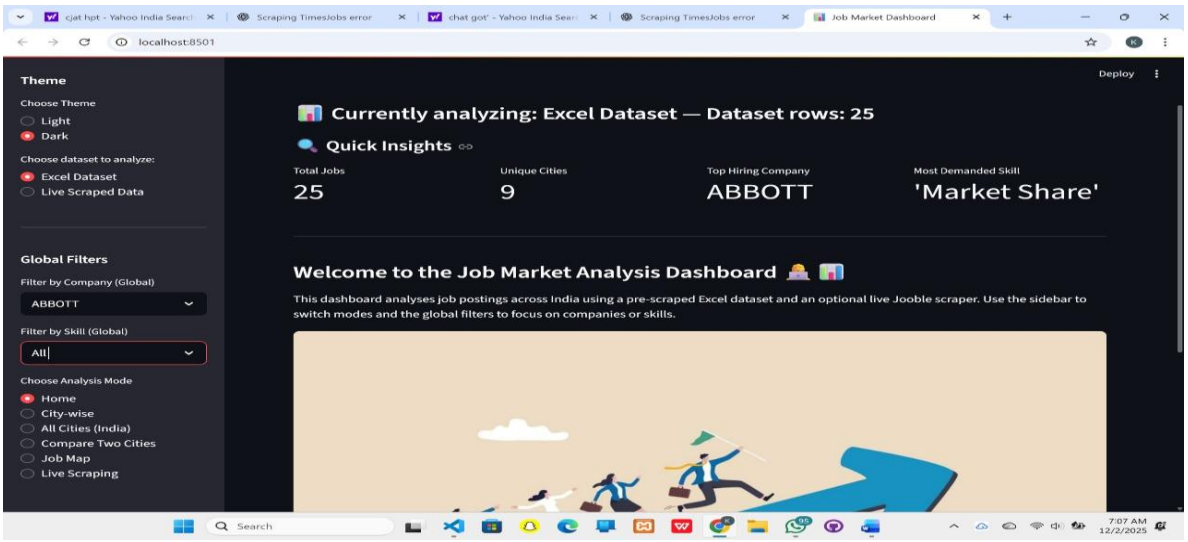
6.2.5.1 What is Streamlit

Streamlit is an open-source Python library that turns Python scripts into interactive web applications. By writing a simple Python script, users can create dashboards, data apps, and ML prototypes. Streamlit automatically refreshes the app whenever a user interacts with it and runs on a local server that opens in a web browser.

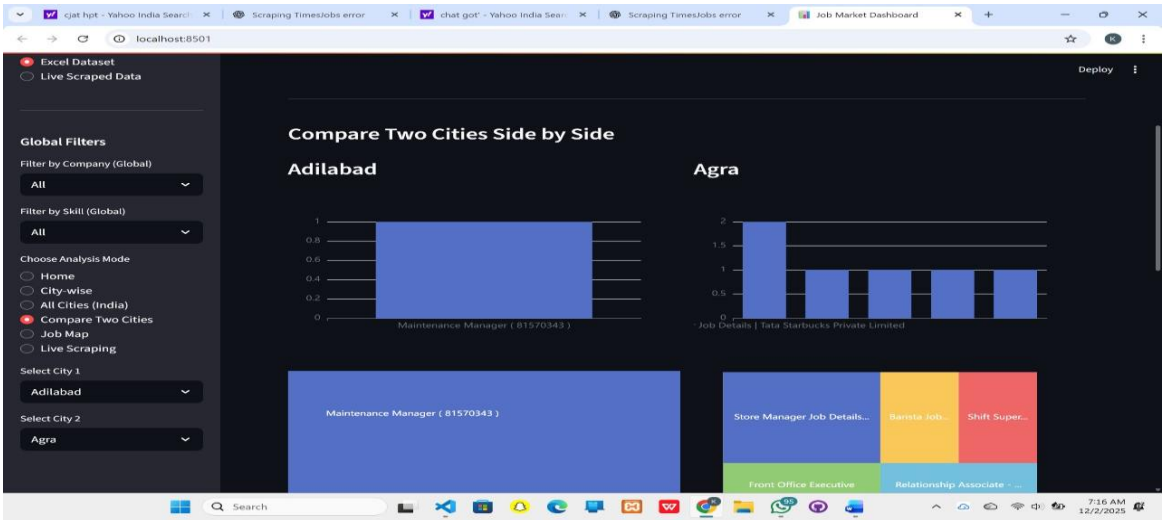
CHAPTER 7

SCREENSHOTS

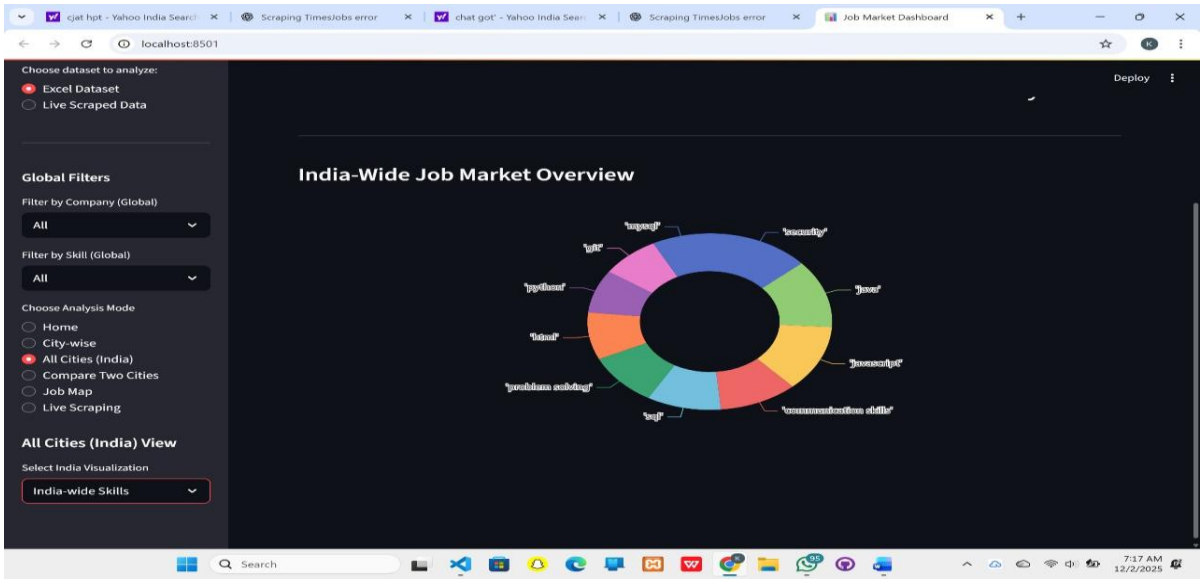
1. Home Screen : Home page showing the Qucik insights .



2. Features : Screen displaying main features like options and visualization etc



3. Visuliaization: Visulaization of Job Trends in india across all cities


Job Market Dashboard
localhost:8501
Choose dataset to analyze:
Excel Dataset
Live Scraped Data
Global Filters
Filter by Company (Global)
All
Filter by Skill (Global)
All
Choose Analysis Mode
Home
City-wise
All Cities (India)
Compare Two Cities
Job Map
Live Scraping
All Cities (India) View
Select India Visualization
India-wide Skills
Deploy
India-Wide Job Market Overview
'mysql'
'security'
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'javascript'
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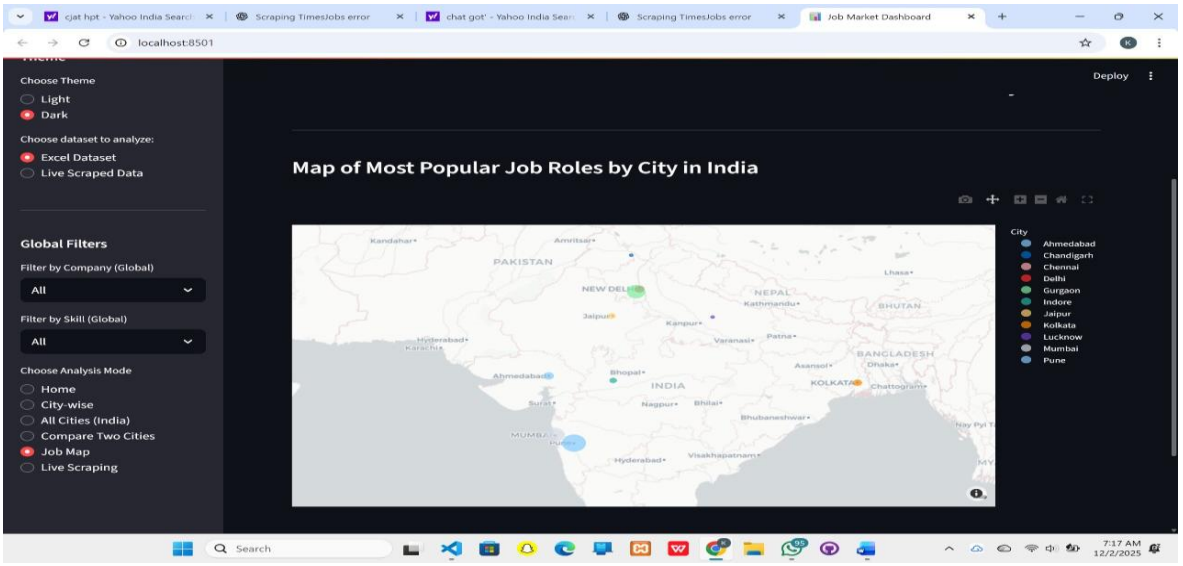
'communication skills'
'sql'
Search
7:17 AM
12/2/2025

4. Job Map:


Job Market Dashboard
localhost:8501
Choose Theme
Light
Dark
Choose dataset to analyze:
Excel Dataset
Live Scraped Data
Global Filters
Filter by Company (Global)
All
Filter by Skill (Global)
All
Choose Analysis Mode
Home
City-wise
All Cities (India)
Compare Two Cities
Job Map
Live Scraping
Deploy
Map of Most Popular Job Roles by City in India
City
Ahmedabad
Chandigarh
Chennai
Delhi
Gurgaon
Indore
Jaipur
Kolkata
Lucknow
Mumbai
Pune
PAKISTAN
NEPAL
BHUTAN
BANGLADESH
INDIA
Search
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CHAPTER 8

SYSTEM TESTING

8.1 Introduction to Testing

Testing ensures that the Job Market Analysis Dashboard works correctly across all modules—data loading, city-wise analytics, India-wide trends, visualization generation, live job scraping, and interactive maps. It verifies that the system produces accurate insights, handles different datasets without errors, and provides a smooth user experience across all features.

8.2 Testing Strategies Used

- **White Box Testing** – Internal code logic for data cleaning, filtering, scraping, and visualization generation was tested, including condition checks, loops, and data transformations.
- **Black Box Testing** – Focused on inputs (Excel dataset, scraped data, city selections) and outputs (charts, tables, word clouds, and insights) without checking internal code structure.
- **Real-World Testing** –Live job scraping was tested using Selenium on actual job portals, ensuring the system can handle dynamic content and different formats of job listings.

8.3 Testing Scenarios

- Testing with different cities (Bangalore, Pune, Mumbai, Delhi, etc.)
- Testing with complete dataset and small filtered subsets
- Testing India-wide visualizations
- Testing city comparison with different combinations
- Testing live scraping from job portals with multiple pages
- Testing visualization behavior on low or uneven data

8.4 Output Validation

- Verified charts (bar, pie, line, treemap, map) for accuracy
- Cross-checked scraped data with actual job postings
- Ensured data filtering shows correct city-wise results
- Confirmed no application crash even with missing fields
- Validated wordcloud accuracy by checking frequency calculation
- Ensured map coordinates match actual city locations
- Verified session state functionality for scraped data persistence

8.6 Conclusion

After thorough unit, functional, integration, and live scraping tests, the **Job Market Analysis Dashboard** is:

✓ Accurate in representing job market trends

✓ Stable across all analysis modes

✓ Reliable in handling both Excel and live scraped data

✓ Capable of generating meaningful visual insights

✓ User-friendly and robust even with large datasets

✓ Ready for real-world deployment in educational, research, or analysis environments

The system has been fully validated and is suitable for analytical use by students, job seekers, and researchers.

CHAPTER 9

CONCLUSION AND FUTURE SCOPE

9.1 Conclusion

The **Job Market Analysis Dashboard** successfully demonstrates the capability of data analytics and interactive visualization in understanding recruitment trends across India. Developed using **Python, Pandas, Streamlit, Selenium, BeautifulSoup, Plotly, Matplotlib, and ECharts**, the system provides a user-friendly platform to analyze job availability, skill demand, experience requirements, and hiring patterns across major Indian cities.

The dashboard allows users to explore **city-wise insights**, understand **India-wide job trends**, compare **two cities side-by-side**, and visualize job roles using an **interactive map**. It also supports **live job scraping**, enabling real-time data collection from job portals for up-to-date analysis.

The system minimizes manual data collection, provides actionable insights, helps job seekers identify in-demand skills, and supports analysts and students in understanding employment patterns. With accurate visualizations, smooth navigation, and clean UI, the dashboard is a reliable tool for job market analytics and research.

9.2 Future Scope

The project offers strong potential for expansion with more advanced analytical and automation features:

- **Add Machine Learning Models**
Predict job demand, trending skills, future hiring needs, and salary expectations using predictive analytics.

- **Integration with Multiple Job Portals**
Scrape jobs from Naukri, Indeed, LinkedIn Jobs, Monster, and Shine to create a richer, multi-source dataset.

● **Real-Time Market Alerts**

Send notifications or email alerts when new jobs matching selected skills or cities appear online.

● **Skill Gap Analysis Module**

Compare job seeker skills vs. market demand and recommend courses or training programs.

● **Sentiment & Description Analysis**

Use NLP to analyze job descriptions and extract detailed skill clusters, responsibilities, and job trends.

● **Interactive Global Job Map**

Expand the dashboard to visualize job markets across countries and compare regions.

● **Automated Monthly Reports**

Generate PDF dashboards summarizing hiring trends, top companies, top skills, and city-wise demand.

● **Cloud Deployment**

Host the dashboard on AWS, Streamlit Cloud, or Azure to make it public for students, recruiters, or researchers.

With these enhancements, the system can evolve into a **complete AI-powered Job Market Intelligence Platform**, helping job seekers, institutions, and organizations better understand and navigate employment trends across India.

REFERENCES

1. **TimesJobs Job Portal** – Used as the primary source for job listings dataset and job scraping.
   https://www.timesjobs.com
2. **Jooble Job Portal** – Used for alternative job scraping and verification of job market trends.
   https://in.jooble.org
3. **Python Documentation** – Official reference for Python syntax, modules, and standard libraries.
   https://docs.python.org
4. **Pandas Documentation** – Used for data cleaning, transformation, and preprocessing.
   https://pandas.pydata.org
5. **Streamlit Documentation** – Used for building the interactive dashboard and user interface.
   https://docs.streamlit.io
6. **Selenium WebDriver Documentation** – Used for browser automation and real-time job scraping.
   https://www.selenium.dev
7. **BeautifulSoup (bs4) Documentation** – Used for HTML parsing and extracting job details from scraped pages.
   https://www.crummy.com/software/BeautifulSoup
8. **Plotly Python Documentation** – Used for interactive charts and map visualizations.
   https://plotly.com/python
9. **Matplotlib Documentation** – Used for additional static visualizations and word cloud plots.
   https://matplotlib.org
10. **Apache ECharts Documentation** – Used for advanced interactive visualizations through Streamlit.
    https://echarts.apache.org
11. **WordCloud Library** – Used for generating skill-based word clouds.
    https://amueller.github.io/word_cloud
12. Research papers, articles, online tutorials related to web scraping