# **Exploratory Data Analysis (EDA) Report: Layoffs Dataset**

**1. Data Cleaning Summary**

In the initial phase of this analysis, a thorough data cleaning process was conducted to ensure the accuracy and reliability of the dataset. Below were some actions performed during the cleaning process:

* **Duplicate Removal**: Identified and removed 5 duplicate records. Duplicate entries can lead to misleading insights, particularly when calculating sums and averages.
* **Handling Missing Values**:
  + Blank cells in the dataset were handled on a case-by-case basis. For categorical fields like the 'Industry' column, missing values were filled based on logical assumptions. For example, companies such as **Airbnb**, which is widely recognized as operating within the travel sector, had their industry fields filled as 'Travel'.
  + Rows containing NULL values in key numerical columns like ‘total\_laid\_off’ and ‘percentage\_laid\_off’ were removed. This was done to maintain the reliability analysis, as these columns are crucial for calculating trends and sum totals.
* **Data Standardization**:
  + Corrected inconsistencies in spelling, such as variations in company names, industry labels, location names, and country names.
  + Applied the ‘**trim function’** to clean up excess spaces in fields, ensuring that all text-based fields were free of leading or trailing spaces.
  + Removed ‘null’ values in the ‘date’ to enable grouping of the dates for accurate analysis.

**2. Exploratory Data Analysis (EDA) Questions Addressed**

The main objective of this analysis was to explore trends within the layoffs dataset between 2020 and 2023. Using pivot tables in Excel, several key questions were addressed to uncover patterns in employee layoffs across various companies, industries, and countries.

* **Highest number of employees laid off at once**:

|  |
| --- |
| **Highest number of employees laid off at once** |
| **Max of total\_laid\_off** |
| 12,000 |

* + The data was analyzed to identify the single largest layoff event which was 12,000 employees.
* **Total number of companies with 100% layoff**:

|  |  |
| --- | --- |
| **Total number of companies with 100% layoff** | |
| percentage\_laid\_off | 1 |
|  |  |
| **Row Labels** | **Max of percentage\_laid\_off** |
| Ahead | 1 |
| Airlift | 1 |
| Airy Rooms | 1 |
| Amplero | 1 |
| Arch Oncology | 1 |
| Assure | 1 |
| Atsu | 1 |
| Aura Financial | 1 |
| Automatic | 1 |
| Awok | 1 |
| BeyondMinds | 1 |
| Bitfront | 1 |
| BlockFi | 1 |
| Bluprint | 1 |
| Bridge Connector | 1 |
| Britishvolt | 1 |
| Brodmann17 | 1 |
| Butler Hospitality | 1 |
| Buy.com / Rakuten | 1 |
| CommonBond | 1 |
| Consider.co | 1 |
| Crejo.Fun | 1 |
| Dark | 1 |
| Deliv | 1 |
| Deliveroo Australia | 1 |
| Digital Surge | 1 |
| Dotscience | 1 |
| DUX Education | 1 |
| Earth Rides | 1 |
| Eatsy | 1 |
| Edmodo | 1 |
| Ejento | 1 |
| EMX Digital | 1 |
| Engine eCommerce | 1 |
| Fast | 1 |
| Faze Medicines | 1 |
| Fifth Season | 1 |
| Fipola | 1 |
| Flux Systems | 1 |
| Gavelytics | 1 |
| GloriFi | 1 |
| GoNuts | 1 |
| GoodGood | 1 |
| Halcyon Health | 1 |
| Haus | 1 |
| Help.com | 1 |
| HOOQ | 1 |
| Hubba | 1 |
| HubHaus | 1 |
| JetClosing | 1 |
| Jump | 1 |
| Kandela | 1 |
| Kaodim | 1 |
| Katerra | 1 |
| Kite | 1 |
| Kitty Hawk | 1 |
| Kune | 1 |
| Lantern | 1 |
| Lido Learning | 1 |
| Limelight | 1 |
| Locomation | 1 |
| Lora DiCarlo | 1 |
| Lumina Networks | 1 |
| Madefire | 1 |
| Masse | 1 |
| Medly | 1 |
| Metigy | 1 |
| Mode Global | 1 |
| Motif Investing | 1 |
| Nirvana Money | 1 |
| Nuri | 1 |
| Openpay | 1 |
| Ozy Media | 1 |
| Pastel | 1 |
| Perceptive Automata | 1 |
| Pesto | 1 |
| PicoBrew | 1 |
| Planetly | 1 |
| Playdots | 1 |
| Pocketmath | 1 |
| Pollen | 1 |
| Popin | 1 |
| Propzy | 1 |
| Protocol | 1 |
| Purse | 1 |
| Qin1 | 1 |
| Quibi | 1 |
| Reali | 1 |
| Rubica | 1 |
| SEND | 1 |
| Service | 1 |
| ShopX | 1 |
| Simple | 1 |
| Simple Feast | 1 |
| Soluto | 1 |
| Sorabel | 1 |
| Stay Alfred | 1 |
| Stockwell AI | 1 |
| Stoqo | 1 |
| Subspace | 1 |
| SummerBio | 1 |
| SuperLearn | 1 |
| The Grommet | 1 |
| The Modist | 1 |
| The Wing | 1 |
| TutorMundi | 1 |
| Udayy | 1 |
| Volt Bank | 1 |
| WanderJaunt | 1 |
| Wavely | 1 |
| WeFit | 1 |
| WeTrade | 1 |
| Wyre | 1 |
| Yabonza | 1 |
| YourGrocer | 1 |
| 115 |  |

* + Filtered the dataset to isolate companies where the percentage\_laid\_off was equal to 100%. There were 115 companies.
* **Top 10 companies with the most funds raised**:

|  |  |
| --- | --- |
| **Top 10 companies by funds raised** | |
| **Row Labels** | **Sum of funds\_raised\_millions** |
| Netflix | $487,600 |
| Uber | $123,500 |
| WeWork | $65,700 |
| Twitter | $38,700 |
| ByteDance | $35,600 |
| Delivery Hero | $26,500 |
| Meta | $26,000 |
| Rivian | $24,500 |
| Tesla | $20,200 |
| Ola | $18,800 |

* + Ranked companies based on the total amount of funding raised. This analysis was crucial for understanding which companies, despite high levels of investment, still had to resort to mass layoffs.
* **Rolling total of layoffs between 2020-2023**:

|  |  |  |
| --- | --- | --- |
| **Rolling total of layoff (2020 - 2023)** | | |
| **Row Labels** | **Sum of total\_layoff** | **Rolling\_total** |
| **2020** | **80,998** | **80,998** |
| **2021** | **15,823** | **96,821** |
| **2022** | **160,661** | **257,482** |
| **2023** | **125,677** | **383,159** |

* + Created a rolling total of layoffs year-over-year to visualize how layoffs accumulated over time.
* **Top 10 industries with the most layoffs**:

|  |  |
| --- | --- |
| **Top 10 industries with the most layoff** | |
| **Row Labels** | **Sum of total\_laid\_off** |
| Consumer | 44,782 |
| Retail | 43,613 |
| Other | 38,689 |
| Transportation | 31,248 |
| Finance | 28,344 |
| Healthcare | 25,953 |
| Food | 22,855 |
| Real Estate | 17,565 |
| Travel | 17,159 |
| Hardware | 13,828 |

* + Grouped the data by industry to determine which sectors experienced the most layoffs. This analysis helped identify industries particularly vulnerable to workforce downsizing.
* **Top 10 countries with the most layoffs**:

|  |  |
| --- | --- |
| **Top 10 countries with the most layoff** | |
| **Row Labels** | **Sum of total\_laid\_off** |
| United States | 256,059 |
| India | 35,993 |
| Netherlands | 17,220 |
| Sweden | 11,264 |
| Brazil | 10,391 |
| Germany | 8,701 |
| United Kingdom | 6,398 |
| Canada | 6,319 |
| Singapore | 5,995 |
| China | 5,905 |

* + Analyzed layoffs by country to understand how workforce reductions were distributed globally.
* **What year did the most layoffs take place**:

|  |  |
| --- | --- |
| **What year did the most layoff happen?** | |
| **Row Labels** | **Sum of total\_laid\_off** |
| 2020 | 80,998 |
| 2021 | 15,823 |
| 2022 | 160,661 |
| 2023 | 125,677 |

* + Identified the year with the highest total number of layoffs across all industries.

**3. Analysis Highlights**

Based on the exploratory data analysis, several key findings were uncovered that shed light on the dynamics of layoffs between 2020 and 2023:

* **Top Industries by Layoffs**:
  + The ‘consumer industry’ saw the largest number of employees laid off during this period.
* **Top Countries by Layoffs**:
  + The country with the largest number of layoffs was the United States, which faced significant workforce reductions across multiple industries.
* **Largest Layoff Event**:
  + The largest single layoff event involved 12,000 employees at once.
* **Total Companies with 100% Layoff**:
  + A total of 115 companies experienced a complete layoff of their workforce, reflecting extreme cases where companies were unable to continue operations.
* **Rolling Total of Layoffs (2020-2023)**:
  + The rolling total analysis showed that layoffs peaked in 2022.

**Conclusion**

The exploratory data analysis of layoffs between 2020 and 2023 has provided valuable insights into the dynamics of workforce reductions across various industries and countries. Through thorough data cleaning and pivot table analysis, I was able to identify key trends, including the industries and countries most affected by layoffs, the companies that raised the most funds but still had layoffs, and the timing of major layoff events. These findings can help inform decision-making and future analysis related to employment trends and economic conditions.