HR Employees Recruitment Prediction Dashboard (Humanlytics)

Technical Report

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ABSTRACT

This innovative initiative aims to design and implement a user-friendly dashboard tailored for HR professionals and recruiters, offering real-time insights and analytics to optimize recruitment processes. The project encompasses requirements gathering, dashboard design, development, analytics integration, thorough testing, documentation, and deployment. By consolidating data from various sources, the dashboard aims to provide comprehensive visualizations of key HR metrics, fostering data-driven decision-making. The project's objectives include enhancing user experience, promoting internal mobility through an internal job marketplace, and ensuring data security and regulatory compliance. With a dedicated team of developers, designers, and data analysts, the project is set to be completed within a four-month timeline, adhering to predefined milestones and deliverables. Governance mechanisms, communication strategies, risk identification, and mitigation plans are integral components of the project management framework. Upon successful completion, the HR dashboard will be formally closed, having met acceptance criteria and provided the necessary training and documentation for seamless integration into HR operations.

1- Introduction

In response to the growing need for more efficient HR practices, our HR Dashboard Development project aims to introduce a user-friendly dashboard tailored for HR professionals and recruiters. This initiative comes at a crucial time when organizations seek innovative solutions to enhance their recruitment processes. The dashboard, a culmination of insights from employee engagement, retention rates, performance evaluations, diversity statistics, and more, is poised to redefine how organizations analyze and interpret crucial HR data. By centralizing HR metrics, our platform promises a holistic view of an organization's workforce dynamics. The project's realistic objectives include creating an interface that aligns with user needs, consolidating data from multiple sources, implementing analytics for recruitment KPIs, fostering internal mobility through an internal job marketplace, and ensuring data security and regulatory compliance. With a dedicated team of developers, designers, and data analysts, we are confident that this project will provide actionable insights and contribute significantly to data-driven decision-making in HR operations.

2- Triangle Model

Our HR Dashboard Development project adopts a robust triangular model, integrating three key components for a comprehensive solution. For the frontend, we leverage a modern and user-friendly interface, utilizing technologies such as VS Code and Streamlit to ensure an intuitive user experience. The backend is powered by Python, facilitating efficient data processing and management. Firebase serves as our database, offering a secure and scalable storage solution for HR-related data. This choice aligns with our commitment to data security and real-time accessibility. At the forefront of our project is the AI model, where we harness the power of GPT-3.5 for intelligent data analysis and interpretation. The successful connection of these three components, each playing a vital role in the project architecture.

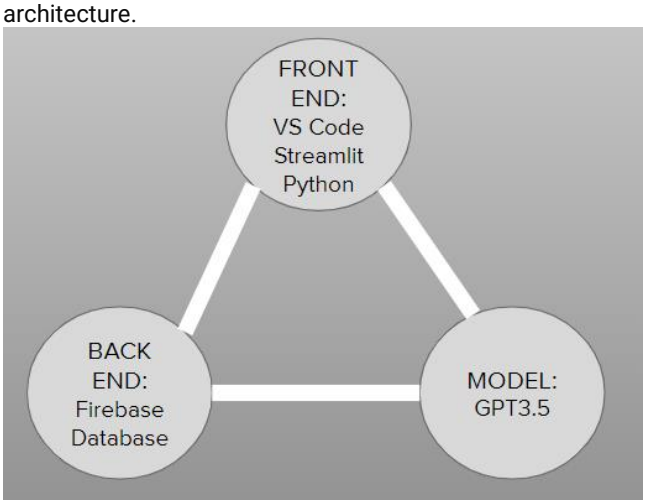


Figure 1.
In this figure1 it shows all the components we are using.

3. DATASET

The acquisition of company datasets, comprising both structured and unstructured formats, stands as a pragmatic cornerstone in the development of our HR Dashboard. The structured datasets, containing detailed information such as company names, locations, employee counts, and essential

HR metrics, provide a solid foundation for our analytics and visualizations. These datasets, collected from diverse industries, reflect the realistic intricacies of workforce data in various organizational settings. Simultaneously, unstructured datasets, capturing textual nuances related to HR activities, present an opportunity for our AI model, GPT-3.5, to clean valuable insights. The realistic inclusion of a range of companies, each with its unique characteristics and challenges, ensures that our dashboard is tailored to real-world scenarios, accommodating the complexities and diversities inherent in HR operations.

company	location	industry	total_laid_off	percentage_laid_off	date	stage	country	funds_raised
New Work	Hamburg	Consumer	400		2024-01-11	Post-IPO	Germany	
Playtika	Tel Aviv	Consumer	300	0.1	2024-01-11	Post-IPO	Israel	
Discord	SF Bay Area	Consumer	170	0.17	2024-01-11	Series H	United States	995
Inmobi	Bengaluru	Marketing	125	0.05	2024-01-11	Unknown	India	320
Audible	New York City	Media	100	0.05	2024-01-11	Acquired	United States	14
Sisense	New York City	Data	60	0.13	2024-01-11	Series F	United States	274
Google	SF Bay Area	Consumer	1000		2024-01-10	Post-IPO	United States	26
Beam Benefits	Columbus	Healthcare	74		2024-01-10	Series E	United States	168
Instagram	SF Bay Area	Consumer	60		2024-01-10	Acquired	United States	57
Amazon	Seattle	Retail			2024-01-10	Post-IPO	United States	108
ChargePoint	SF Bay Area	Manufacturing		0.12	2024-01-10	Unknown	United States	1400
[illegible]	Miami	Infrastructure		0.12	2024-01-10	Acquired	United States	20
[illegible]FI	SF Bay Area	Finance		0.04	2024-01-10	Post-IPO	United States	3000
Twitch	SF Bay Area	Consumer	500	0.35	2024-01-09	Acquired	United States	35
Branch	Columbus	Finance	85		2024-01-09	Series C	United States	229
Nevro	SF Bay Area	Healthcare	63	0.05	2024-01-09	Post-IPO	United States	556
Uber Freight	SF Bay Area	Logistics	40		2024-01-09	Subsidiary	United States	2700
Rent the Runway	New York City	Retail	37	0.1	2024-01-09	Post-IPO	United States	526
Humane	SF Bay Area	Hardware	10	0.04	2024-01-09	Series C	United States	230
Trend Micro	Tokyo	Security		0.02	2024-01-09	Unknown	Japan	
Unity	SF Bay Area	Other	1800	0.25	2024-01-08	Post-IPO	United States	1300
NuScale Power	Corvallis	Energy	154	0.28	2024-01-08	Post-IPO	United States	470
Pitch	Berlin	Other	80	0.67	2024-01-08	Series B	Germany	138

Figure 2

In figure 2 it is showing the raw data of the layoff.

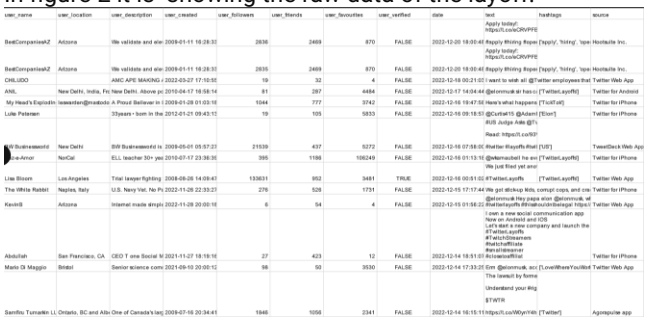


Figure 3

In figure 3 it is showing the raw data we have collected from the employees tweets.

3.1 DATA PRE-PROCESSING

For better visualization and analysis we extract some information from the data set and also rename some columns we have performed these steps shown below.

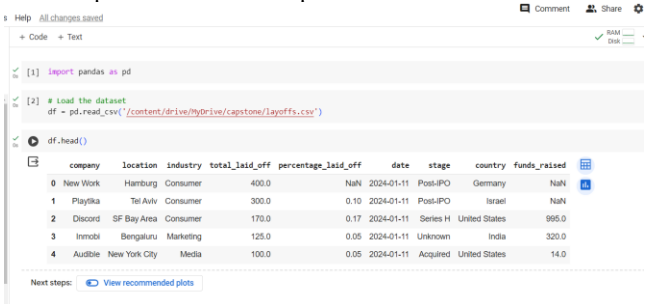


Figure 4

In figure 4 we perform the Column Removal. This approach simplifies the dataset by removing attributes that are irrelevant to the investigation, boosting model performance, and increasing interpretability.

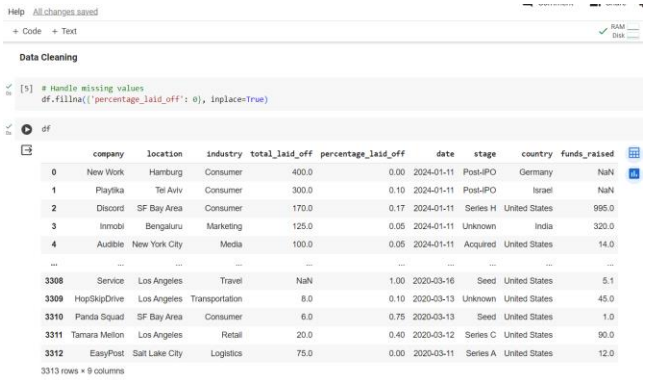
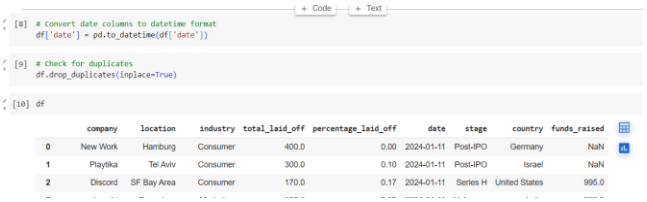


Figure 5

In figure 5 we perform the Column renaming. This clarifies the dataset and assists users in understanding the purpose and substance of each attribute.

In figure 6 we are dealing with *NaN* or *null* values in the dataset. To maintain data quality and analytical accuracy, common procedures include imputation (replacing missing values with estimates), eliminating rows or columns with missing values, or specific treatment based on the context.

Figure 6



Data Type Identification: Recognizing the data type (e.g., integer, float, string) of each column is critical for selecting appropriate data transformation techniques, dealing with categorical variables, and ensuring compatibility with analysis or modeling algorithms as shown in figure 6.

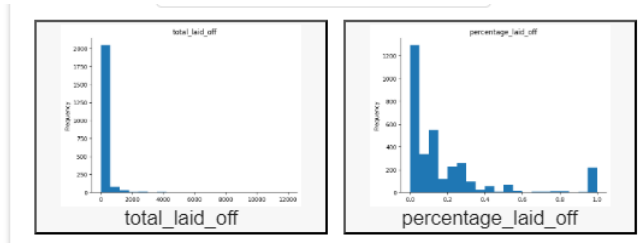


Figure 7

In our HR Dashboard, we've implemented two insightful graphs to provide a comprehensive view of workforce dynamics. The first graph elegantly illustrates the percentage of layoffs, offering a visual representation of the proportion of employees affected. This metric is crucial for understanding the relative impact on different departments or organizational levels. The second graph, focusing on the total number of layoffs, offers a tangible figure, providing a quantitative perspective on the extent of workforce changes. Together, these graphs empower HR professionals with valuable insights into workforce restructuring, facilitating strategic decision-making and proactive management of organizational changes.

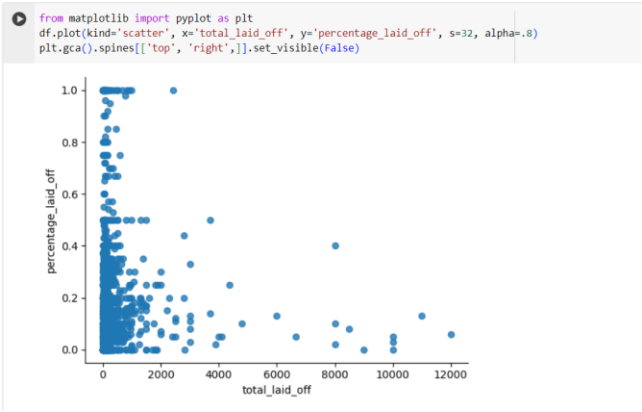


Figure 8

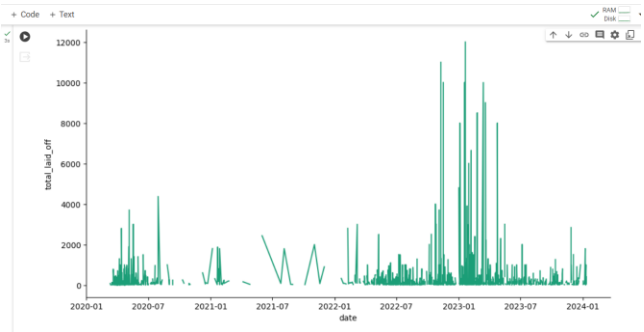


Figure 9

In figure 9 the graph depicting the total layoffs from 2020 to 2024 serves as a dynamic temporal visualization, offering a chronological overview of workforce changes over the specified period. This graph provides HR professionals with a comprehensive historical perspective, enabling them to identify trends, patterns, and potential correlations with external factors such as economic fluctuations or organizational shifts. The plotted data facilitates the analysis of long-term workforce dynamics, helping stakeholders make informed decisions based on historical context. This graphical representation proves instrumental in understanding the trajectory of workforce changes, supporting strategic planning, and fostering a proactive approach to human resource management. A pivotal moment in the pandemic, as numerous U.S. school districts initiated the transition to online learning. This shift in educational delivery transformed the daily routines and mobility patterns of students, parents, and educators.

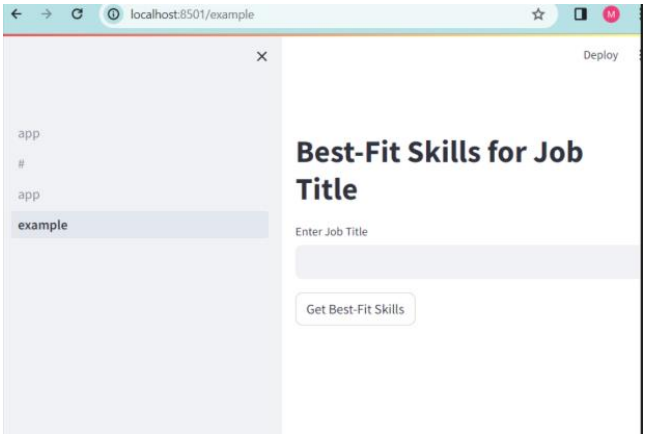


Figure 10

The integration of a user-friendly front-end feature, where applicants input their skills to receive tailored job recommendations, marks a significant advancement in our HR Dashboard. This innovative interface not only streamlines the job application process but also enhances the user experience by providing personalized and relevant job matches. Applicants can enter their skill sets, and the system, powered by advanced algorithms, swiftly matches their qualifications with available job opportunities. This dynamic front-end functionality not only empowers applicants to find roles that align with their expertise but also facilitates a more efficient and targeted recruitment process for HR professionals. This user-centric approach reinforces the dashboard's commitment to improving accessibility and engagement, ultimately fostering a more seamless connection between job seekers and potential employers.

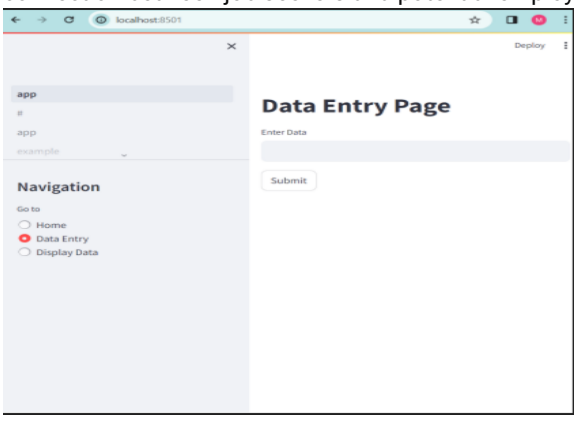


Figure11

In figure 11 it showed the incorporation of a data entry box on the front end, seamlessly connected to our backend database using Firebase, enhances the functionality and versatility of our HR Dashboard. This feature allows for the easy and efficient input of new data directly from the user interface, eliminating the need for complex data entry processes. The entered data, encompassing various HR metrics and information, is securely stored in our Firebase backend, ensuring real-time accessibility and centralized management.

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